Sydney Metro West
Westmead to The Bays and Sydney CBD

Amendment Report

Concept and Stage 1

2020

Cover: An artist's impression of Parramatta Station.

Glossary

	Definitions
AEP	Annual exceedance probability
AHD	Australian Height Datum
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	Environmental Planning and Assessment Regulation 2000
LEP	Local Environmental Plan
NCA	Noise catchment area
NML	Noise management level
PMF	Probable maximum flood
Proposed amendments	The proposed amendments to the project described in the *Sydney Metro West Westmead to the Bays and Sydney CBD – Environmental Impact Statement* (2020a)
SEPP	State Environmental Planning Policy
SHR	State Heritage Register
Stage 1	Stage 1 of the works for Sydney Metro West – all major civil construction works between Westmead and The Bays including station excavation and tunnelling
The Concept	Sydney Metro West – the construction and operation of a metro rail line, around 24 kilometres long, between Westmead and Sydney CBD

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Contents

List of Tables

List of Figures

Executive summary

Overview

Sydney is expanding and the NSW Government is working to deliver an integrated transport system that meets the needs of customers now and in the future. The delivery of Sydney Metro West is critical to keeping Sydney moving and is identified in a number of key strategic planning documents including the *Greater Sydney Region Plan: A Metropolis of Three Cities – connecting people* (Greater Sydney Commission, 2018), *Building Momentum: State Infrastructure Strategy 2018-2038* (Infrastructure NSW, 2018), and the *Future Transport 2056* strategy (Transport for NSW, 2018).

Sydney Metro is Australia's biggest public transport program. Services on Stage 1 of the network between Rouse Hill and Chatswood started in May 2019 on this new stand-alone metro railway system, which is revolutionising the way Sydney travels.

Sydney Metro's program of work includes:

- **The Metro North West Line** – Opened in May 2019 with driverless trains running every four minutes in the peak in each direction between Tallawong Station in Rouse Hill and Chatswood
- **Sydney Metro City & Southwest** – A new 30-kilometre metro line extending the new metro network from the end of the Metro North West Line at Chatswood, under Sydney Harbour, through the Sydney CBD and south-west to Bankstown. It is due to open in 2024 with capacity to run a metro train every two minutes each way under the centre of Sydney.
- **Sydney Metro West (this project)** – A new 24-kilometre metro line that would connect Greater Parramatta with the Sydney CBD. Confirmed stations include Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock, The Bays and Sydney CBD. The location of the Sydney CBD station will be determined following further investigations and community and stakeholder engagement, and an optional station at Pyrmont is also under investigation. This infrastructure project would double the rail capacity between Greater Parramatta and the Sydney CBD with a travel time target between the two centres of about 20 minutes.
- **Sydney Metro – Western Sydney Airport** – A new metro rail line that will service Greater Western Sydney and the new Western Sydney International (Nancy-Bird Walton) Airport forming the transport spine of the Western Parkland City.

An overview of the Sydney Metro network is provided in Figure E1.

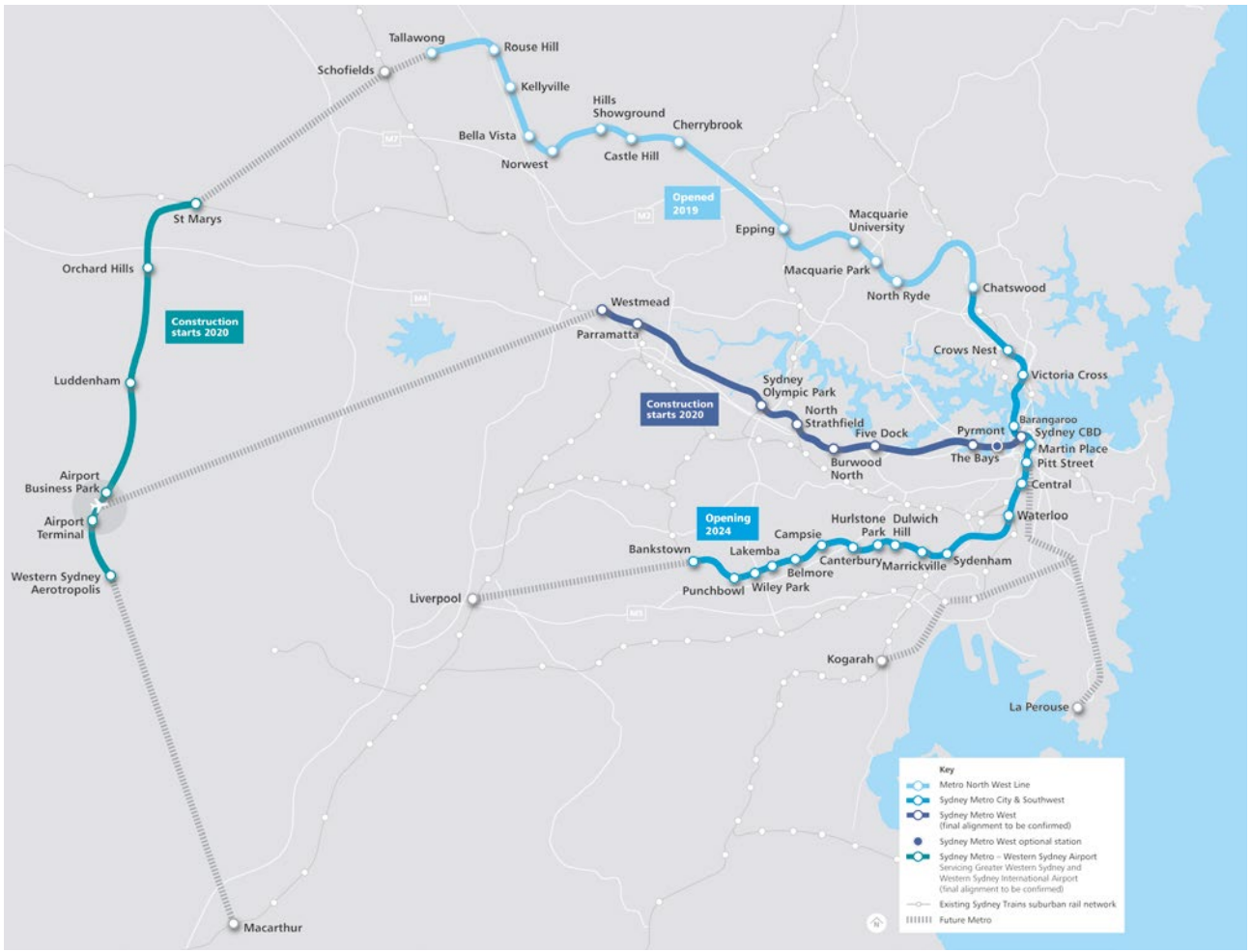

Figure E1: Sydney Metro network

Sydney Metro West

Sydney Metro West is shown in Figure E2.

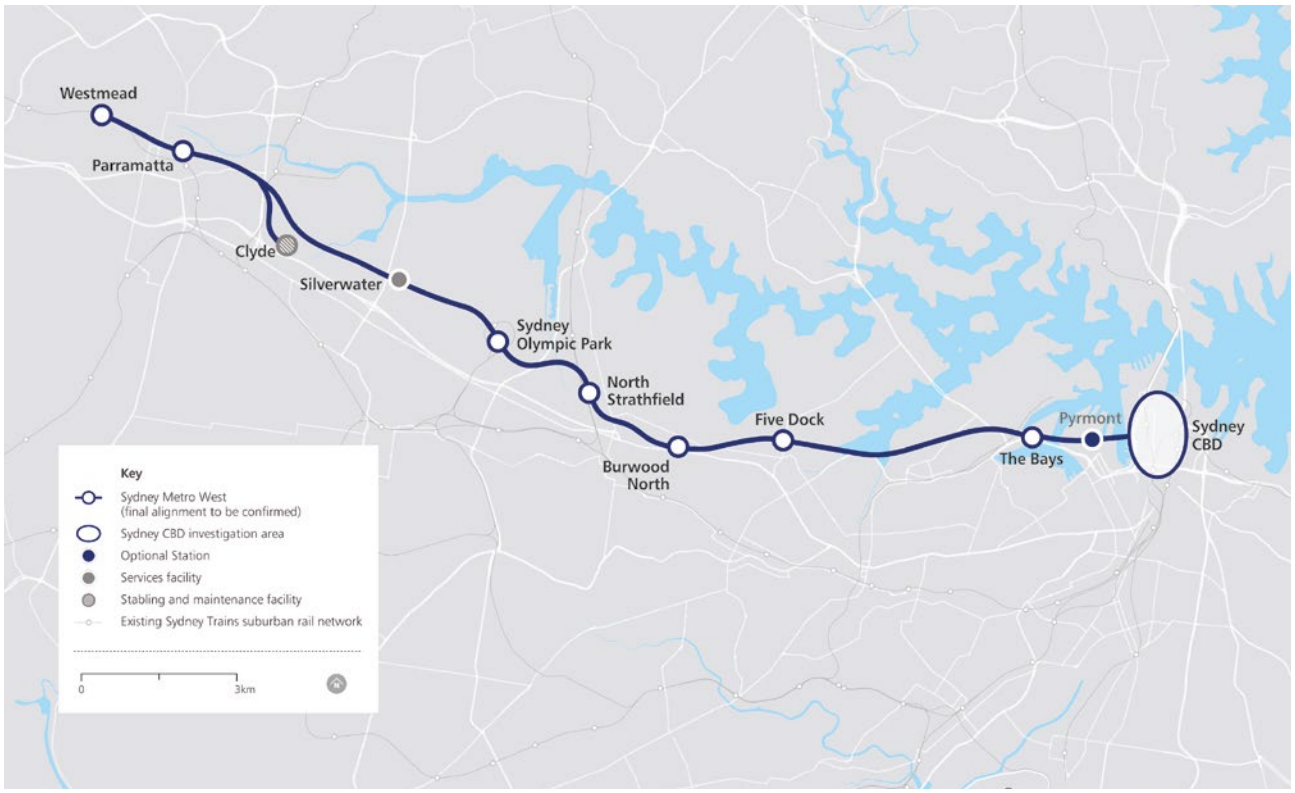

Figure E2: Sydney Metro West

The planning approvals and environmental impact assessment for Sydney Metro West has been staged in recognition of the size of the project. The proposed staging of planning approvals has been revised since exhibition of the *Sydney Metro West Westmead to The Bays and Sydney CBD – Environmental Impact Statement* (Sydney Metro, 2020a) (referred to as the Environmental Impact Statement throughout this Amendment Report) based on ongoing refinement of the project's delivery strategy. This includes the Sydney Metro West Concept and the following stages:

- **Stage 1** – All major civil construction works including station excavation and tunnelling between Westmead and The Bays
- **Stage 2** – All major civil construction works including station excavation and tunnelling between The Bays to Sydney CBD
- **Stage 3** – Tunnel fit-out, station building and operation of the line between Westmead to Sydney CBD.

The Environmental Impact Statement includes the Sydney Metro West Concept and Stage 1.

This Amendment Report has been prepared to outline and assess the proposed amendments to Sydney Metro West since the exhibition of the Environmental Impact Statement and is relevant to the Concept and Stage 1 comprising all major civil construction works including station excavation and tunnelling between Westmead and The Bays.

Proposed amendments

There would be no changes proposed to the Concept as described in Chapter 6 (Concept description) of the Environmental Impact Statement. The proposed amendments are related to Stage 1 construction sites as a result of continued design development and refinement to minimise environmental impacts and to respond to matters raised in submissions received during the exhibition of the Environmental Impact Statement. The proposed amendments are:

Clyde stabling and maintenance facility construction site

- Kay Street and Unwin Street route realignment amended from a proposed road bridge to a road underpass

Sydney Olympic Park metro station construction site

- Northern pedestrian entry amended from proposed cut-and-cover construction method to a mined construction method

Five Dock Station construction site

- Waterview Street to be converted to one-way general traffic flow for the duration of construction, for the section north of the main Five Dock car park on the corner of First Avenue and Waterview Street to Second Avenue

The Bays Station construction site

- A longer station box to support future eastern tunnelling and tunnel fit-out construction work
- Revised construction site layout to accommodate the Port Access Road to be retained on its current alignment and the longer station box

The Bays Station construction site and Rozelle power supply works

- Provision of empty conduits for the power supply works for other future major projects to minimise cumulative and future construction impacts.

An environmental impact screening assessment was undertaken to determine if each proposed amendment could result in possible changes to any of the potential impacts as presented in the Environmental Impact Statement. Additional environmental impact assessment has been provided where a potential change to impact was identified in the environmental impact screening assessment.

Clyde stabling and maintenance facility construction site

The Kay Street and Unwin Street general traffic and B-double route at the Clyde stabling and maintenance facility construction site would be changed from a proposed road bridge to a proposed underpass, with corresponding refinement of creek alignment and culverts. This proposed amendment would reduce residual visual and flooding impacts and reduce the overall proposed scope of works, while allowing the future metro tracks to cross the existing B-double route at Clyde.

There would be no proposed change to the overall footprint of the Clyde stabling and maintenance facility indicative construction site as the proposed amendment would remain within the construction site boundary.

The additional assessment concluded that, compared to the Environmental Impact Statement, the proposed amendment would:

- Reduce the predicted operational traffic noise levels
- Reduce the landscape character and visual amenity impacts for the streetscapes on the site and several viewpoints, as the proposed road underpass would create less engineered earthworks associated with the roadworks. Overall, however, the landscape character and visual amenity impact ratings would generally be unchanged due to the overall scale and extent of the works.
- Reduce the potential flow velocity and scour impacts
- Result in the following changes to potential flood impacts:
  - Minor reductions in potential flooding impacts to properties which were identified as flood impacted
  - Minor increases in potential flooding impacts in the one per cent AEP event downstream of the Clyde stabling and maintenance facility construction site
  - Minor increases in flood levels in bunded areas on the Viva Energy site.

One hydrology and flooding environmental mitigation measure has been revised and one has been removed to reflect the changed potential flooding impacts as a result of the proposed amendment to the Clyde stabling and maintenance facility. Although this proposed amendment would result in some potential additional impacts for some aspects, overall the proposed amendment would minimise environmental impacts associated with landscape character and visual amenity and flooding.

Sydney Olympic Park metro station construction site

The proposed construction methodology for the northern pedestrian entry at the Sydney Olympic Park metro station would be changed from cut-and-cover to mined tunnel with a cut-and-cover shaft at the northern end to join Dawn Fraser Avenue. This would avoid and minimise the heritage and visual impacts on the heritage listed Abattoir Heritage Precinct gardens identified in the Environmental Impact Statement. The change in construction methodology would also avoid the need for a partial or full road closure of Herb Elliot Avenue and the potential relocation of underground services.

The additional assessment concluded that, compared to the Environmental Impact Statement, the proposed amendment would:

- Reduce the non-Aboriginal heritage impact to the State significant State Abattoirs from a moderate impact to a minor impact
- Reduce the potential visual and landscape impact to the Abattoir Heritage Precinct gardens from a moderate adverse impact to a minor adverse impact
- Potentially increase temporary airborne noise, ground-borne noise, and vibration impacts at a small number of receivers in the vicinity of the Sydney Olympic Park metro station construction site for the relatively short duration of excavation works during daytime and out-of-hours works.

As a result of the decrease in potential impacts to the State significant State Abattoirs and the retention of the heritage gardens, environmental mitigation measure NAH9 as described in the Environmental Impact Statement would no longer be required and is proposed to be removed. Although this proposed amendment would result in some potential additional impacts for some aspects, overall the proposed amendment would minimise environmental impacts associated with transport and traffic, non-Aboriginal heritage, and landscape character and visual amenity.

Five Dock Station construction site

It is proposed to convert the section of Waterview Street, from north of the main Five Dock car park to Second Avenue, from a two-way street to a northbound one-way street. This would minimise potential conflicts with northbound heavy vehicle movements arriving at the Five Dock Station eastern construction site and is anticipated to improve safety and traffic outcomes for the local area and avoid the need for additional on-street parking removal along Waterview Street. This would be in place for the period of Stage 1 construction.

The additional assessment concluded that, compared to the Environmental Impact Statement, the proposed amendment would result in a minor increase in travel distance and travel time for some residents on Waterview Street when approaching from the north.

The proposed amendments to the Five Dock Station construction site would not require any changes or additions to the environmental mitigation measures provided in the Environmental Impact Statement. Although this proposed amendment would result in some potential additional impacts for some aspects, overall the proposed amendment would minimise environmental impacts associated with potential traffic safety and parking.

The Bays Station construction site

It is proposed to modify The Bays Station construction site layout to retain the current alignment of Port Access Road and to accommodate a longer station box to support future eastern tunnelling and tunnel fit-out construction work. The longer station box would enable the provision of dedicated access points for future works, reducing the overall duration of construction works at The Bays and minimising the duration of potential noise and vibration and landscape character and visual amenity impacts of future stages.

The additional assessment concluded that, compared to the Environmental Impact Statement, the proposed amendment would:

- Potentially increase temporary noise and vibration impacts including:
    - A relatively minor increase in the number of noise and vibration receivers with predicted exceedances of noise management levels during initial excavation works
    - A larger increase in the number of receivers exceeding noise management levels during excavation with acoustic sheds and tunnel boring machine launch and support works

- Result in some minor changes to the potential hydrology and flooding impacts including:
  - Reduced flooding impacts in flood ponding areas in the eastern portion of the construction site and adjoining areas
  - Minor increases in potential flooding impacts in probable maximum flood event for flooding in Robert Street and low lying area to north-west of The Bays Station construction site. No additional properties would be impacted.

The proposed amendments to The Bays Station construction site would not require any changes or additions to the environmental mitigation measures provided in the Environmental Impact Statement. Although this proposed amendment would result in some potential additional impacts for some aspects, overall the proposed amendment would minimise environmental impacts associated with a reduction in the overall construction duration at The Bays.

The Bays Station construction site and Rozelle power supply works

It is proposed to provide empty conduits along the power supply works required from the Ausgrid Rozelle sub-transmission station to The Bays Station for the future requirements of other projects. This would include Transport for NSW's Western Harbour Tunnel (subject to receipt of a separate planning approval), as well as future capacity for Ausgrid, Port Authority of NSW from the Rozelle sub-transmission substation to the local area, including to The Bays Precinct and the locality.

This would result in a substantial reduction in potential cumulative and future impacts and a reduced overall cumulative construction duration compared to these works from multiple projects being undertaken separately, although there would be an increase in impacts to those described in the Environmental Impact Statement. Additional trenching and underboring works would be undertaken as part of Stage 1 construction, to provide empty conduits for use by these other projects in the future.

The additional assessment concluded that, compared to the Environmental Impact Statement, the proposed amendment would:

- Increase the potential temporary transport and traffic impacts including:
  - Additional impacts associated with vehicular access to properties in locations where full road closures are required; pedestrian access to properties would be maintained and Sydney Metro would provide alternative car parking where possible in the locality
  - Additional minor impacts to road network performance due to the longer duration of temporary partial road closures and the need for full road closures
  - Additional minor impacts to cyclists due to the need for temporary detours in some locations where full road closures are required
  - Additional minor impacts to parking due to the longer duration of temporary loss of on-street kerbside parking
  - Additional minor impacts to public transport due to the temporary relocation of one bus stop
- Increase the duration of potential temporary construction noise and vibration impacts, however the overall noise levels are not anticipated to change
- Potentially increase the duration of temporary amenity-related impacts to local businesses
- Potentially increase the duration of temporary social impacts to the local community.

The proposed amendments to The Bays Station construction site and Rozelle power supply works would require changes to one of the environmental mitigation measures provided in the Environmental Impact Statement, as well as two additional measures. Overall it is expected that the proposed amendment would minimise environmental impacts compared to the potential cumulative and future impacts of these works being progressed separately.

Conclusion and next steps

The proposed amendments would result in an overall reduction in impacts when compared to those assessed in the Environmental Impact Statement and would not result in any unacceptable additional impacts. Where there is a potential for a change in impacts to those described in the Environmental Impact Statement, revised environmental mitigation measures have been proposed accordingly. Two environmental mitigation measures that were included in the Environmental Impact Statement are now proposed to be removed, to reflect the reduction in impacts as a result of the proposed amendments.

On balancing the strategic need and benefits of Sydney Metro West (as outlined in the Environmental Impact Statement) with the potential changes in impacts as a result of the proposed amendments, there has been no change to the overall strategic merit of Sydney Metro West.

The Department of Planning, Industry and Environment will consider this Amendment Report and the *Sydney Metro West Westmead to The Bays and Sydney CBD – Submissions Report* (Sydney Metro, 2020b) during its assessment of the Concept and Stage 1 of Sydney Metro West. The Secretary of the Department of Planning, Industry and Environment will prepare an Environmental Assessment Report in accordance with section 5.18 of the *Environmental Planning and Assessment Act 1979*. The Minister for Planning and Public Spaces will then make a determination on the project and identify any conditions of approval which would apply.

This Amendment Report and the Submissions Report will be available on the Department of Planning, Industry and Environment website and on the Sydney Metro website at **https://www.sydneymetro.info/**.

If approved by the Department of Planning, Industry and Environment, Sydney Metro will continue to consult with community members, government agencies and stakeholders during the detailed design and construction phases of the Concept and Stage 1, and as part of the environmental impact assessment of future stages.

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1 Introduction

This chapter provides an overview of Sydney Metro West, the exhibition of the *Sydney Metro West Westmead to The Bays and Sydney CBD – Environmental Impact Statement* (Sydney Metro, 2020a), the proposed amendments to the project as exhibited, and the purpose of this Amendment Report.

1.1 Overview

Sydney is expanding and the NSW Government is working to deliver an integrated transport system that meets the needs of customers now and in the future. The delivery of Sydney Metro West is critical to keeping Sydney moving and is identified in a number of key strategic planning documents including the *Greater Sydney Region Plan: A Metropolis of Three Cities – connecting people* (Greater Sydney Commission, 2018), *Building Momentum: State Infrastructure Strategy 2018-2038* (Infrastructure NSW, 2018) and the *Future Transport 2056* strategy (Transport for NSW, 2018).

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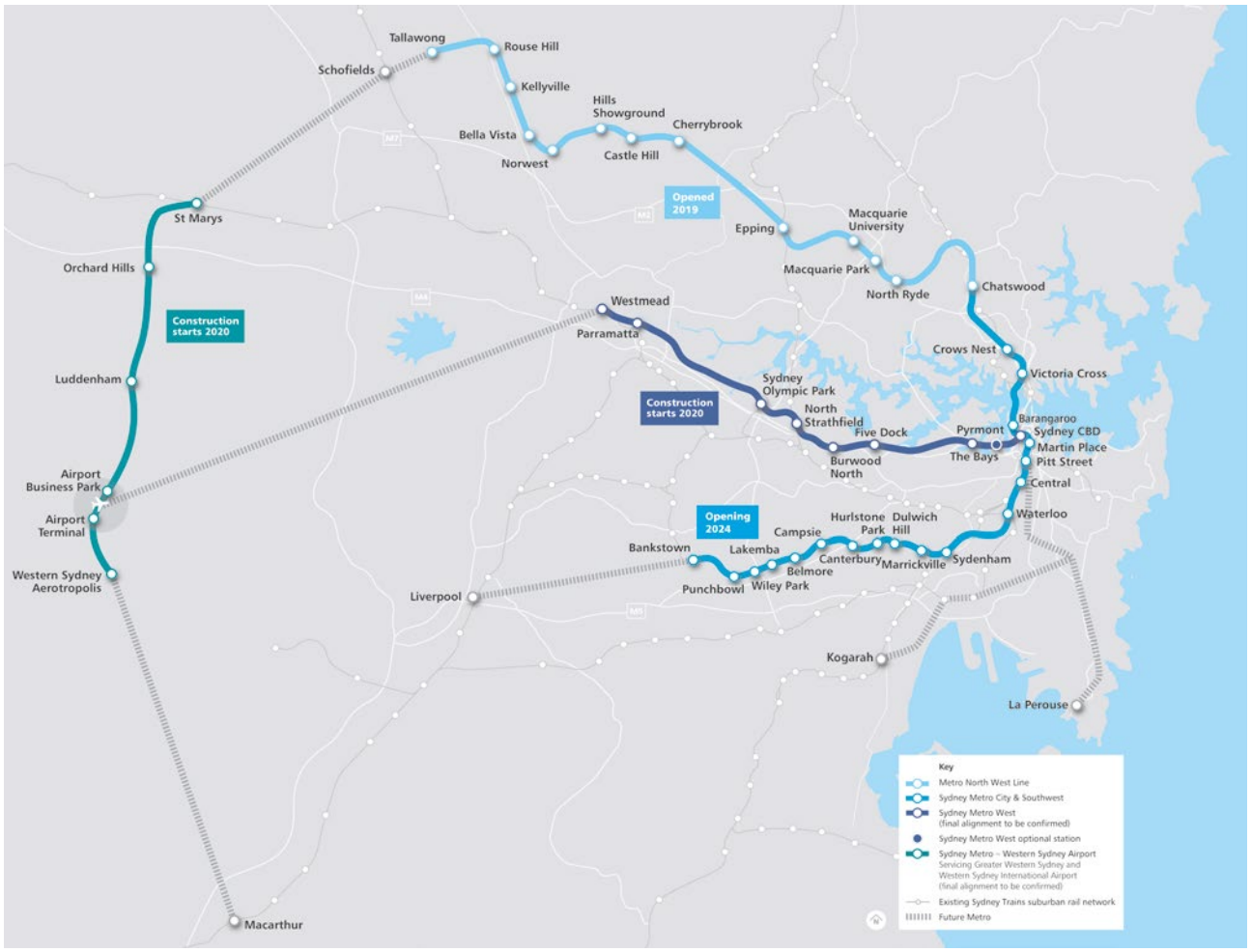

Figure 1-1: Sydney Metro network

1.2 Sydney Metro West

The planning approvals and environmental impact assessment for Sydney Metro West has been staged in recognition of the size of the project. The proposed staging of planning approvals has been revised since exhibition of the *Sydney Metro West Westmead to The Bays and Sydney CBD – Environmental Impact Statement* (Sydney Metro, 2020a) (referred to as the Environmental Impact Statement throughout this Amendment Report) based on ongoing refinement of the project's delivery strategy. This includes the Sydney Metro West Concept and the following stages:

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- **Stage 3** – Tunnel fit-out, station building and operation of the line between Westmead to Sydney CBD.

The Environmental Impact Statement includes the Sydney Metro West Concept and Stage 1.

The exhibited Environmental Impact Statement did not reflect the decision made by the NSW Government in April 2020 to no longer consider Rydalmere as a strategic station location option. The NSW Government determined that the optional station in Rydalmere would not proceed due to the distance from the proposed metro alignment and the additional time it would add to the journey between Parramatta and the Sydney CBD. This is now reflected in Figure 1-2 and discussed further in Chapter 2 (Environmental Impact Statement clarifications) of the *Sydney Metro West Westmead to The Bays and Sydney CBD – Submissions Report* (Sydney Metro, 2020b) which has been prepared to respond to the issues raised by government agencies, key stakeholders and the community during exhibition of the Environmental Impact Statement. This will be referred to as the Submissions Report throughout this Amendment Report.

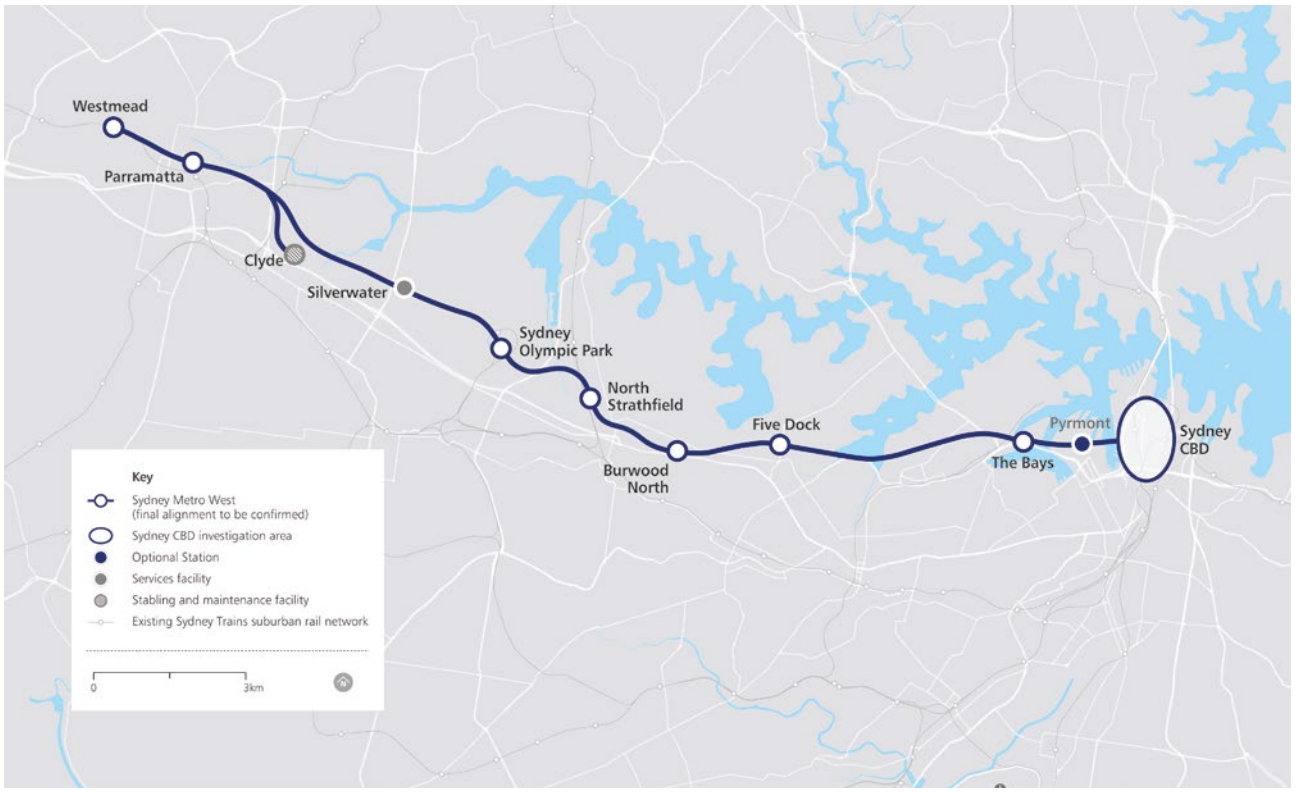

Figure 1-2: Sydney Metro West

1.2.1 Key features of the Concept

Sydney Metro West (the Concept) involves the construction and operation of about 24 kilometres of underground metro rail between Westmead and the Sydney CBD. The indicative alignment and proposed station locations are shown on Figure 1-2.

Key components of the Concept would include:

- About 24 kilometres of twin tunnels between Westmead and the Sydney CBD
- New metro stations at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock, The Bays and Sydney CBD. The NSW Government is continuing to assess an optional station at Pyrmont and further planning is underway to determine the location of a new metro station within the Sydney CBD.
- A turn-up-and-go metro service operating from early morning to late at night, between Westmead and the Sydney CBD
- Pedestrian links and connections to other modes of transport (such as the existing suburban rail network and other parts of the metro network) and surrounding land uses
- Modifications to existing suburban stations and associated rail infrastructure (including overhead wiring, signalling, access tracks/paths and rail corridor fencing) at Westmead and North Strathfield
- Services within each of the metro stations, including mechanical and fresh air ventilation equipment and electrical power substations to supply power for operation
- A stabling and maintenance facility at Clyde, and associated aboveground and belowground tracks to connect to the mainline tunnels and other operational ancillary infrastructure
- Services facilities at Rosehill (within the Clyde stabling and maintenance facility construction site), Silverwater and between Five Dock and The Bays for fresh air ventilation and emergency evacuation
- Alterations to pedestrian and traffic arrangements, and cycling and public transport (e.g. bus) infrastructure around the metro stations
- Subdivision of station sites to support integrated station and precinct developments, and ancillary facilities
- Ancillary facilities to support construction.

A more detailed description of the Concept is available in Chapter 6 (Concept description) of the Environmental Impact Statement.

1.2.2 Key features of Stage 1

Stage 1 would involve major civil construction work between Westmead and The Bays including:

- Enabling works, such as demolition, utility supply to construction sites, utility adjustments and modifications to the existing transport network
- Tunnel excavation, including tunnel support activities
- Station excavation for new metro stations at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock and The Bays
- Shaft excavation for services facilities at Rosehill (within the Clyde stabling and maintenance facility construction site), Silverwater and at a location between Five Dock and The Bays (to be determined)
- Civil works for the stabling and maintenance facility at Clyde including earthworks and structures for crossings at A'Becketts Creek and Duck Creek
- A concrete segment facility for use during construction located at the Clyde stabling and maintenance facility construction site
- Excavation of a tunnel dive structure and associated tunnels at Rosehill to support a connection between the Clyde stabling and maintenance facility and the mainline metro tunnels.

The location of Stage 1, including the underground tunnel and construction sites for the stations and services facilities are shown on Figure 1-3.

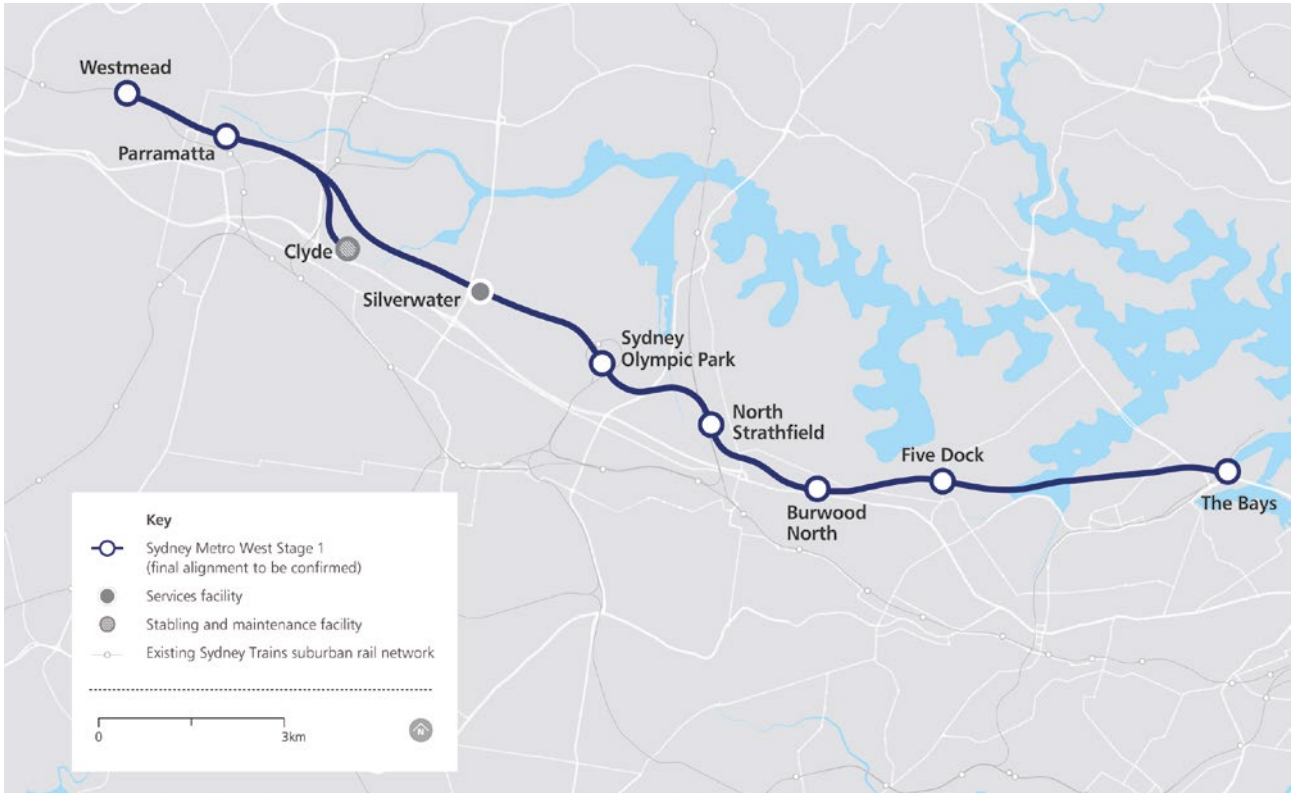

Figure 1-3: Location of Stage 1

A more detailed description of Stage 1 is available in Chapter 9 (Stage 1 description) of the Environmental Impact Statement.

1.3 Environmental Impact Statement exhibition

The Environmental Impact Statement was placed on exhibition by the Department of Planning, Industry and Environment from 30 April 2020 to 26 June 2020.

The Submissions Report has been prepared to respond to the issues raised by government agencies, key stakeholders and the community during exhibition of the Environmental Impact Statement. The Submissions Report identifies the issues raised during exhibition and provides responses to those issues.

1.4 Overview of proposed amendments

There would be no changes proposed to the Concept as described in Chapter 6 (Concept description) of the Environmental Impact Statement. The proposed amendments are related to Stage 1 construction sites as a result of continued design development and refinement to minimise environmental impacts and to respond to matters raised in submissions received during the exhibition of the Environmental Impact Statement. The proposed amendments are:

Clyde stabling and maintenance facility construction site

- Kay Street and Unwin Street route realignment amended from a proposed road bridge to a road underpass

Sydney Olympic Park metro station construction site

- Northern pedestrian entry amended from proposed cut-and-cover construction method to a mined construction method

Five Dock Station construction site

- Waterview Street to be converted to one-way general traffic flow for the duration of construction, for the section north of the main Five Dock car park on the corner of First Avenue and Waterview Street to Second Avenue

The Bays Station construction site

- A longer station box to support future eastern tunnelling and tunnel fit-out construction work
- Revised construction site layout to accommodate the Port Access Road to be retained on its current alignment and the longer station box

The Bays Station construction site and Rozelle power supply works

- Provision of empty conduits for the power supply works for other future major projects to minimise cumulative and future construction impacts.

The amendments at each construction site compared with the Environmental Impact Statement are described in more detail in Chapters 3 to 7 of this Amendment Report.

1.5 Purpose of this Amendment Report

The purpose of this Amendment Report is to outline the proposed amendments in response to feedback received on the project and additional design development work undertaken by Sydney Metro. In accordance with clause 192 of the Environmental Planning and Assessment Regulation 2000 (EP&A Regulation), the Amendment Report assesses the proposed amendments since the exhibition of the Environmental Impact Statement.

The Amendment Report includes:

- **Chapter 2** – details the methodology used for this impact assessment
- **Chapters 3 to 7** – considers the potential impacts associated with the proposed amendments at each construction site and provides additional assessment where required. Revised environmental mitigation measures are also described, where relevant.
- **Chapter 8** – provides a complete set of the revised environmental mitigation measures
- **Chapter 9** – provides a conclusion and summarises the next steps.

Figure 1-4 presents the assessment and approval process. Following the preparation of the Amendment Report and the Submissions Report, an assessment will be carried out by the Department of Planning, Industry and Environment, and a Secretary's Environmental Assessment Report will be prepared. The Minister for Planning and Public Spaces or a delegate will then make a determination on the project and identify any conditions of approval which would apply.

Figure 1-4: Assessment and approval process

2 Methodology

This chapter describes how the proposed amendments have been assessed throughout Chapters 3 to 7 of this report.

2.1 Overview

The amendments are related to proposed construction works that would be carried out at the Stage 1 construction sites. The proposed amendments at each of these sites are described in Chapters 3 to 7.

2.2 Assessment of proposed amendments

The Environmental Impact Statement provided an assessment of the key and other issues defined in the Secretary's Environmental Assessment Requirements, dated 11 December 2019. The outcomes for the assessment on Stage 1 of Sydney Metro West are detailed in Chapters 10 to 27 of the Environmental Impact Statement.

An environmental impact screening assessment was carried out for the proposed amendments at each construction site to determine if the amendments could result in possible changes to any of the potential impacts as presented in the Environmental Impact Statement. An environmental impact screening table is provided for each construction site associated with a proposed amendment (see Chapters 3 to 7). Where the environmental impact screening assessment identified the proposed amendments were unlikely to result in a change to the potential impacts as presented in the Environmental Impact Statement, no further assessment was required. Additional environmental impact assessment has been provided where a potential change to impact was identified in the environmental impact screening assessment.

Where impacts may change from that as described in the Environmental Impact Statement, the assessment should be read in conjunction with the Environmental Impact Statement and the corresponding Technical Paper of the Environmental Impact Statement, where relevant.

A supplement to Technical Paper 2 (Noise and vibration) of the Environmental Impact Statement has been prepared and is appended to this report as Appendix A (Noise and vibration technical information).

In some instances, the additional assessment has resulted in the need for revised environmental mitigation measures which are provided in Chapters 3 to 7. A complete set of revised environmental mitigation measures is provided in Chapter 8, which also includes those required as a result of the response to submissions, as identified in the Submissions Report.

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3 Clyde stabling and maintenance facility construction site – Kay Street and Unwin Street realignment

This chapter provides a description of the proposed amendment at the Clyde stabling and maintenance facility construction site, an environmental impact screening assessment, additional assessment of the amendment where required and identifies any changes required to environmental mitigation measures.

As described in Chapter 7 (Government and key stakeholder submissions) of the Submissions Report, Sydney Water and City of Parramatta Council raised concerns that the design of the Clyde stabling and maintenance facility would increase flood levels in and adjacent to Duck Creek and Duck River.

Additional design investigations have been undertaken to explore options to provide the optimal solution for how the future metro rail track could cross Kay Street and Unwin Street at Clyde, which is a designated B-double route. This investigation has resulted in the development of an alternate design solution to reduce the residual flood impacts, reduce the visual impacts as outlined in the Environmental Impact Statement and reduce the overall proposed scope of works associated with the realignment of Kay Street and Unwin Street. Although this proposed amendment would result in some potential additional impacts for some aspects (as outlined below), overall, the proposed amendment would minimise environmental impacts associated with landscape character and visual amenity and flooding.

3.1 Design proposed in the Environmental Impact Statement

The Clyde stabling and maintenance facility construction site is described in Section 9.5.3 of the Environmental Impact Statement and would cover about 380,000 square metres between the M4 Motorway, James Ruse Drive and Rosehill Gardens Racecourse.

Kay Street and Unwin Street are public roads that accommodate general traffic including B-double heavy vehicles. The design proposed in the Environmental Impact Statement would permanently realign the two roads around the Clyde stabling and maintenance facility construction site and would include a road bridge over the future metro rail tracks. This realignment would maintain the existing two-lane road configuration and would be designed to accommodate B-double trucks. The realigned road would cross over the future Sydney Metro West tracks, A'Becketts Creek and Duck Creek and was proposed to be elevated on piles for about 500 metres to manage flood impacts.

A'Becketts Creek and Duck Creek was proposed to be realigned during Stage 1 works as shown in Figure 9-18 of the Environmental Impact Statement (reproduced as Figure 3-1). The creeks would generally flow through culverts and new open channels, and would be naturalised where possible.

The location and indicative layout of the Clyde stabling and maintenance facility construction site is reproduced in Figure 3-2.

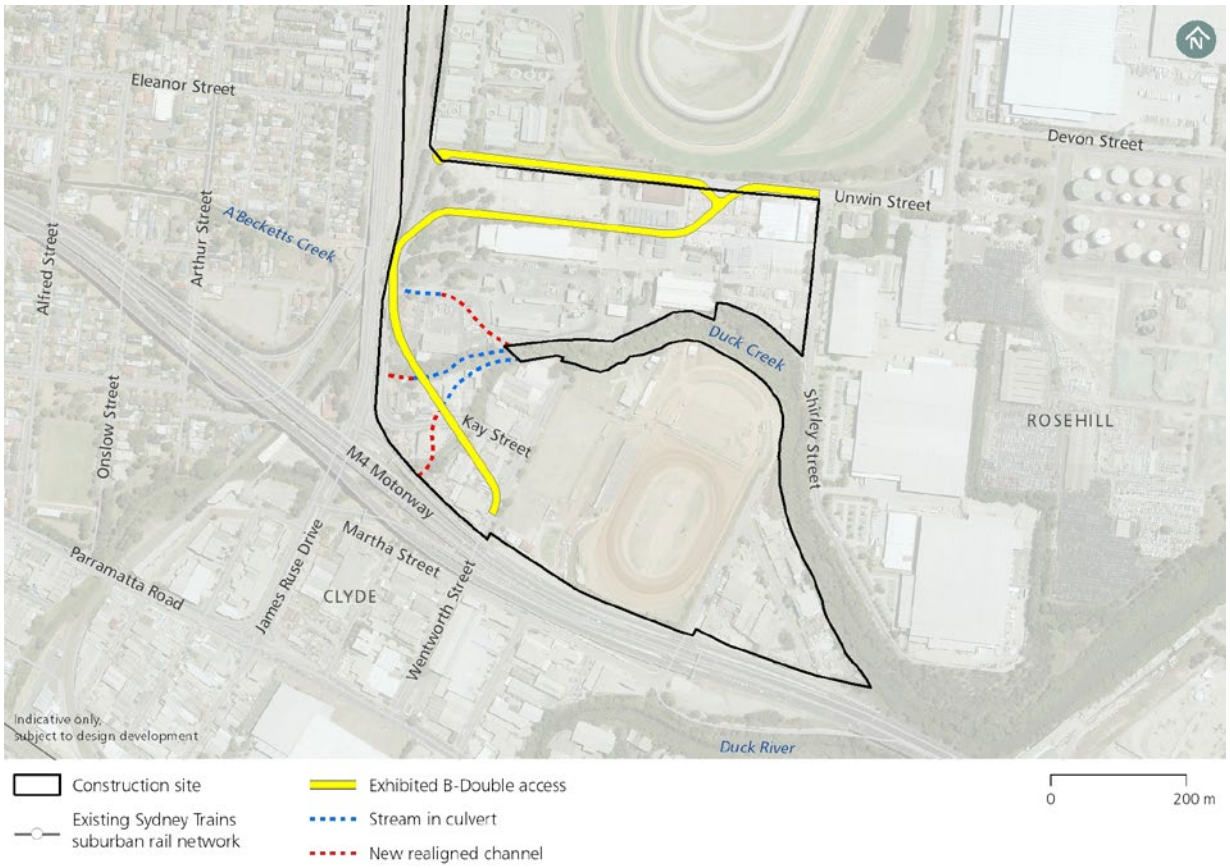

Figure 3-1: Exhibited Kay Street and Unwin Street route and creek alignment works

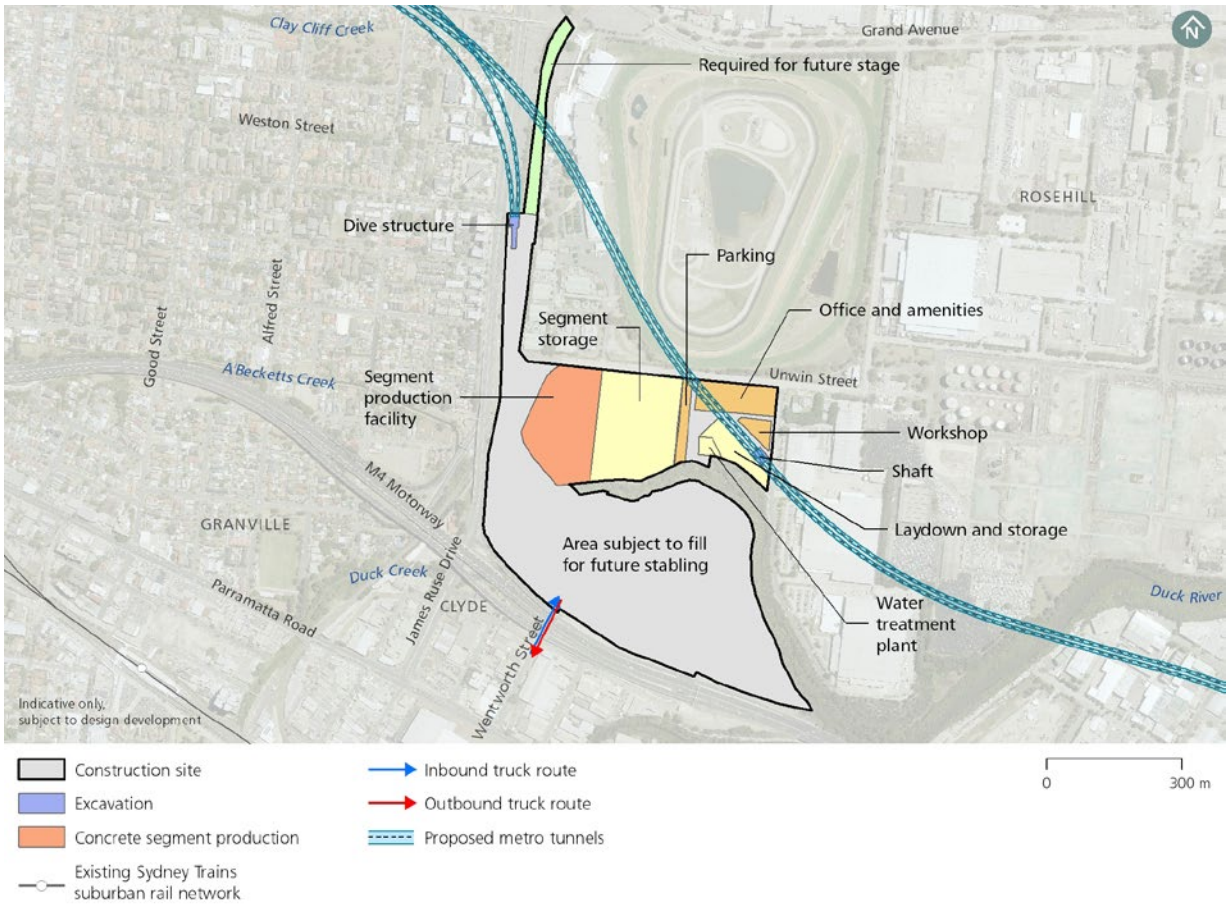

Figure 3-2: Exhibited Clyde stabling and maintenance facility indicative construction site layout

3.2 Description of amendment

The proposed amendment would replace the existing at-grade roads with a realigned at-grade route including a small section of road underpass. The structures over A'Becketts Creek and Duck Creek, including creek realignment works would be in different positions to those proposed in the Environmental Impact Statement. This would result in reduced increases in peak flood levels in and adjacent to Duck Creek and Duck River, resulting in an improvement compared to the potential flood impacts predicted in the Environmental Impact Statement.

There would be no proposed change to the overall footprint of the Clyde stabling and maintenance facility indicative construction site as the proposed amendment would remain within the construction site boundary. This proposed amendment would reduce the predicted residual flood impacts and visual impacts outlined in the Environmental Impact Statement and reduce the overall proposed scope of works.

This amendment would involve the following:

- **Change to the Kay Street and Unwin Street route** – the proposed road bridge over the future metro rail tracks would be changed to an at-grade road and a road underpass designed to accommodate B-double trucks (refer to Figure 3-3). The underpass section would have a length of about 80 metres, a sign posted clearance of 4.6 metres, and a shared path to accommodate pedestrians and cyclists on one side.
- **Change to the culverts** – the revised at-grade route would require the refinement of the creek realignment and culverts. This is shown on Figure 3-3 and includes:
  - Rationalisation of transverse drainage structures, including refinement of sizing and alignment of A'Becketts Creek and Duck Creek culvert structures and removal of a third transverse drainage crossing and outlet channel previously situated north of A'Becketts Creek in order to fit the proposed road underpass
  - Refinement of proposed overland flow swales around the upstream side of the construction site to cater for high flows in up to the probable maximum flood event
  - Removal of the proposed on-site stormwater detention proposed as environmental mitigation measure HF2 in the Environmental Impact Statement (see Section 3.5)
- **Minor change to the segment production facility boundary** – the boundary of the segment production facility was refined to accommodate the proposed amended route for the Kay Street and Unwin Street route, however it remains within the indicative construction site boundary.

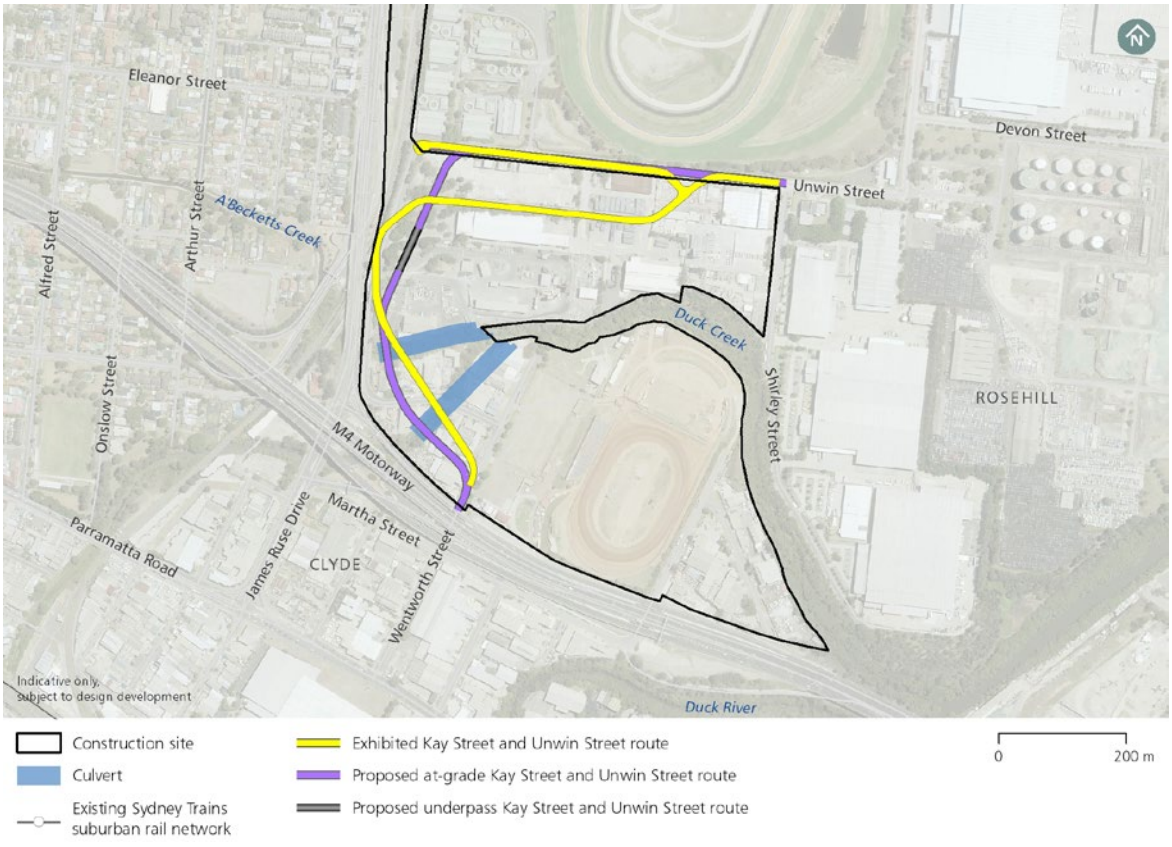

Figure 3-3: Proposed amendment to Kay Street and Unwin Street route and creek alignment works

3.3 Environmental impact screening assessment

This screening assessment considers whether the proposed amendment could change the potential impacts in the Environmental Impact Statement. Table 3-1 assesses whether additional environmental assessment of the proposed amendment would be required and if the assessment in the Environmental Impact Statement remains applicable. Where the requirement for further detailed assessment has been identified, this has been provided with any revised environmental mitigation measures in sections 3.4 and 3.5 respectively.

Table 3-1: Amended Clyde stabling and maintenance facility construction site environmental screening

Environmental aspect	Comparison of proposed amendment against Environmental Impact Statement	Further detailed assessment required?
Transport and traffic	The proposed amendment would not change the overall route or construction vehicle numbers from that documented in the Environmental Impact Statement. Therefore, the transport and traffic impacts as described in the Environmental Impact Statement would not change.	No
Noise and vibration	The proposed route is different to that in the Environmental Impact Statement in terms of horizontal and vertical alignment and requires assessment to identify any potential changes to the operational traffic noise impacts from the amendment. The proposed amendment is not anticipated to result in any changes to construction noise levels at surrounding receivers.	Yes
Non-Aboriginal heritage	The proposed route would fall within the curtilage of a locally significant heritage item, the RTA Depot. Assessment is required to identify any potential changes to impacts from the amendment.	Yes
Aboriginal heritage	One area of Aboriginal archaeological potential is located within the Clyde stabling and maintenance facility. Assessment is required to identify any potential changes to impacts from the amendment.	Yes
Property and land use	The proposed amendment would not result in any changes to properties or land use from those assessed in the Environmental Impact Statement. The proposed amendment is within the exhibited indicative Clyde construction site boundary. No additional properties would be acquired as a result of the proposed amendment.	No
Landscape character and visual amenity	The proposed amendment may alter visual impacts, including changes to viewpoints assessed in the Environmental Impact Statement. Assessment is required to identify any potential changes to impacts from the amendment.	Yes
Business impacts	The business impacts and business risks for the proposed amendment would be consistent with those assessed in the Environmental Impact Statement. No additional businesses would be impacted by the proposed amendment.	No
Social impacts	The social factors and social risks for the proposed amendment would be consistent with those assessed in the Environmental Impact Statement.	No
Groundwater and ground movement	Excavation for the proposed underpass is not expected to penetrate the groundwater table and therefore, this amendment is not expected to change the groundwater-related impacts as discussed in the Environmental Impact Statement.	No

Environmental aspect	Comparison of proposed amendment against Environmental Impact Statement	Further detailed assessment required?
Soils and surface water quality	The proposed amendment is within the construction site footprint assessed in the Environmental Impact Statement and therefore the soils and surface water quality would be consistent with those described in the Environmental Impact Statement. The proposed amendment is not anticipated to change the water balance presented in the Environmental Impact Statement.	No
Contamination	The proposed amendment is within the construction site footprint assessed in the Environmental Impact Statement and therefore the contamination impacts would be consistent with those described in the Environmental Impact Statement. While the route would extend within the northern boundary of the construction site, adjacent to areas of moderate contamination risk potential, the Environmental Impact Statement identified that all potential soil contamination identified can be managed to acceptable levels with the implementation of appropriate environmental mitigation measures and/or remediation. As a result, the proposed amendment is not anticipated to change the contamination impacts described in the Environmental Impact Statement.	No
Hydrology and flooding	Construction of an underpass and related design refinements may have the potential for changes to flooding and hydrology impacts that were assessed in the Environmental Impact Statement. Further assessment is required to identify any potential changes to impacts from the proposed amendment.	Yes
Biodiversity	The proposed amendment would not result in any additional clearing of vegetation or fauna habitat than assessed in the Environmental Impact Statement.	No
Air quality	The proposed amendment would generate potential dust and other air quality emissions consistent with those assessed in the Environmental Impact Statement.	No
Spoil, waste management and resource use	The proposed amendment would generate spoil and waste and would have resource needs consistent with those assessed in the Environmental Impact Statement.	No
Hazards	The potential hazards associated with the proposed amendment would be consistent with those assessed in the Environmental Impact Statement.	No
Sustainability and climate change	The potential climate change risks and greenhouse gas emissions associated with the proposed amendment would be consistent with those assessed in the Environmental Impact Statement. The environmental and sustainability management system that would be implemented would be unchanged.	No

3.4 Environmental impact assessment

3.4.1 Noise and vibration

Operational road traffic noise impacts

The noise assessment described in the Environmental Impact Statement concluded the potential impacts from the proposed operation of the road bridge at the Clyde stabling and maintenance facility were unlikely to alter existing road traffic noise levels at the adjacent receivers. This was due to existing and future road traffic noise levels in the area being predicted to be controlled by existing traffic on James Ruse Drive, which is closer to the nearest receivers to the west and has substantially higher volumes of traffic compared to Kay Street and Unwin Street.

The proposed amended Kay Street and Unwin Street alignment and underpass is expected to reduce the predicted noise compared to the road bridge proposed in the Environmental Impact Statement. This is due to the relative lowering of the route's vertical alignment which would increase acoustic shielding from the immediate surroundings and James Ruse Drive. As a result, existing and future noise levels would be dominated by the existing traffic noise of James Ruse Drive.

A qualitative assessment of the potential changes to operational noise impacts at the nearest receiver was completed by comparing the position of the proposed amended road alignment to the existing roads. This assessment shows the proposed amendment is not predicted to result in any additional impacts and would result in a reduction in predicted noise impacts from that described in the Environmental Impact Statement.

Changes to or additional environmental mitigation measures

The proposed amendment would not require any changes or additions to the noise and vibration environmental mitigation measures provided in the Environmental Impact Statement.

3.4.2 Non-Aboriginal heritage

The proposed road alignment and underpass route would fall within the curtilage of the local heritage listed RTA Depot. This remains unchanged from the Environmental Impact Statement. As a result, the overall heritage impact would be consistent with the Environmental Impact Statement, which was described as minor. Stage 1 works would still retain the remaining façade of the RTA Depot; therefore the potential impacts would be consistent with the impacts described in the Environmental Impact Statement. The proposed amendment would not result in changes of impact to any other heritage items as described in the Environmental Impact Statement.

Changes to or additional environmental mitigation measures

The proposed amendment would not require any changes or additions to the non-Aboriginal heritage environmental mitigation measures provided in the Environmental Impact Statement.

3.4.3 Aboriginal heritage

The proposed amendment is not located within the portion of the Clyde stabling and maintenance facility construction site which has been identified as containing Aboriginal archaeological potential and subsequently the amendment would have no effect on the Aboriginal heritage impact assessment of the Clyde stabling and maintenance facility construction site.

As a result, the potential Aboriginal heritage impact would remain consistent with that described in the Environmental Impact Statement.

Changes to or additional environmental mitigation measures

The proposed amendment would not require any changes or additions to the Aboriginal heritage environmental mitigation measures provided in the Environmental Impact Statement.

3.4.4 Landscape character and visual amenity

Changes to landscape impact

The proposed amendment could alter the potential landscape impact identified for the site and streetscapes of Unwin Street, Kay Street and Shirley Street which is considered below. All other landscape impacts would remain unchanged from the Environmental Impact Statement.

The site and streetscapes including Unwin Street, Kay Street and Shirley Street

The proposed realignment of Kay Street and Unwin Street via an at-grade road and a road underpass (instead of a road bridge) would be of a lesser scale and a less engineered character, compared with the proposed ramping embankment of the proposed road bridge in the Environmental Impact Statement.

The Environmental Impact Statement identified that the Clyde stabling and maintenance facility construction site would result in a minor adverse landscape impact due to the scale of the earthworks and vegetation removal required across the entire construction site. This impact level would be unchanged as a result of the proposed amendment.

Changes to daytime visual impact

Five representative viewpoints at Clyde were assessed in the Stage 1 Environmental Impact Statement. Of these, the following viewing locations have been reassessed as the road bridge structure proposed in the Environmental Impact Statement may be seen in these views:

Viewpoint 1 – View south-east along James Ruse Drive

- Improved visual amenity outcome for this element compared to the road bridge proposed in the Environmental Impact Statement
- **Moderate adverse visual impact**, unchanged from the Environmental Impact Statement

Viewpoint 3 – View south-west to the corner of Unwin and Shirley streets

- Improved visual amenity perspective compared to the Environmental Impact Statement due to the reduced scale of the road at-grade and underpass construction
- **Minor adverse visual impact**, unchanged from the Environmental Impact Statement

Viewpoint 5 – View north-east from M4 Western Motorway on ramp

- Improved visual amenity perspective compared to the Environmental Impact Statement as the construction of the at-grade road and road underpass would be located below this viewpoint
- **Moderate adverse visual impact**, unchanged from the Environmental Impact Statement

Views from Rosehill Gardens racecourse

- No perceived change in the amenity of this view, as even though the amendment would further reduce the prominence of Stage 1 works in views from this location, the overall visibility of the works would be small
- **Negligible visual impact**, unchanged from the Environmental Impact Statement.

The changes to impacts at each are further described in the sections below.

Viewpoint 1 – View south-east along James Ruse Drive

Figure 3-4: Viewpoint 1 – View south-east along James Ruse Drive, existing view

Figure 3-4 presents the existing view at Viewpoint 1. The proposed amendment to realign Kay Street and Unwin Street via an at-grade road and road underpass would be less visually prominent in this view as the works would no longer include the construction of a bridge structure. Construction of the at-grade road and underpass would have a low profile compared with the construction of the bridge structure which would have risen taller than the adjacent James Ruse Drive.

The proposed amendment would reduce the vertical scale of the construction works in the background of this view. This would be an improved visual amenity outcome for this element compared to the road bridge proposed in the Environmental Impact Statement. However, the construction activities for the Clyde stabling and maintenance facility construction site as assessed in the Environmental Impact Statement would continue to extend across a large portion of this view such that there would continue to be a **moderate adverse visual impact**, which is of local sensitivity. Despite the visual amenity improvement of the proposed amendment, the visual amenity impact level of the Clyde stability and maintenance facility construction site is unchanged from the Environmental Impact Statement.

Viewpoint 3 – View south-west to the corner of Unwin and Shirley streets

Figure 3-5: Viewpoint 3 – View south-west to the corner of Unwin and Shirley Streets, existing view

Figure 3-5 presents the existing view at Viewpoint 3. The proposed works to realign Kay Street and Unwin Street would be seen in the background of this view, extending to the south-west, away from the viewer. The proposed amendment would be less visually prominent than identified in the Environmental Impact Statement as this work would include the excavation and construction of an at-grade road and road underpass, rather than the formation of embankments and construction of a road bridge structure. Any use of this route by construction vehicles would be absorbed into the character of the construction site and located in the far background of this view.

Although the amendment would be an improvement from what was identified in the Environmental Impact Statement, from a visual amenity perspective due to the reduced scale of the road underpass construction, the overall extent and intensity of construction work would be seen in the centre of this view and would be a **minor adverse visual impact**. This impact level is unchanged from the Environmental Impact Statement.

Viewpoint 5 – View north-east from M4 Western Motorway onramp

Figure 3-6: Viewpoint 5 – View north-east from M4 Western Motorway onramp, existing view

Figure 3-6 presents the existing view at Viewpoint 5. The proposed works to realign Kay Street and Unwin Street would be less prominent in this view, which is glimpsed from vehicles on the M4 Motorway onramp. The amendment would be an improvement from what was identified in the Environmental Impact Statement from a visual amenity perspective as the construction of the road underpass would be located below this viewpoint. However, there would still be extensive construction work seen in the foreground and extending across much of this view associated with construction of the stabling and maintenance facility.

Overall, the impact level is unchanged from the Environmental Impact Statement resulting in a **moderate adverse visual impact**.

Views from Rosehill Gardens racecourse

The proposed amendment of the realignment of the general traffic and B-double route to an at-grade road and road underpass (from a road bridge) would reduce the vertical scale of the construction activity seen in the far background of oblique views from the Rosehill Gardens racecourse. While the amendment would further reduce the prominence of Stage 1 works in views from this location, the overall visibility of the works would be small and there would be no perceived change in the amenity of this view. The proposed amendment would result in a **negligible visual impact** and the impact level would be unchanged from the Environmental Impact Statement.

Changes to night time visual impact

The construction hours would not change as a result of the amendment and therefore there would be no changes to the night time visual impact of Stage 1 works.

Changes to or additional environmental mitigation measures

The proposed amendment would not require any changes or additions to the landscape character and visual amenity environmental mitigation measures provided in the Environmental Impact Statement.

3.4.5 Hydrology and flooding

The assessment of the potential changes in hydrology and flooding impacts as a result of the proposed amendment at the Clyde stabling and maintenance facility construction site is provided in the following sections. Where there are no changes in impacts predicted in the Environmental Impact Statement, these are not repeated in this Amendment Report.

Potential impacts on flood behaviour

The flooding impacts have been quantified for the amended design and are summarised in Table 3-2. In general, the proposed amendment would result in similar or reduced flooding impacts for the one per cent annual exceedance probability (AEP) event and the probable maximum flood (PMF) event in comparison to the Environmental Impact Statement. The proposed amendment would also result in potential decreases in peak flood levels on the Duck Creek floodplain upstream of the Clyde stabling and maintenance facility construction site compared to the Environmental Impact Statement, resulting in increased benefits.

Based on the flood impact outcomes for the five per cent AEP event in the Environmental Impact Statement, it is expected that the change in flooding impacts with the design amendment would be similar to those for the one per cent AEP event.

Table 3-2: Potential flooding impacts for amended Stage 1 – Clyde stabling and maintenance facility construction site

Potential impact	Impact description as per Environmental Impact Statement	Impact description with amendment	Change in potential impact
Change in flooding levels	Potential reduction in peak flood levels on the Duck Creek and A'Becketts Creek floodplains of up to 0.1 metres during the five per cent and one per cent AEP events (upstream of the Clyde stabling and maintenance facility).	Potential reduction in peak flood levels on the Duck Creek floodplain of up to 0.3 metres during the one per cent AEP event (upstream of the Clyde stabling and maintenance facility).	Increased benefits, with potential decreases in flood levels compared to predictions in the Environmental Impact Statement. The proposed amendment would result in a further reduction in peak flood levels of 0.2 metres.
		Potential reduction in peak flood levels on the A'Becketts Creek floodplain of up to 0.09 metres during the one per cent AEP events (upstream of the Clyde stabling and maintenance facility).	Slightly reduced benefits, with expected decreases in flood levels compared to Environmental Impact Statement. This would still be an improvement from existing conditions.
	Potential increase in peak flood levels in and adjacent to Duck Creek and Duck River of up to 0.08 metres during the five per cent and one per cent AEP events (downstream of the Clyde stabling and maintenance facility).	Potential increase in peak flood levels in and adjacent to Duck Creek and Duck River of up to 0.03 metres during the one per cent AEP events (downstream of the Clyde stabling and maintenance facility).	Reduction of 0.05 metres in the predicted increase in peak flood levels resulting in an improvement compared to the Environmental Impact Statement. A potential increase in average flood level compared to the Environmental Impact Statement by up to 0.007 metres. Additionally, the area which would be affected by flood level increases greater than 0.02 metres has increased to 86 hectares from the 32 hectares predicted in the Environmental Impact Statement. This is shown in yellow on Figure 3-12, with the extent as per the Environmental Impact Statement shown on Figure 3-11 for comparison.

Potential impact	Impact description as per Environmental Impact Statement	Impact description with amendment	Change in potential impact
	Potential increase in flood levels in the one per cent AEP event of up to 0.05 metres in the bunded areas on the Viva Energy site.	Potential increases in flood levels in bunded ponding areas on Viva Energy site at the downstream end of Duck River of 0.1 to 0.3 metres in the one per cent AEP event, as a result of the minor increase in flood levels in Duck River. The volume of water overflowing to the bunded areas and the flood levels in the bunded areas is sensitive to the Duck River flood levels.	Minor increase in potential impacts compared to Environmental Impact Statement.
	Potential increase in peak flood levels in the PMF event (upstream and downstream of the Clyde stabling and maintenance facility) up to 0.07 metres in the A'Becketts Creek floodplain.	Potential increase in peak flood levels in the PMF event (upstream and downstream of the Clyde stabling and maintenance facility) up to 0.09 metres in the A'Becketts Creek floodplain.	Minor increase in potential peak flood levels in the PMF event of 0.02 metres compared to Environmental Impact Statement.
	Potential increase in peak flood levels in the PMF event (upstream and downstream of the Clyde stabling and maintenance facility) up to 0.15 metres in the Duck Creek floodplain upstream of the culvert crossing.	Potential increase in peak flood levels in the PMF event (upstream and downstream of the Clyde stabling and maintenance facility) up to 0.14 metres in the Duck Creek floodplain upstream of the culvert crossing.	Minor reduction in potential peak flood levels in the PMF event of 0.01 metres compared to Environmental Impact Statement.
	Potential increase in peak flood levels in the PMF event (upstream and downstream of the Clyde stabling and maintenance facility) up to 0.06 metres in Duck Creek downstream of the culvert crossing.	Potential increase in peak flood levels in the PMF event (upstream and downstream of the Clyde stabling and maintenance facility) up to 0.08 metres in Duck Creek downstream of the culvert.	Minor increase in potential peak flood levels in the PMF event of 0.02 metres compared to Environmental Impact Statement.
	Potential increase in peak flood levels in the PMF event (upstream and downstream of the Clyde stabling and maintenance facility) up to 0.1 metres in the Duck River floodplain (upstream of the M4 Motorway).	Potential increase in peak flood levels in the PMF event (upstream and downstream of the Clyde stabling and maintenance facility) up to 0.1 metres in the Duck River floodplain (upstream of the M4 Motorway).	No change in potential peak flood levels in the PMF event compared to the Environmental Impact Statement.

Potential impact	Impact description as per Environmental Impact Statement	Impact description with amendment	Change in potential impact
	Potential increase in peak flood levels in the PMF event (upstream and downstream of the Clyde stabling and maintenance facility) up to 0.2 metres on the south-western section of Rosehill Gardens racecourse grounds.	Potential reduction in peak flood levels in the PMF event up to 0.05 metres on the south-western section of Rosehill Gardens racecourse grounds, and increases of up to 0.04 metres along the southern boundary of Rosehill Gardens racecourse grounds.	The change in impacts compared to the Environmental Impact Statement varies, with minor increases and decreases in potential peak flood levels in the PMF event in the vicinity of the Rosehill Gardens racecourse grounds compared to the Environmental Impact Statement.
Change in flood extent	Potential minimal increases in the flood extent for all events up to the PMF.	Potential minimal increases in the flood extent for all events up to the PMF.	No change compared to the Environmental Impact Statement.
	Potential maximum increases in the PMF extent of around 10 metres and typical increases of less than five metres.	Potential maximum increases in the PMF extent of around 10 metres and typical increases of less than five metres.	
Change in flood hazard	Potential minor increases in the high flood hazard extent in the five per cent and one per cent AEP and PMF events (refer to Figure 21-1 to Figure 21-3 of the Environmental Impact Statement).	Potential minor increases in the high flood hazard extent in the one per cent AEP (see Figure 3-8) and PMF events (see Figure 3-10).	No change compared to the Environmental Impact Statement. See Figure 3-7 and Figure 3-9 for the potential change in flood hazard predicted in the Environmental Impact Statement, for comparison.
	Some potential reductions in the high hazard extent in the five per cent and one per cent AEP events (refer to Figure 21-1 and Figure 21-2 of the Environmental Impact Statement).	Some potential reductions in the high hazard extent on the Duck Creek and A'Becketts Creek floodplains upstream of the Clyde stabling and maintenance facility in the one per cent AEP event (see Figure 3-8).	
Change in duration of inundation	No significant increases in the duration of inundation.	No significant increases in the duration of inundation.	No change compared to the Environmental Impact Statement.

Potential impact	Impact description as per Environmental Impact Statement	Impact description with amendment	Change in potential impact
Property impacts	Potential minor increases in flood levels of 0.01 to 0.02 metres at industrial properties in Auburn adjacent to Duck River in the five per cent and one per cent AEP events.	Potential minor increases in flood levels of 0.01 to 0.02 metres at industrial properties in Auburn adjacent to Duck River in the one per cent AEP events.	No change compared to the Environmental Impact Statement.
	Potential increases in flood levels of 0.08 metres at commercial and industrial properties near the Duck Creek and Duck River confluence in the five per cent and one per cent AEP events.	Potential increases in flood levels of 0.03 metres at commercial and industrial properties near the Duck Creek and Duck River confluence in the one per cent AEP event.	Minor reduction in potential property impacts by 0.05 metres compared to Environmental Impact Statement.
	No newly-affected properties in the one per cent AEP event.	No newly-affected properties in the one per cent AEP event.	While potential flood levels have increased within some properties, there would be no change to the previously identified flood affected properties in the Environmental Impact Statement.
	Potential for seven newly-affected properties in the PMF event.	Potential for five newly-affected properties in the PMF event.	Reduced impacts compared to Environmental Impact Statement, with two less properties to be newly-affected.
Critical infrastructure impacts	No significant impacts to critical infrastructure.	No significant impacts to critical infrastructure.	No change compared to the Environmental Impact Statement.
Climate change impacts	No increase in the flood protection level required to account for the effects of climate change on flooding.	No increase in the flood protection level required to account for the effects of climate change on flooding.	No change compared to the Environmental Impact Statement.

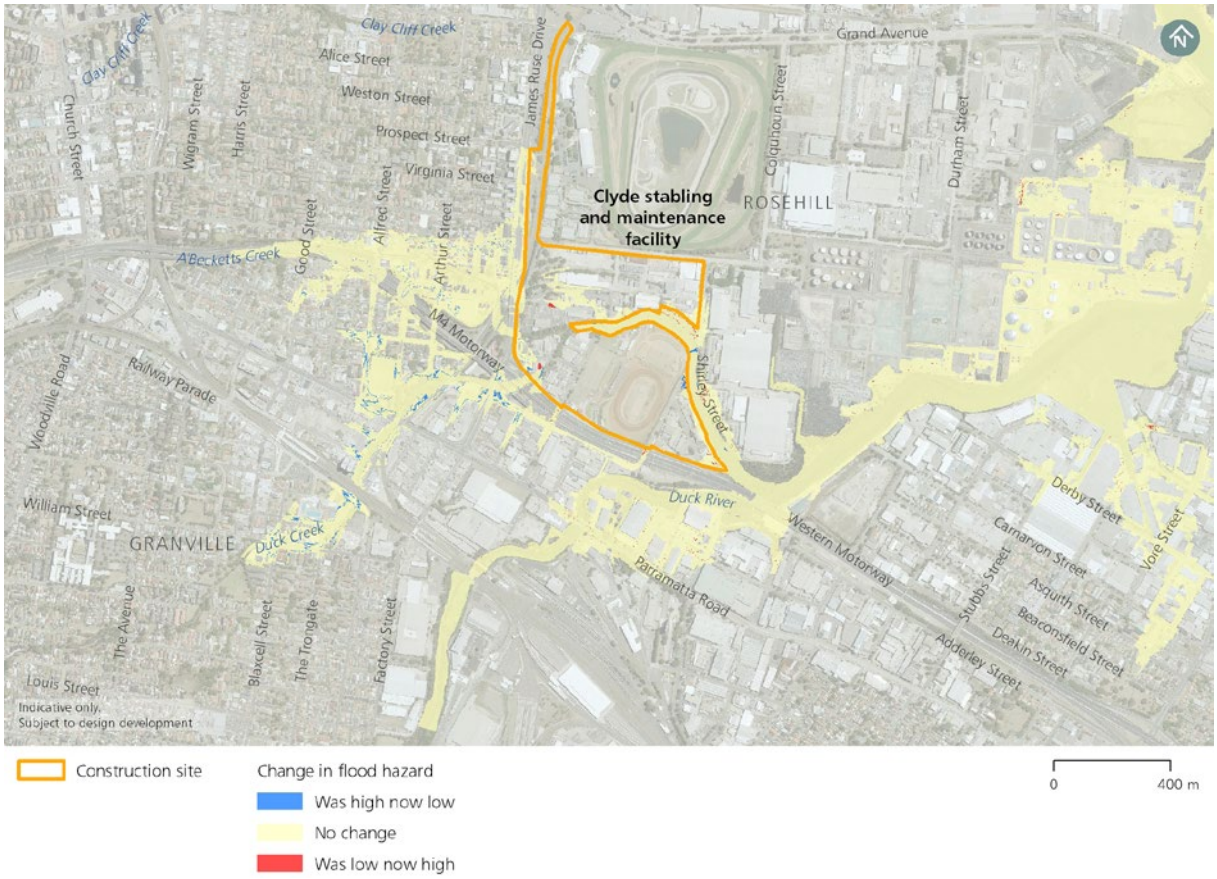

Figure 3-7: Potential change in flood hazard – one per cent AEP event as per the Environmental Impact Statement compared to existing environment

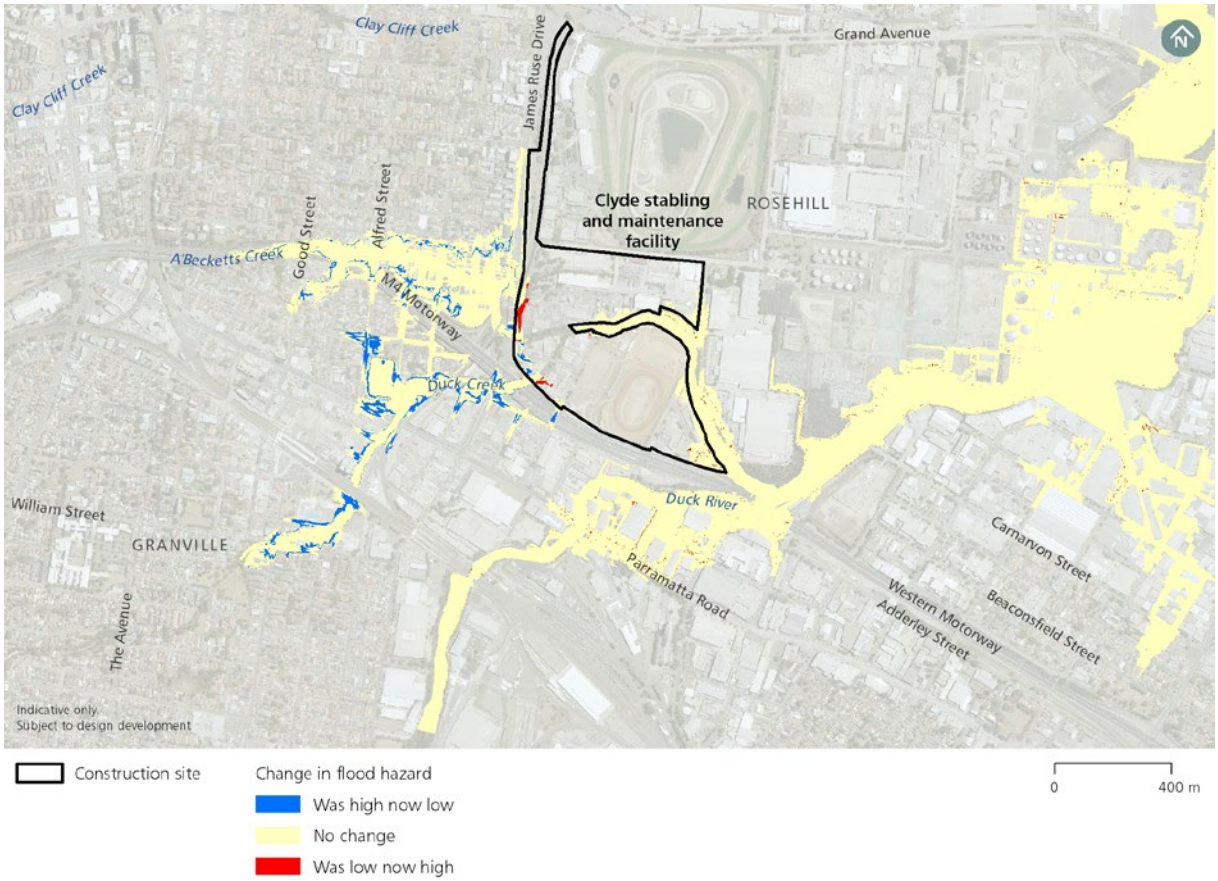

Figure 3-8: Potential change in flood hazard – one per cent AEP event for the proposed amendment compared to existing environment

Figure 3-9: Potential change in flood hazard – probable maximum flood event as per Environmental Impact Statement compared to existing environment

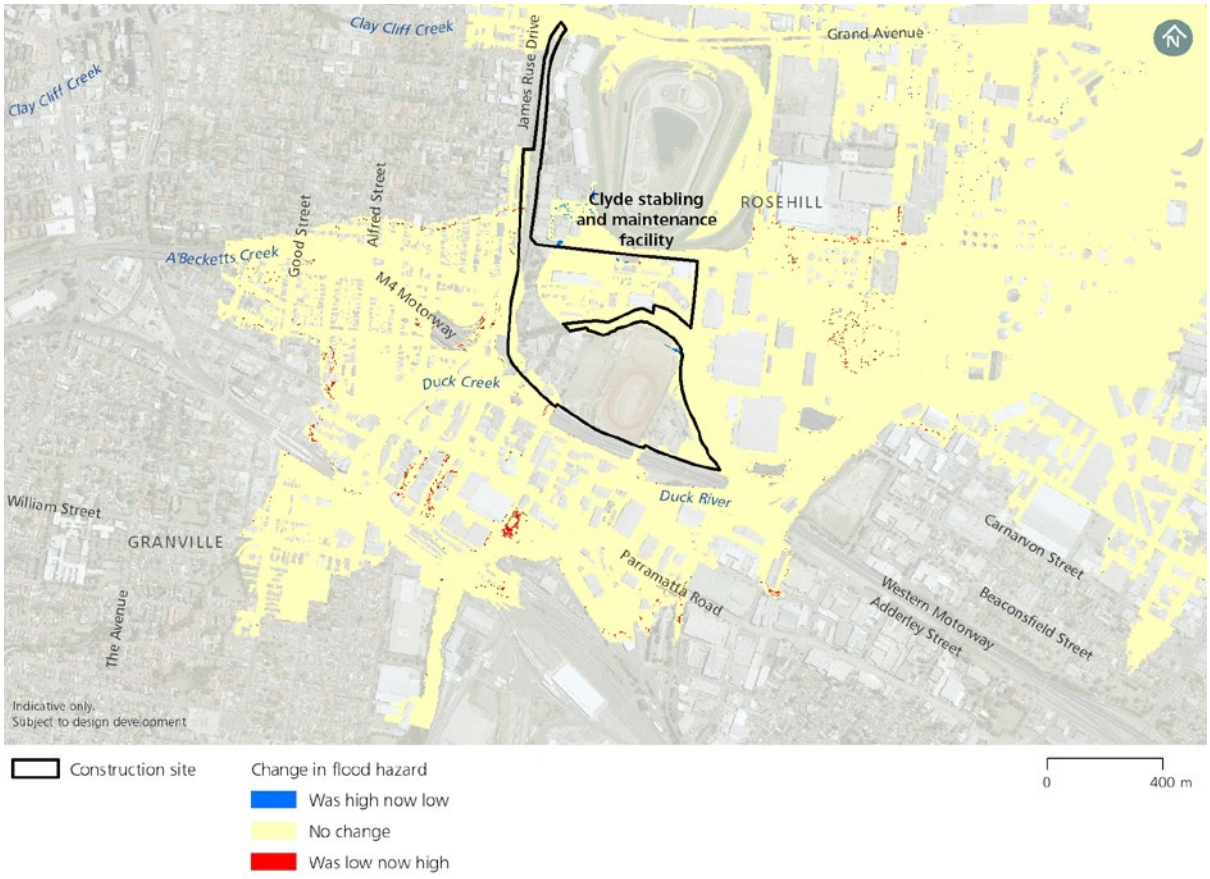

Figure 3-10: Potential change in flood hazard – probable maximum flood event for the proposed amendment compared to existing environment

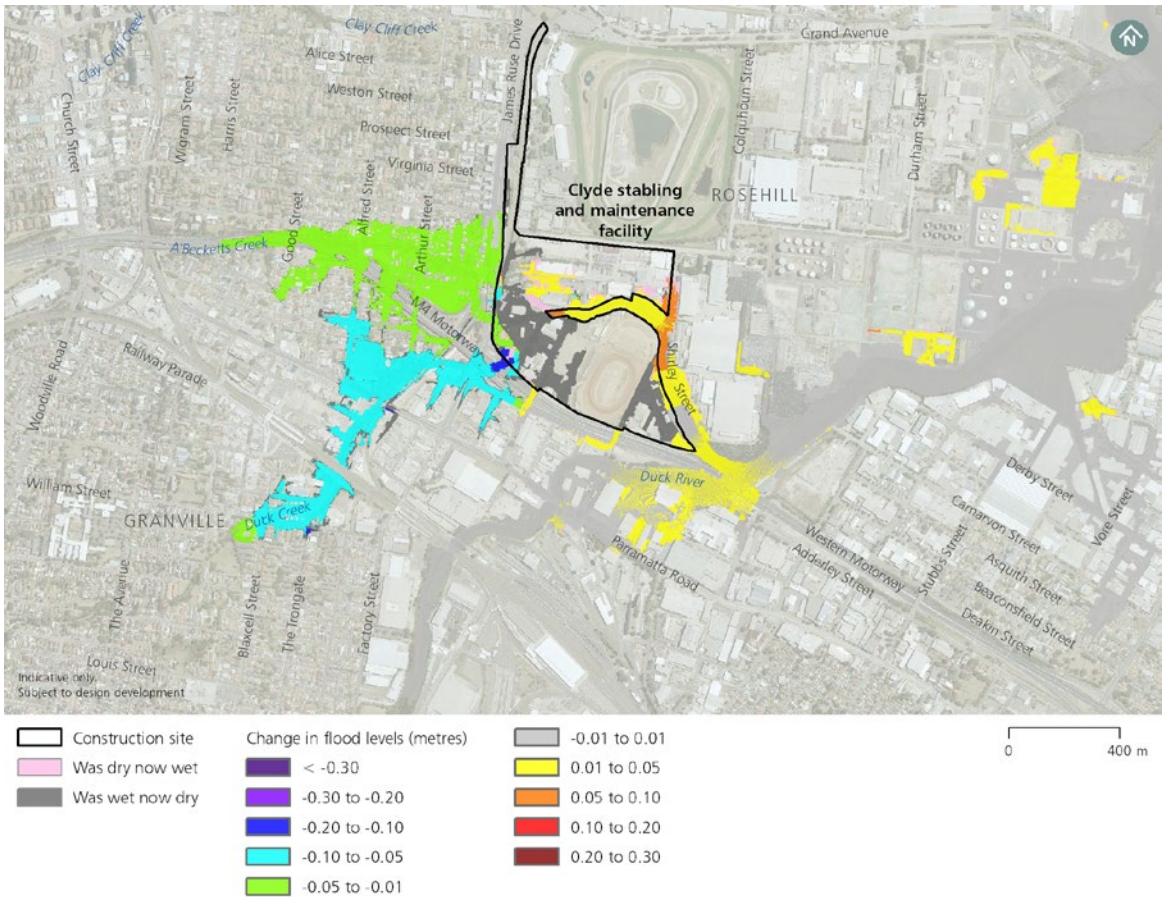

Figure 3-11: Potential change in flood levels – one per cent AEP event as per Environmental Impact Statement compared to existing environment

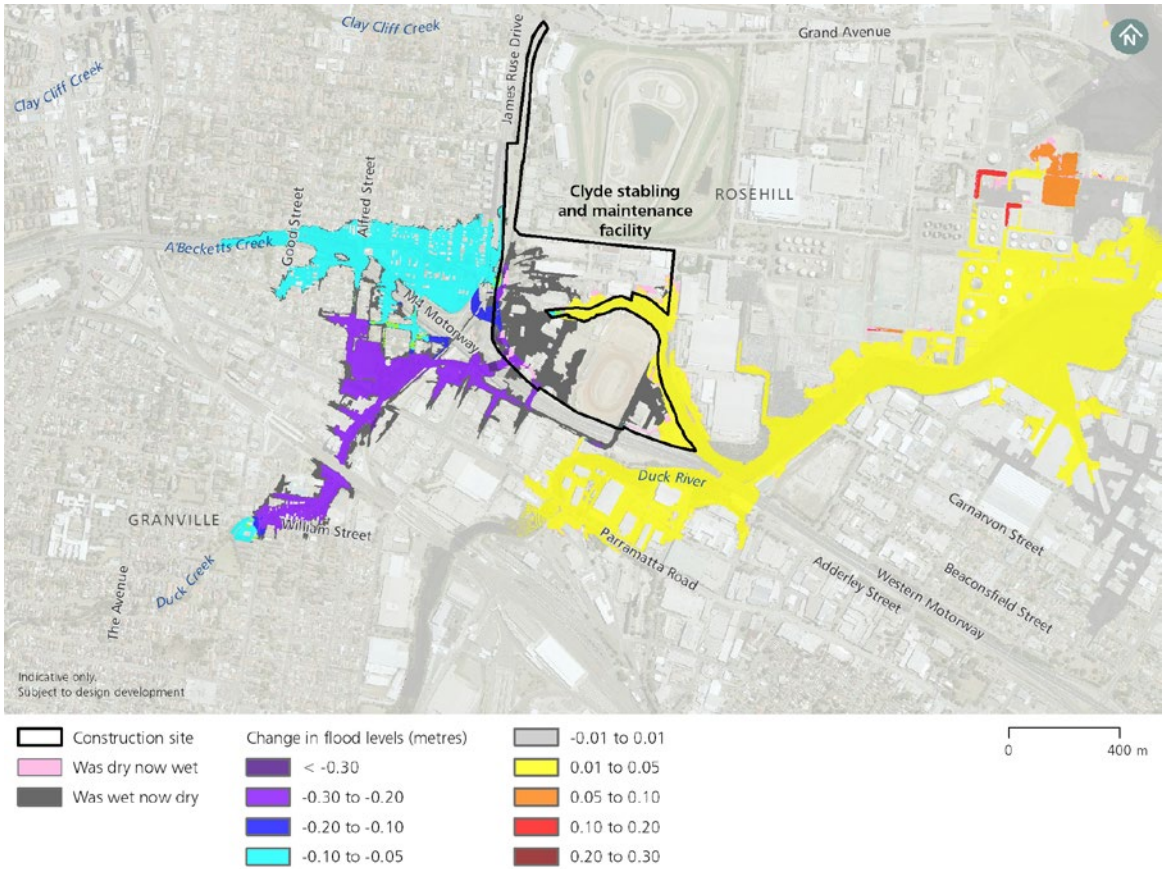

Figure 3-12: Potential change in flood levels – one per cent AEP event for the proposed amendment compared to existing environment

Potential downstream velocity and scour impacts

The updated TUFLOW flood modelling carried out for the proposed amendment indicate that flow velocities would reduce at and downstream of the culvert crossing outlets, from 1.1 metres per second in the scenario for the Environmental Impact Statement down to 0.8 metres per second with the proposed amendment in the one per cent AEP event. This represents a reduction in the impacts predicted in the Environmental Impact Statement, where an increase in flow velocities in the construction stage was expected. This is attributed to refinements in the Duck Creek and A'Becketts Creek culvert designs.

As described in environmental mitigation measure HF3 of Chapter 21 (Hydrology and flooding) of the Environmental Impact Statement, further design refinements at this construction site would occur during detailed design to mitigate potential impacts, including the potential increased risk of scour at the proposed creek crossings and in downstream channels.

Floodplain risk management

As there are no adopted floodplain risk management plans or proposed/implemented measures in the vicinity of the Clyde stabling and maintenance facility construction site or the surrounding floodplain, there would be no impacts on floodplain risk management as a result of the proposed amendment.

Potential impacts to emergency management arrangements for flooding

Emergency management routes, facilities and sensitive properties would remain unchanged from the Environmental Impact Statement.

There would be no consequential changes to potential impacts compared to the Environmental Impact Statement. The only change would be that parts of the Kinderoo property would potentially be affected in the PMF event with increases in flood depths of up to 0.03 metres (previously an increase of 0.02 metres predicted in the Environmental Impact Statement).

Cumulative impacts

There would be no predicted change in cumulative flood impacts at the Clyde staling and maintenance facility construction site as a result of the proposed amendment.

Changes to or additional environmental mitigation measures

Revisions to one, and removal of another of the hydrology and flooding environmental mitigation measures provided in the Environmental Impact Statement are proposed as a result of the proposed amendment. These are listed in Section 3.5.

Due to the location of the construction at the outlet of the A'Becketts Creek and Duck Creek catchments, the increased rates of runoff from the developed site are unlikely to be significant compared to the catchment flows. A delay in timing of site runoff due to detention is likely to worsen flooding. As a result, environmental mitigation measure HF2, as described in the Environmental Impact Statement, would no longer be required and is proposed to be removed.

3.5 Revised environmental mitigation measures

The revised environmental mitigation measures proposed to manage any potential impacts as a result of the proposed amendment to the Clyde stabling and maintenance facility construction site are provided in Table 3-3. New mitigation measures or additions to mitigation measures included in the Environmental Impact Statement are shown in bold text, with deletions shown with a strikethrough.

Table 3-3: Revised environmental mitigation measures – Clyde stabling and maintenance facility construction site

Reference	Impact/issue	Environmental Mitigation measure	Revised environmental mitigation measure	Application location(s)
Hydrology and flooding				
HF2	Flooding behaviour impacts	On-site stormwater detention would be provided for the Clyde stabling and maintenance facility to manage peak site runoff rates and volumes due to increased imperviousness of the site.	~~On-site stormwater detention would be provided for the Clyde stabling and maintenance facility to manage peak site runoff rates and volumes due to increased imperviousness of the site~~.	Clyde stabling and maintenance facility
HF3	Flooding behaviour impacts	Further design refinement at the Clyde stabling and maintenance facility construction site would occur during detailed design to mitigate the identified potential impacts including: • The increases in flood levels of up to 0.08 metres in Duck Creek and adjacent properties in the one per cent AEP flood event • Increases in flow velocities and the potential increased risk of scour at the proposed creek crossings and in the downstream channels • The potential flooding impacts from filled features including the road overbridge approach.	Further design refinement at the Clyde stabling and maintenance facility construction site would occur during detailed design to mitigate the identified potential impacts including: • The increases in flood levels of up to **0.03** ~~0.08~~ metres in Duck Creek and adjacent properties in the one per cent AEP flood event • Increases in flow velocities and the potential increased risk of scour at the proposed creek crossings and in the downstream channels • The potential flooding impacts from filled features ~~including the road overbridge approach~~.	Clyde stabling and maintenance facility

4 Sydney Olympic Park metro station construction site – northern pedestrian entry

This chapter provides a description of the proposed amendment at the Sydney Olympic Park metro station construction site, an environmental impact screening assessment, additional assessment of the amendment where required and identifies any changes required to environmental mitigation measures.

Additional engineering and design investigations have been undertaken to explore construction methodology options to minimise the proposed impacts associated with the construction of the northern pedestrian entry at Sydney Olympic Park, including to the heritage listed Abattoir Heritage Precinct gardens.

This investigation has resulted in the proposed amendment to change the construction methodology for the northern pedestrian entry from cut-and-cover to mined tunnel with a cut-and-cover shaft. The change in methodology to mined would avoid the need for cut-and-cover excavation across Herb Elliot Avenue and within the State significant State Abattoirs. This would avoid and minimise the heritage and visual impacts on the heritage listed Abattoir Heritage Precinct gardens identified in the Environmental Impact Statement. Additionally, the change in construction methodology would avoid the need for a partial or full road closure of Herb Elliot Avenue, and the potential relocation of underground services. Although this proposed amendment would result in some potential additional impacts for some aspects (as outlined below), overall, the proposed amendment would minimise environmental impacts associated with transport and traffic, non-Aboriginal heritage, and landscape character and visual amenity.

4.1 Design proposed in the Environmental Impact Statement

The Sydney Olympic Park metro station construction site is described in Section 9.5.5 of the Environmental Impact Statement. This station would be constructed using a cut-and-cover technique, including the northern pedestrian entry as part of Stage 1 works.

The location and indicative layout of the Sydney Olympic Park metro station construction site, including vehicle access and egress is reproduced in Figure 4-1.

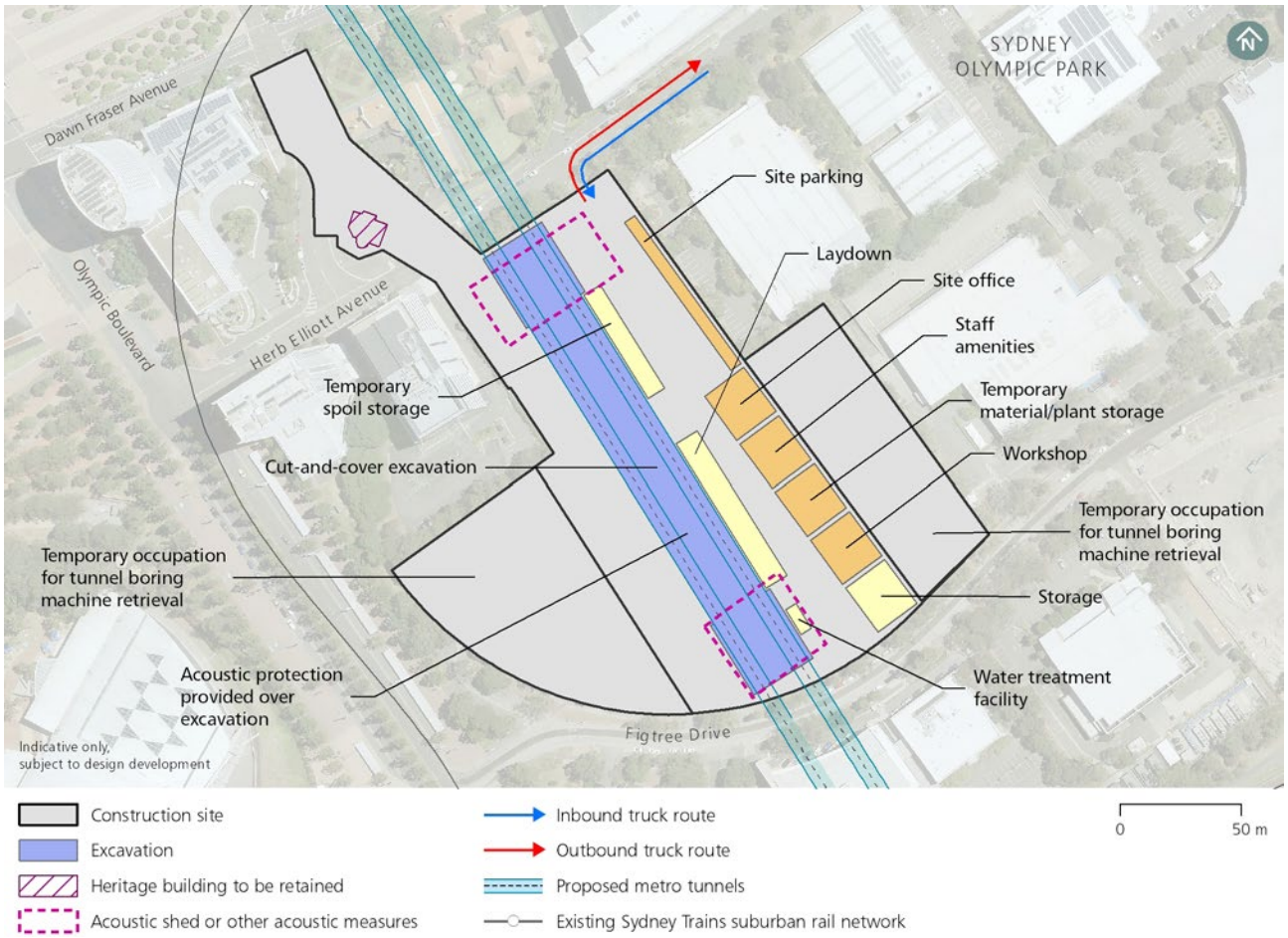

Figure 4-1: Exhibited Sydney Olympic Park metro station indicative construction site layout

4.2 Description of amendment

It is proposed to change the construction methodology for the northern pedestrian entry from cut-and-cover to a mined tunnel with a cut-and-cover shaft at the northern end to join Dawn Fraser Avenue. This would connect the secondary pedestrian entry to the main station. This is shown in Figure 4-2. The mined tunnel would be about 17.5 metres deep from ground level to floor level.

The duration of construction of the cut-and-cover shaft would be about five months. Construction of the mined tunnel would begin following completion of construction of the cut-and-cover shaft and would be about three months in duration. As a result, the total construction duration for the cut-and-cover shaft and the mined tunnel would be about eight months.

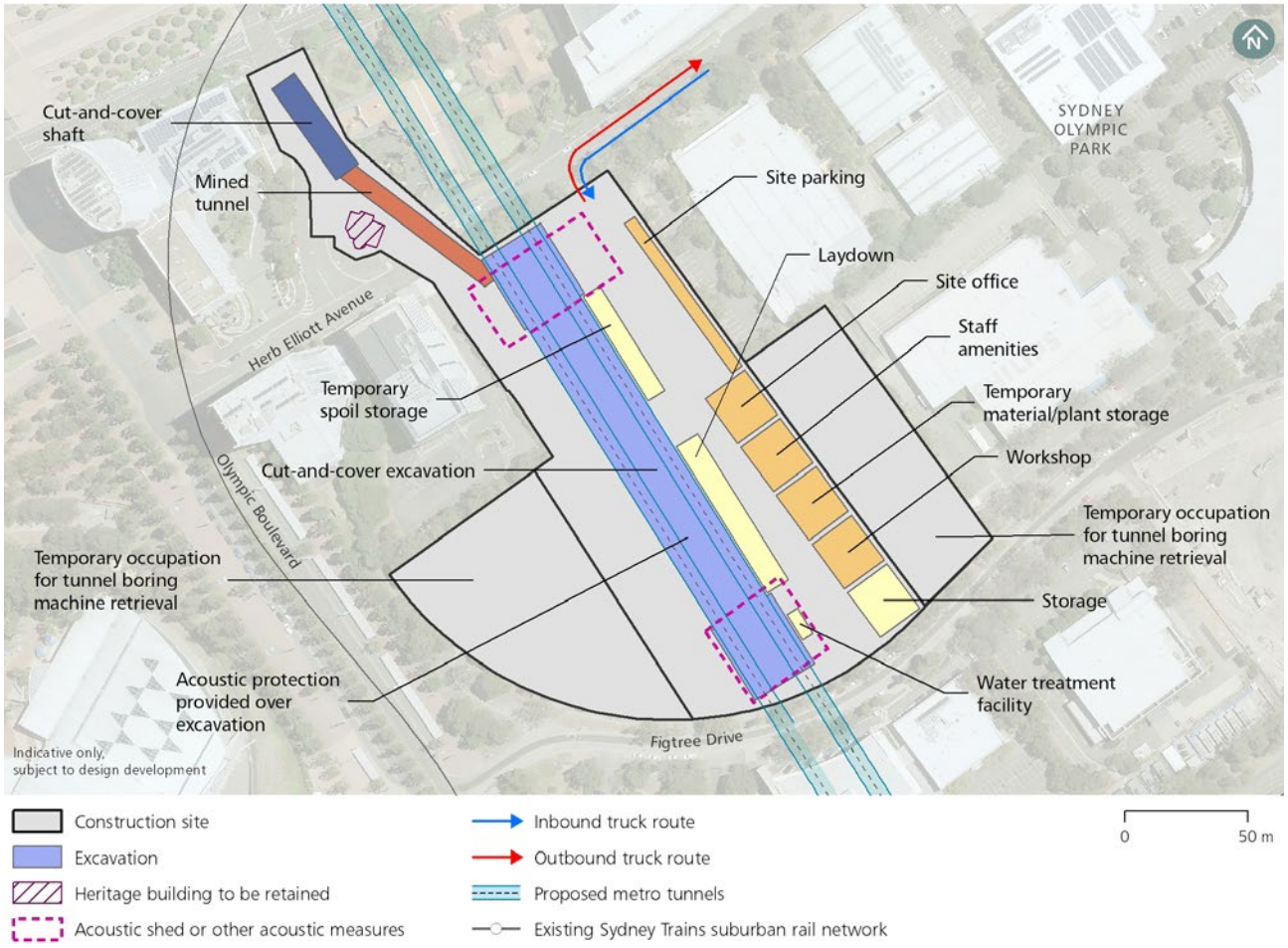

Figure 4-2: Amended Sydney Olympic Park metro station indicative construction site layout

4.3 Environmental impact screening assessment

This screening assessment considers whether the proposed amendment could change the potential impacts in the Environmental Impact Statement. Table 4-1 assesses whether additional environmental assessment of the proposed amendment would be required and if the assessment in the Environmental Impact Statement remains applicable. Where the requirement for further detailed assessment has been identified, this has been provided with any revised environmental mitigation measures in sections 4.4 and 4.5 respectively.

Table 4-1: Amended Sydney Olympic Park metro station construction site environmental screening

Environmental aspect	Comparison of proposed amendment against Environmental Impact Statement	Further detailed assessment required?
Transport and traffic	The proposed amendment would avoid the need for temporary partial or full road closures along Herb Elliot Avenue. No changes to construction vehicle numbers or routes are anticipated. Therefore, the amendment is expected to have a reduced transport and traffic impact compared to those described in the Environmental Impact Statement.	No
Noise and vibration	The excavation of the northern pedestrian entry was not assessed in the Environmental Impact Statement. Quantitative airborne noise, ground-borne noise and vibration predictions are required to identify the potential impacts from the excavation of the northern pedestrian entry as proposed in the amendment.	Yes

Environmental aspect	Comparison of proposed amendment against Environmental Impact Statement	Further detailed assessment required?
Non-Aboriginal heritage	The northern pedestrian entry would be located within the curtilage of the State significant State Abattoirs. Assessment is required to identify any potential changes in impacts from the amendment.	Yes
Aboriginal heritage	Construction of the amended northern pedestrian entry would not impact any Aboriginal sites or areas of Aboriginal archaeological potential. This is unchanged from the Environmental Impact Statement.	No
Property and land use	The construction site footprint would not change as a result of the proposed amendment. As such, no additional or changed property and land use impacts would result compared to the Environmental Impact Statement.	No
Landscape character and visual amenity	The proposed amendment may alter visual impacts, including changes to viewpoints and the landscape character impacts for the Abattoir Heritage Precinct assessed in the Environmental Impact Statement. Assessment is required to identify any potential changes in impacts from the amendment.	Yes
Business impacts	The proposed amendment to the construction methodology would not result in changed business impacts from those described in the Environmental Impact Statement, as it would not change traffic or passing trade. There may be some minor improvements in relation to access associated with no longer needing to temporarily close Herb Elliott Avenue.	No
Social impacts	The social factors and social risks for the proposed amendment would be consistent with those assessed in the Environmental Impact Statement.	No
Groundwater and ground movement	As there is no change to the excavation footprint or depth, the method of excavation is not expected to change the estimated groundwater-related impacts as discussed in the Environmental Impact Statement.	No
Soils and surface water quality	The proposed amendment is within the construction site footprint assessed in the Environmental Impact Statement and therefore the soils and surface water quality would be consistent with those described in the Environmental Impact Statement. The amendment is not anticipated to change the water balance presented in the Environmental Impact Statement.	No
Contamination	The construction site footprint, the excavation footprint and the excavation depth would not change as a result of the proposed amendment. As such, no additional or changed contamination impacts would result compared to the Environmental Impact Statement.	No
Hydrology and flooding	As the construction site is not flood affected, hydrology and flooding impacts would be consistent with those assessed in the Environmental Impact Statement.	No

Environmental aspect	Comparison of proposed amendment against Environmental Impact Statement	Further detailed assessment required?
Biodiversity	The construction site footprint would not change as a result of the proposed amendment. As such, no additional or changed vegetation or fauna habitat clearing would result. The potential impacts would be unchanged from that in the Environmental Impact Statement.	No
Air quality	The proposed amendment would generate potential dust and other air quality emissions consistent with those assessed in the Environmental Impact Statement.	No
Spoil, waste management and resource use	The proposed amendment would generate spoil and waste and would have resource needs consistent with those assessed in the Environmental Impact Statement.	No
Hazards	The potential hazards associated with the proposed amendment would be consistent with those assessed in the Environmental Impact Statement.	No
Sustainability and climate change	The potential climate change risks and greenhouse gas emissions associated with the proposed amendment would be consistent with those assessed in the Environmental Impact Statement. The environmental and sustainability management system that would be implemented would be unchanged.	No

4.4 Environmental impact assessment

4.4.1 Noise and vibration

Although the Environmental Impact Statement described and assessed the proposed cut-and-cover for the northern pedestrian entry, this construction was inadvertently omitted from the description of noise and vibration impacts described in Chapter 11 (Noise and vibration) of the Environmental Impact Statement. As a result, this section presents the noise and vibration impacts of the proposed amendment of a mined tunnel with a cut-and-cover shaft in comparison with the overall noise impacts assessed for the Sydney Olympic Park metro station construction site within the Environmental Impact Statement.

When compared to the base case construction methodology of cut-and-cover excavation of the entire northern pedestrian entry (as described in the Environmental Impact Statement), the impacts of the proposed amendment would be the same (for the cut-and-over shaft section) or reduced (for the mined tunnel section).

The noise and vibration construction scenario descriptions referred to in this section are described in Table 11-2 of the Environmental Impact Statement. The mined caverns scenario that is described in the Environmental Impact Statement would be applied to the construction of the northern pedestrian entry.

Consistent with the methodology used in the Environmental Impact Statement, the noise levels presented in this assessment are a result of modelling that has been based on a realistic worst-case assessment of each works scenario, where construction equipment is at the closest point to each receiver. The airborne noise levels and ground-borne noise and vibration levels were modelled and the results are presented in Appendix A (Noise and vibration technical information).

Stage 1 includes a number of base case environmental mitigation measures to minimise the potential temporary airborne noise impacts, which are considered part of the design or construction methodology in the impact assessment. As a result, the noise and vibration impacts described in this section have been assessed based on the inclusion of these base case environmental mitigation measures which are described in Chapter 11 (Noise and vibration) and throughout Technical Paper 2 (Noise and vibration) of the Environmental Impact Statement.

The potential temporary construction noise and vibration impacts would be managed in accordance with the *Sydney Metro Construction Noise and Vibration Standard* (Sydney Metro, 2020c) as described in Chapter 8, which aims to manage noise and vibration levels through feasible and reasonable measures. The Standard provides a process for the development of Construction Noise and Vibration Impact Statements, standard environmental mitigation measures and additional environmental mitigation measures to be implemented based on noise and vibration trigger levels.

Airborne noise impacts

Number of noise management level exceedances

The potential and temporary airborne noise levels from the proposed piling and initial excavation works associated with the cut-and-cover shaft north of the mined tunnel, are predicted to be comparable to the noise level results in the Environmental Impact Statement for the construction of the entire site at the majority of receivers, with up to two additional receivers predicted to be subject to temporary exceedances. The works would also result in an increase from one to two receivers with 'high' impacts, when compared to the Environmental Impact Statement assessment (these receivers were impacted in the Environmental Impact Statement assessment to a lesser degree). The additional impacted receivers are adjacent the site and are the same receivers for both scenarios. These predicted exceedances would occur for part of the estimated five month duration of cut-and-cover works and only during standard daytime construction hours.

The noise impacts of the mined cavern have been assessed on the basis that an acoustic shed would be constructed, and that the cavern would be mined from the station box towards the northern pedestrian entry following the construction of the acoustic shed. The additional mined cavern with shed works for the northern pedestrian entry are predicted to cause 'minor' impacts for the estimated three months duration of works, at one receiver during the night-time period (at a residential receiver to the east of the site). This would be due to noise transmitted through the open shed doors. These works are predicted to be compliant with the management levels when the shed doors are kept closed and during all other time periods.

Impacts during standard construction hours

The noise impacts predicted during standard construction hours from the proposed amendment are generally consistent with the predictions in the Environmental Impact Statement, with the only change being an increase of exceedance category at three of the receivers closest to the northern pedestrian entry as shown in Figure 4-3 for the approximate five month period of construction of the cut-and-cover shaft. These receivers include the Novotel Hotel, which changes from a 'minor' to 'moderate' exceedance, and two commercial receivers. All other receivers are predicted to have comparable temporary impacts to those presented in the Environmental Impact Statement.

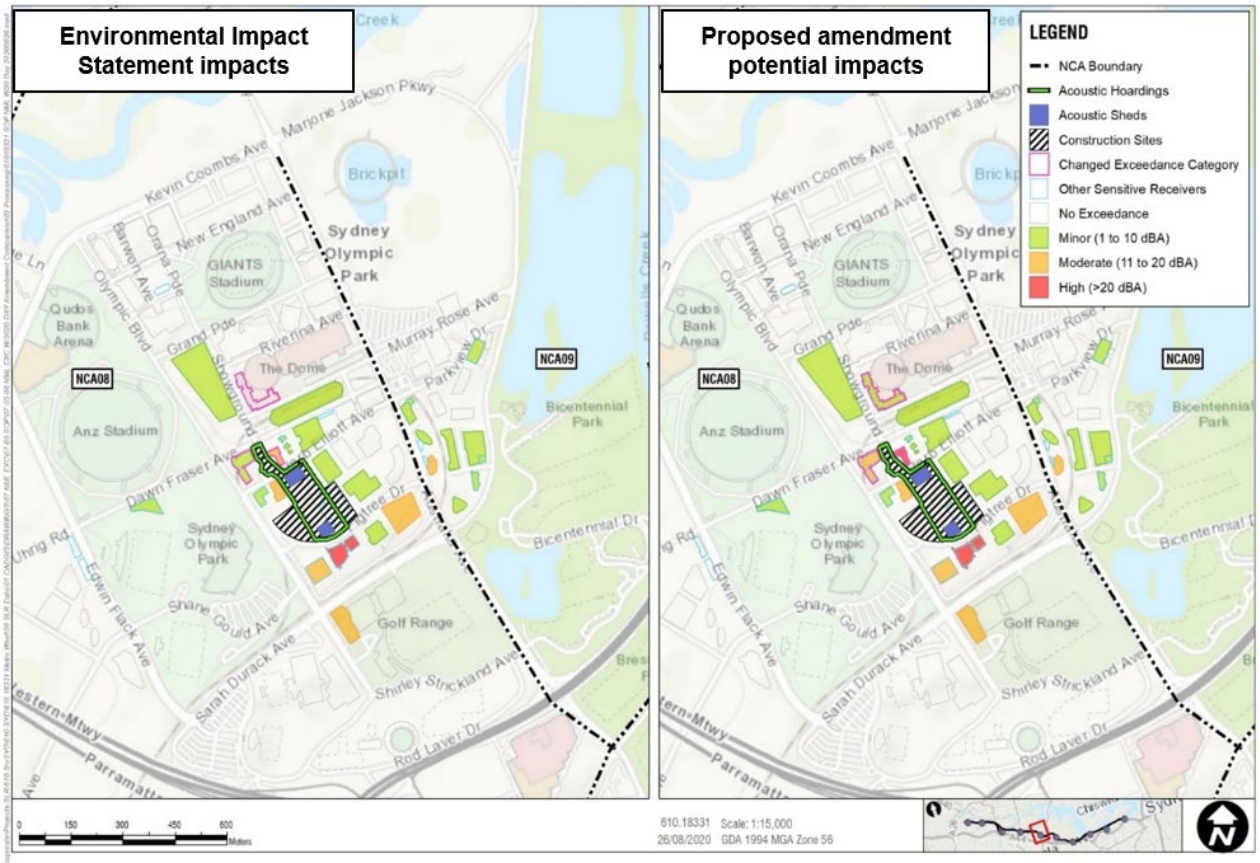

Figure 4-3: Worst-case daytime airborne noise impacts

Impacts during the night-time

Night time works for the northern pedestrian entry would be completed within the site's northern acoustic shed for about three months. In the worst-case scenario when the acoustic shed doors are open, one residential receiver to the east of the site is predicted to experience temporary minor impacts due to noise levels transmitted through the shed door. When the acoustic shed doors are closed, the predicted noise levels are compliant with the noise management levels at all receivers.

Sleep disturbance

The proposed amendment would not alter the results of the sleep disturbance noise impacts presented in the Environmental Impact Statement.

Highly noise affected residential receivers

The proposed amendment would not alter the results of the highly noise affected residential receivers presented in the Environmental Impact Statement.

Ground-borne noise impacts

The potential ground-borne noise impacts from the amended works are predicted to result in additional temporary daytime impacts, for the estimated three month period of mined excavation, at three receivers which are adjacent to the mined tunnel as shown in Figure 4-4. The additional temporary impacts include:

- High worst-case impacts at one commercial receiver, situated above the mined tunnel
- Moderate worst-case impacts at one commercial receiver building located to the east of the mined tunnel
- Minor worst-case impacts at one commercial receiver to the west of the mined tunnel.

The amended works during the night-time are predicted to result in temporary minor worst-case ground-borne noise impacts at one additional hotel building, which contains both the Ibis Sydney Olympic Park and Novotel Sydney Olympic Park receivers to the west of the mined tunnel.

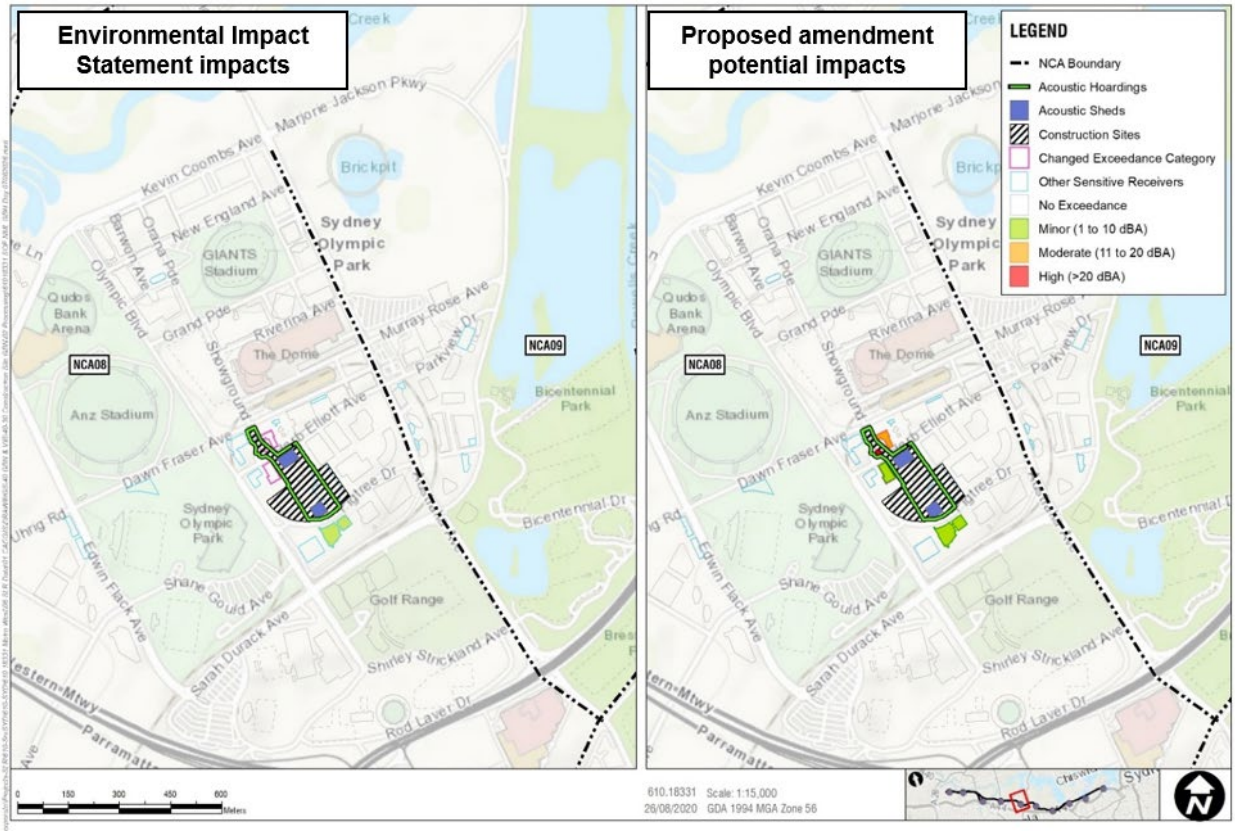

Figure 4-4: Ground-borne noise impacts – daytime construction hours

Vibration impacts

The proposed amendment would not alter the results of the temporary vibration impacts presented in the exhibited Environmental Impact Statement.

Changes to or additional environmental mitigation measures

The proposed amendment would not require any changes or additions to the noise and vibration environmental mitigation measures provided in the Environmental Impact Statement. The environmental mitigation measures described in Chapter 11 (Noise and vibration) of the Environmental Impact Statement would continue to be applied to impacted receivers, including any newly impacted receivers.

4.4.2 Non-Aboriginal Heritage

The proposed amendment would lower the impact to the State significant State Abattoirs Heritage item from the moderate impact described in the Environmental Impact Statement to a minor impact as a result of the proposed amendment. The northern section of the pedestrian entry that would remain cut-and-cover, while within the curtilage, is limited to an area of road and footpath associated with the heritage item. The section that is now proposed as being mined would be located beneath Herb Elliot Road and the gardens. This mined construction technique would not result in any surface works. In addition, there would be no removal of trees or vegetation and significant garden elements (including mature plantings and palm grove, garden beds, kerbing and landscape elements) would be retained.

Changes to or additional environmental mitigation measures

As a result of the decrease in impacts to the State significant State Abattoirs and the retention of the heritage gardens, environmental mitigation measure NAH9 as described in the Environmental Impact Statement would no longer be required and is proposed to be deleted. This deletion is shown in Section 4.5.

4.4.3 Landscape character and visual amenity

Changes to landscape impact

The proposed amendment may alter the impacts identified for The Abattoir Heritage Precinct which is considered in the following section. All other landscape impacts would remain unchanged from the Environmental Impact Statement.

The Abattoir Heritage Precinct

The proposed amendment would avoid any direct impact on the heritage gardens, resulting in a reduced landscape impact, compared to that described in the Environmental Impact Statement. Although reduced, there would continue to be an overall noticeable temporary reduction in the quality of this landscape, which is of local sensitivity which would result in a **minor adverse landscape impact**. This impact level is less than the moderate adverse impact identified in the Environmental Impact Statement.

The heritage gardens would be retained as a result of the proposed amendment to include a mined construction method at the northern pedestrian entry. This would include retaining the palm grove and surrounding carriage loop gardens, which provide a setting for the heritage listed gatehouse building and wider Abattoir Heritage Precinct.

While access to the gardens may be restricted during construction, the mature fan palm trees (*Washingtonia robusta*) would be visible above the hoarding, somewhat maintaining the legibility and some amenity within this area. The environmental mitigation measures proposed in the Environmental Impact Statement to manage any impacts on the gardens, such as dust, would be applied so that the health of the gardens are maintained. There would continue to be a temporary diversion of footpaths, affecting accessibility and legibility of the area, and the acoustic shed and other works would alter the visual relationship between the built form on the site and the heritage precinct.

Changes to daytime visual impact

Five representative viewpoints at Sydney Olympic Park were assessed in the Environmental Impact Statement. Only Viewpoint 1 – View south-east along Showground Road has been reassessed, as the proposed amendment would be seen only in this view.

Viewpoint 1 – View south-east along Showground Road

Figure 4-5: Viewpoint 1 – View south-east along Showground Road, existing view

Figure 4-5 presents the existing view at Viewpoint 1. The amendment would retain the heritage gardens including the visually prominent palm grove which would be seen above the site so there would be a reduced magnitude of visual change overall. There would still be substantial temporary construction activity seen in this view, and obstruction of the view to the heritage building and gardens, which would be a **minor adverse visual impact** which would be less than the moderate adverse impact identified in the Environmental Impact Statement.

Changes to night time visual impact

The construction hours would not change due to the proposed amendment. However, the inclusion of an underground mined construction method for a portion of the northern pedestrian entry may reduce the night time activity on the surface in the vicinity of the heritage gardens. Lighting for the construction site near the Abattoir Heritage Precinct would contrast with the lower light levels of this place, however, if alternative acoustic measures are provided instead of an acoustic shed, all lighting would be designed to minimise light spill and skyglow.

Retaining the vegetation within the gardens would also assist in the screening and containment of lighting to surrounding areas, including views from the elevated hotels and nearby residential towers which overlook the heritage gardens and this area of the site. These works would generally be in character with the existing setting, including nearby brightly lit commercial and residential buildings, public transport and sports facilities as well as the traffic on the surrounding streets.

Overall, while there is the potential that less lighting is required with the amendment, there may still be a noticeable temporary reduction in visual amenity at night and a **minor adverse visual impact**. This impact level is unchanged from the Environmental Impact Statement.

Changes to or additional environmental mitigation measures

The proposed amendment would not require any changes or additions to the landscape character and visual amenity environmental mitigation measures provided in the Environmental Impact Statement.

4.5 Revised environmental mitigation measures

The revised environmental mitigation measures proposed to manage any potential impacts as a result of the proposed amendment to the Sydney Olympic Park metro station construction site are provided in Table 4-2. New mitigation measures or additions to mitigation measures included in the Environmental Impact Statement are shown in bold text, with deletions shown with a strikethrough.

Table 4-2: Revised environmental mitigation measures – Sydney Olympic Park metro station construction site

Reference	Impact/issue	Environmental mitigation measure	Revised environmental mitigation measure	Application location(s)
Non-Aboriginal heritage				
NAH9	Direct heritage impacts	The impacted gardens within the State Abattoirs would be reinstated with sympathetic landscaping that is in keeping with the provisions of the Conservation Management plan.	~~The impacted gardens within the State Abattoirs would be reinstated with sympathetic landscaping that is in keeping with the provisions of the Conservation Management plan.~~	Sydney Olympic Park metro station

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5 Five Dock Station construction site – Waterview Street converted to one-way north of the main Five Dock car park

This chapter provides a description of the proposed amendment at the Five Dock Station construction site, an environmental impact screening assessment, additional assessment of the amendment where required and identifies any changes required to environmental mitigation measures.

As described in Chapter 6 (Community submissions) of the Submissions Report, community submissions raised concern that the use of heavy vehicles on local roads would result in safety and amenity issues, and raised concerns about the interactions of heavy and light vehicles in the vicinity of Five Dock Station construction site.

In response to this concern, construction traffic arrangements have been further investigated to further minimise potential conflicts with heavy vehicle movements in order to address potential safety risks and improve community outcomes at the Five Dock Station construction site. This investigation has resulted in a proposal to convert Waterview Street at Five Dock to a one-way northbound general traffic flow, north of the main Five Dock car park. This would minimise the interaction and potential conflicts between construction heavy vehicles and local traffic.

Options considered as part of this analysis included:

- Retaining Waterview Street as two-way traffic flow and retaining the on-street parking on both sides. This option was considered to have higher potential for conflicts and traffic safety issues between construction heavy vehicles and local traffic.
- Retaining Waterview Street as two-way traffic flow and removing on-street parking from one side of the street. This would have resolved the potential conflicts and traffic safety issues, however would have resulted in potential impacts associated with the removal of around 14 on-street parking spaces.
- Converting Waterview Street to one-way traffic flow and retaining on-street parking on both sides. This option was considered to resolve the potential conflicts and traffic safety issues and avoid the potential impacts from additional parking removal. However it would result in minor additional travel distance and time for some local residents (further assessed in Section 5.4.1). On balance, this was identified as the preferred option.

Although this proposed amendment would result in some potential additional impacts for some aspects (as outlined below), overall the proposed amendment would minimise environmental impacts associated with potential traffic safety and parking.

5.1 Design proposed in the Environmental Impact Statement

The Five Dock Station construction site is described in Section 9.5.8 of the Environmental Impact Statement. That section stated that the access to the eastern construction site would be left-in from Waterview Street. This is reproduced in Figure 5-1.

Figure 5-1: Exhibited Five Dock Station indicative construction site layout

While the Environmental Impact Statement did not propose any road network modifications to Waterview Street (with the exception of some removal of parking), the traffic and transport assessment described in Chapter 10 (Transport and traffic) of the Environmental Impact Statement included an environmental mitigation measure (TT20) to explore potential adjustments to site access arrangements at the Five Dock Station construction during detailed design to minimise conflicts with heavy vehicle movements.

5.2 Description of amendment

It is proposed to convert Waterview Street from a two-way street to a northbound one-way street north of the main Five Dock car park up to Second Avenue, for the period of Stage 1 construction. This is shown in Figure 5-2. Southbound traffic would be redistributed to other local streets.

This would minimise potential conflicts with northbound heavy vehicle movements arriving at the Five Dock Station eastern construction site and is anticipated to improve safety and traffic outcomes for the local area and avoid the need for additional on-street parking removal.

This amendment would also result in temporary localised redistribution of southbound traffic along the following roads:

- Great North Road
- First Avenue
- Second Avenue
- Park Road.

Figure 5-2: Amended road network modification at Five Dock Station construction site

Potential alternative traffic routes are shown in Figure 5-3 and include:

- From Great North Road in the southbound direction – left onto First Avenue and left onto Waterview Street
- From Waterview Street (between Second Avenue and Barnstaple Road) in the southbound direction – right onto Second Avenue, left onto Great North Road, left onto First Avenue and left onto Waterview Street
- From Waterview Street (between Second Avenue and Barnstaple Road) in the southbound direction – left onto Second Avenue, right onto Park Road, right onto First Avenue and right onto Waterview Street
- From Park Road in the southbound direction – right onto First Avenue and right onto Waterview Street
- From Second Avenue in the eastbound direction – right onto Park Road, right onto First Avenue and right onto Waterview Street
- From Second Avenue in the westbound direction – left onto Great North Road, left onto First Avenue and left onto Waterview Street.

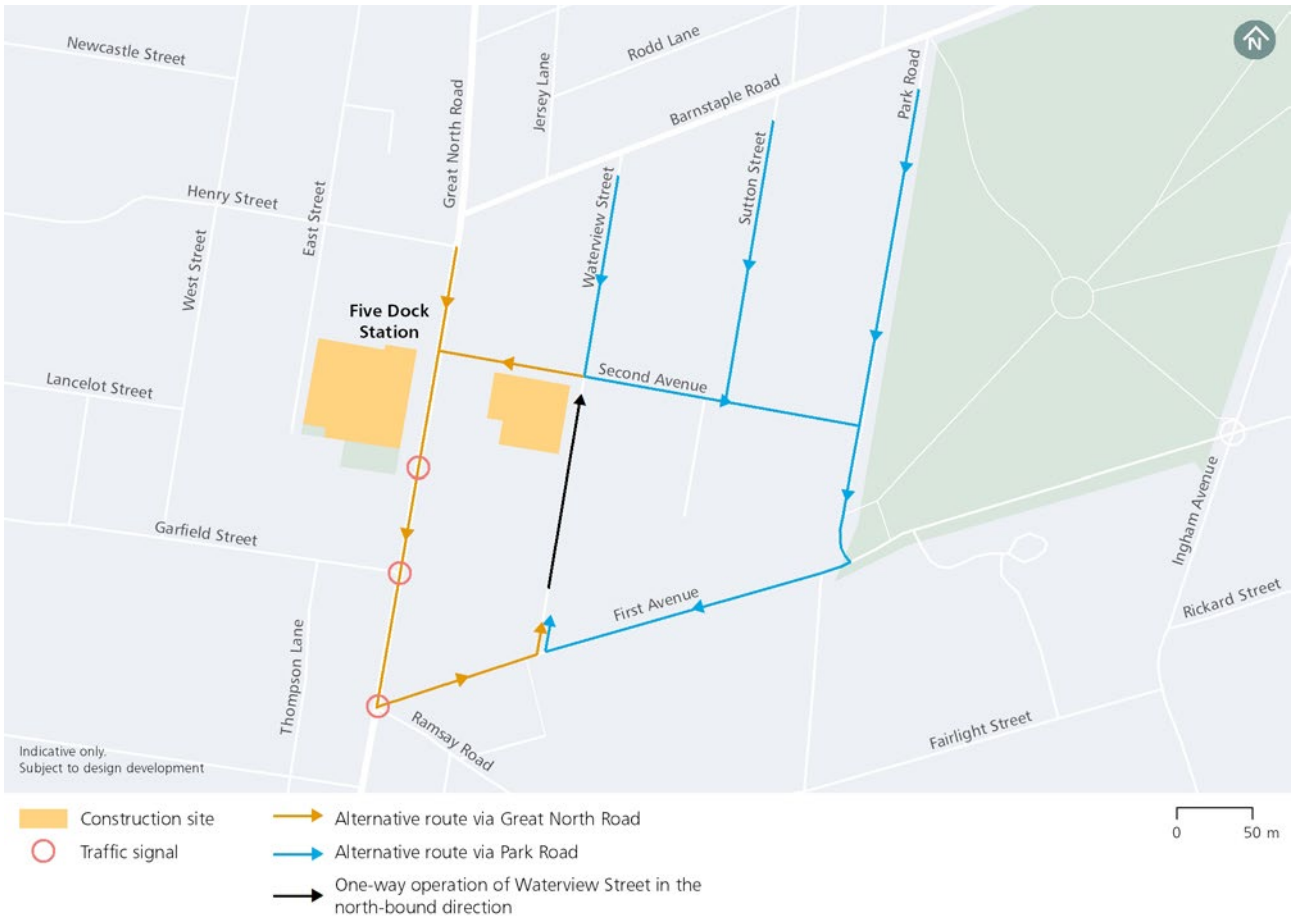

Figure 5-3: Potential alternate traffic routes

5.3 Environmental impact screening assessment

This screening assessment considers whether the proposed amendment could change the potential impacts in the Environmental Impact Statement. Table 5-1 assesses whether additional environmental assessment of the proposed amendment would be required and if the assessment in the Environmental Impact Statement remains applicable. Where the requirement for further detailed assessment has been identified, this has been provided with any revised environmental mitigation measures in sections 5.4 and 5.5 respectively.

Table 5-1: Amended Five Dock Station construction site environmental screening

Environmental aspect	Comparison of proposed amendment against Environmental Impact Statement	Further detailed assessment required?
Transport and traffic	Road network and interchange performance may be altered from those assessed in the Environmental Impact Statement. Further assessment is required to identify any potential changes in transport and traffic impacts resulting from the one-way conversion of Waterview Street.	Yes
Noise and vibration	The one-way conversion of Waterview Street could lead to changes to the road traffic noise impacts assessed in the Environmental Impact Statement. Further assessment is required to identify any potential changes in road traffic noise impacts.	Yes
Non-Aboriginal heritage	The construction site footprint would not change as a result of the proposed amendment. As such, no additional or changed non-Aboriginal heritage impacts would result compared to the Environmental Impact Statement.	No

Environmental aspect	Comparison of proposed amendment against Environmental Impact Statement	Further detailed assessment required?
Aboriginal heritage	The construction site footprint would not change as a result of the proposed amendment. As such, no additional or changed Aboriginal heritage impacts would result compared to the Environmental Impact Statement.	No
Property and land use	The construction site footprint would not change as a result of the proposed amendment. As such, no additional or changed property and land use impacts would result compared to the Environmental Impact Statement.	No
Landscape character and visual amenity	The proposed amendment would not alter any visual impacts and would not result in any changes to the viewpoints assessed in the Environmental Impact Statement. As such, no landscape character and visual amenity impacts would result compared to the Environmental Impact Statement.	No
Business impacts	Waterview Street north of the Five Dock car park is a residential area. As such, the proposed amendment would not result in changed business impacts from those described in the Environmental Impact Statement, as it would not change traffic or passing trade impacts for businesses.	No
Social impacts	The social factors and social risks for the proposed amendment would be consistent with those assessed in the Environmental Impact Statement.	No
Groundwater and ground movement	The construction site footprint and station excavation depth would not change as a result of the proposed amendment. As such, no additional or changed groundwater and ground movement impacts would result compared to the Environmental Impact Statement.	No
Soils and surface water quality	The construction site footprint and station excavation depth would not change as a result of the proposed amendment. As such, no additional or changed soils and surface water impacts would result compared to the Environmental Impact Statement.	No
Contamination	The construction site footprint and station excavation depth would not change as a result of the proposed amendment. As such, no additional or changed contamination impacts would result compared to the Environmental Impact Statement.	No
Hydrology and flooding	The proposed surface works, including the construction site footprint, would not change as a result of the proposed amendment. As such, no additional or changed hydrology and flooding impacts would result compared to the Environmental Impact Statement.	No
Biodiversity	The construction site footprint would not change as a result of the proposed amendment. As such, no additional or changed vegetation or fauna habitat clearing would result. The potential impacts would be unchanged from that in the Environmental Impact Statement.	No
Air quality	The proposed amendment would not result in any additional dust or other air quality emissions. The potential impacts would be unchanged from that in the Environmental Impact Statement.	No

Environmental aspect	Comparison of proposed amendment against Environmental Impact Statement	Further detailed assessment required?
Spoil, waste management and resource use	The proposed amendment would not result in any additional generation of spoil and waste and would have resource needs consistent with those assessed in the Environmental Impact Statement.	No
Hazards	The potential hazards associated with the proposed amendment would be consistent with those assessed in the Environmental Impact Statement.	No
Sustainability and climate change	The potential climate change risks and greenhouse gas emissions associated with the proposed amendment would be consistent with those assessed in the Environmental Impact Statement. The environmental and sustainability management system that would be implemented would be unchanged.	No

5.4 Environmental impact assessment

5.4.1 Transport and traffic

Impacts on road network performance

The conversion of Waterview Street to one-way northbound general traffic flow between the northern end of the main Five Dock car park and the Second Avenue intersection would minimise potential risk of conflicts with heavy vehicle movements and improve safety and community outcomes in the vicinity of Waterview Street and the Five Dock eastern construction site.

The redistribution of southbound traffic would likely result in a minor increase to traffic volumes at the following intersections that were assessed in the Environmental Impact Statement:

- Great North Road/Ramsay Road/First Avenue
- Great North Road/Second Avenue
- First Avenue/Waterview Street.

The temporary redistribution of southbound traffic would also result in a minor increase to traffic volumes at the following intersections that were not assessed in the Environmental Impact Statement:

- First Avenue/Park Road
- Second Avenue/Park Road.

The existing volume of southbound traffic on Waterview Street that would be redistributed on the local road network is about 20 vehicles in the morning peak hour and about 110 vehicles in the evening peak hour. Given the existing low volumes of southbound traffic on Waterview Street, it is expected that the performance of the intersections of Great North Road/Ramsay Road/First Avenue, Great North Road/Second Avenue and First Avenue/Waterview Street would be similar to the performance described in the Environmental Impact Statement. In addition, the intersections of First Avenue/Park Road and Second Avenue/Park Road have spare capacity to accommodate additional vehicles. Therefore, any potential temporary impacts of the redistribution of traffic on the local road network are considered minor.

The conversion of Waterview Street to one-way operation in the northbound direction north of the main Five Dock car park (on the corner of First Avenue and Waterview Street) could also result in increased travel distances and travel times for residents of Waterview Street between First Avenue and Second Avenue. The maximum additional travel distance when driving would be 600 metres and the additional travel time would be about three minutes. The additional travel distance and travel time impacts that residents of Waterview Street between First Avenue and Second Avenue would experience were assessed to be minor.

Parking and property access impacts

The proposed amendment is not anticipated to result in any changes to the parking and property access impacts described in the Environmental Impact Statement, as property access would be maintained and no additional parking spaces would be removed.

Public transport network impacts

'On-demand' bus services operated by Transit Systems may also be required to travel on alternative routes to access Waterview Street between First Avenue and Second Avenue. However, the additional travel distance and travel time is considered minor. Furthermore, the service only operates during off-peak periods on weekdays. No other impacts to the public transport network are anticipated.

Active transport network impacts

The proposed amendment is not anticipated to result in any changes to the active transport network impacts described in the Environmental Impact Statement. No pedestrian or cycle routes would be impacted.

Changes to or additional environmental mitigation measures

The proposed amendment would not require any changes or additions to the transport and traffic environmental mitigation measures provided in the Environmental Impact Statement. Sydney Metro would continue to investigate construction site access arrangements to reduce potential impacts and minimise potential conflicts with heavy vehicle movements.

5.4.2 Noise and vibration

Road traffic noise impacts

The existing volume of southbound traffic on Waterview Street would be redistributed on the local road network. This reduction in road traffic volumes on Waterview Street could reduce road traffic noise levels for receivers fronting this section of road. This would also result in a reduction in road traffic volumes on Waterview Street of up to 20 vehicles in the morning peak and 110 vehicles in the evening peak.

The low volumes of redirected Waterview Street southbound traffic, including construction vehicles, are not expected to significantly increase noise levels on the local road network due to comparably high volumes on Great North Road, Ramsay Road, First Avenue, Great North Road, Second Avenue and First Avenue. These changes in road traffic volumes are not expected to result in an increase in road traffic noise of two decibels or more.

Changes to or additional environmental mitigation measures

The proposed amendment would not require any changes or additions to the noise and vibration environmental mitigation measures provided in the Environmental Impact Statement.

5.5 Revised environmental mitigation measures

The proposed amendment to the Five Dock Station construction site would not require any changes or additions to the environmental mitigation measures provided in the Environmental Impact Statement.

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6 The Bays Station construction site – longer station box and site layout

This chapter provides a description of the proposed amendments at The Bays Station construction site, an environmental impact screening assessment, additional assessment of the amendments where required and identifies any changes required to environmental mitigation measures.

As described in Chapter 6 (Community submissions) of the Submissions Report, a business submission raised concern that the realignment of the Port Access Road would constrain the long-term development of the White Bay Precinct. Additional engineering and design investigations have been undertaken to consider how to reduce the scope of works at The Bays Station construction site, resulting in a more efficient construction scenario that would avoid the need to relocate the Port Access Road around The Bays Station construction site. This has resulted in retaining the Port Access Road and amending the site layout to reduce the complexity of works originally envisaged.

Additionally, investigations and construction planning have identified an opportunity to reduce the overall duration of construction works for future stages through creating a longer station box in Stage 1 works, minimising the noise and vibration and landscape character and visual amenity impacts of future stages and resulting in Sydney Metro West being delivered quicker and more efficiently.

The longer station box would enable the provision of dedicated access points for future tunnel fit-out works (at the western end) and the future eastern tunnelling works (at the eastern end) to be separated from the station works. This would allow the separation of different work packages; the earlier commencement of station works and would reduce the overall duration of construction works at The Bays. Although this proposed amendment would result in some potential additional impacts for some aspects (as outlined below), overall the proposed amendment would minimise environmental impacts associated with a reduction in the overall construction duration at The Bays Station construction site.

6.1 Design proposed in the Environmental Impact Statement

The Bays Station construction site is described in Section 9.5.10 of the Environmental Impact Statement.

The location and indicative layout of The Bays Station construction site, including vehicle access and egress (via Solomons Way and Port Access Road) is illustrated in Figure 9-30 of the Environmental Impact Statement and reproduced as Figure 6-1.

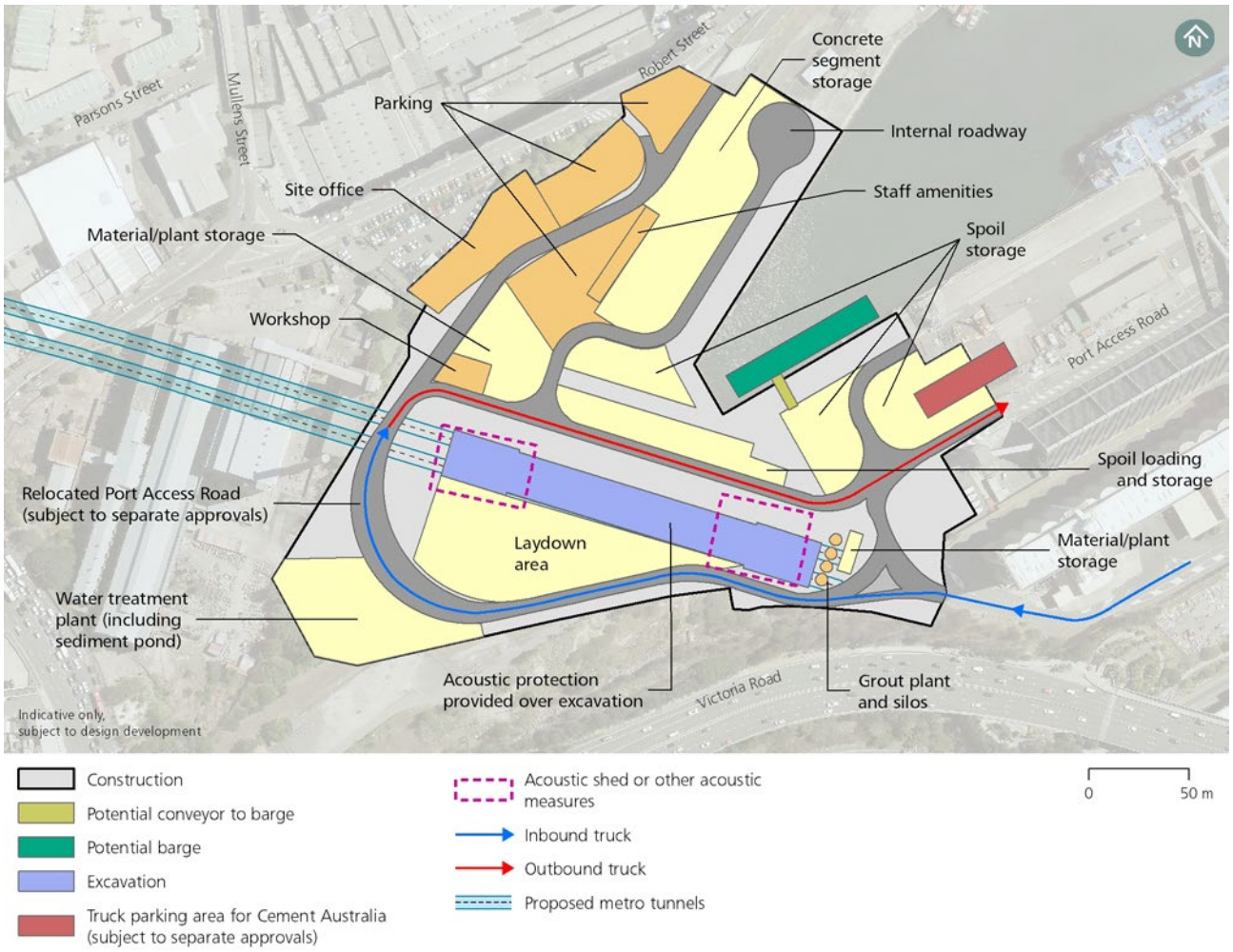

Figure 6-1: Exhibited The Bays Station indicative construction site layout

6.2 Description of amendments

The proposed amendments at The Bays Station construction site include:

- A longer station box to support future eastern tunnelling and tunnel fit-out construction work
- Changes to the construction site layout to retain the current alignment of Port Access Road and the longer station box.

The proposed amendments to the construction site layout are shown in Figure 6-2 and include:

- Adjustment of staff amenities, storage areas, and sheds around the retained Port Access Road and longer station box
- Repositioning of the acoustic sheds (or other acoustic measures) to avoid the retained Port Access Road and reflect the longer station box
- Relocation of the grout plant and silos to the southern side of the station box.

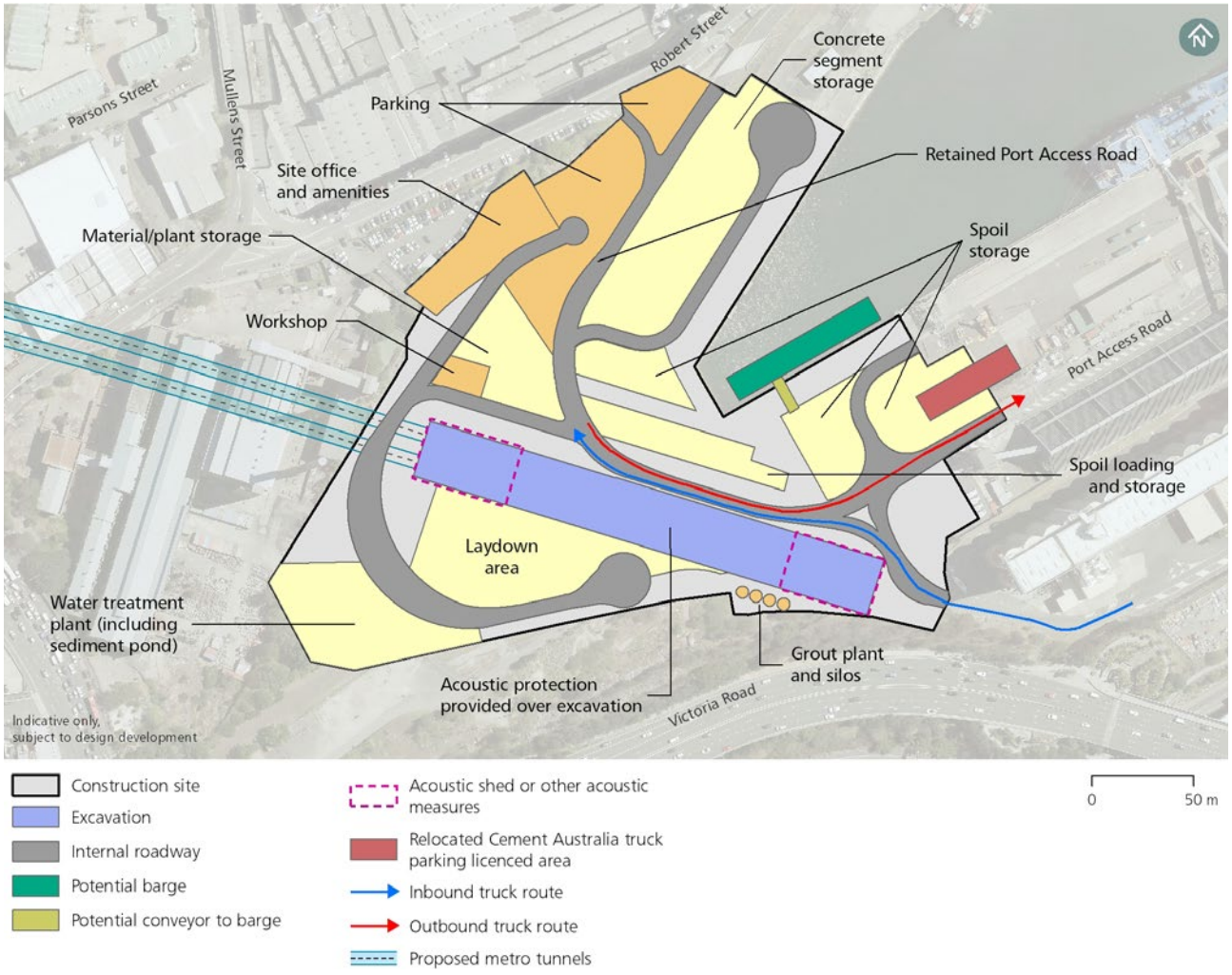

Figure 6-2: Amended The Bays Station indicative construction site layout

6.3 Environmental impact screening assessment

This screening assessment considers whether the proposed amendments could change the potential impacts in the Environmental Impact Statement. Table 6-1 assesses whether additional environmental assessment of the proposed amendments would be required and if the assessment in the Environmental Impact Statement remains applicable. Where the requirement for further detailed assessment has been identified, this has been provided with any revised environmental mitigation measures in sections 6.4 and 6.5 respectively.

Table 6-1: Amended The Bays Station construction site environmental screening

Environmental aspect	Comparison of proposed amendments against Environmental Impact Statement	Further detailed assessment required?
Transport and traffic	A relatively minor volume of additional spoil material would need to be removed from the site as a result of the proposed amendments. While daily project-related traffic numbers would remain consistent with the Environmental Impact Statement, heavy vehicle removal of spoil would occur over a longer duration than previously described in the Environmental Impact Statement. The construction vehicle numbers and routes would not change as a result of the proposed amendments.	No

Environmental aspect	Comparison of proposed amendments against Environmental Impact Statement	Further detailed assessment required?
Noise and vibration	The changes to the construction site layout at The Bays have the potential to affect construction airborne noise levels at nearby receivers. Quantitative assessment is required to identify any potential changes to impacts from the amendments. The revised station box footprint would be approximately 30 metres closer to heritage listed Glebe Island Silo buildings and encroaches further within the curtilage of the White Bay Power Station. Quantitative ground-borne noise and vibration predictions are required to identify any potential changes to impacts from the amendments.	Yes
Non-Aboriginal heritage	The Bays Station construction site would encroach upon the curtilage of the State Heritage Register listed White Bay Power Station and could change potential impacts on the locally listed The Valley Conservation Area, Glebe Island Silos, White Bay Power Station (outlet) Canal and the Beattie Street Stormwater Channel No. 15. Assessment is required to identify any potential changes in impacts from the amendments compared to the Environmental Impact Statement.	Yes
Aboriginal heritage	One area of Aboriginal archaeological potential is located within The Bays station construction site. Assessment is required to identify any potential changes in impacts from the amendments.	Yes
Property and land use	The proposed amendments would not result in any changes to properties or land use from those assessed in the Environmental Impact Statement. No additional properties would be acquired as a result of the proposed amendments.	No
Landscape character and visual amenity	The proposed amendments may alter visual impacts, including changes to viewpoints assessed in the Environmental Impact Statement. Assessment is required to identify any potential changes in impacts from the amendments.	Yes
Business impacts	The business impacts and business risks for the proposed amendments would be consistent with those assessed in the Environmental Impact Statement. No additional businesses would be impacted by the proposed amendments.	No
Social impacts	The social factors and social risks for the proposed amendments would be consistent with those assessed in the Environmental Impact Statement.	No
Groundwater and ground movement	The station box would be larger than the box proposed in the Environmental Impact Statement, resulting in the potential for further ground and groundwater disturbance. Assessment is required to identify any potential changes in impacts from the amendments.	Yes

Environmental aspect	Comparison of proposed amendments against Environmental Impact Statement	Further detailed assessment required?
Soils and surface water quality	The proposed amendments are within the construction site footprint assessed in the Environmental Impact Statement and therefore the soils and surface water quality would be consistent with those described in the Environmental Impact Statement. The amendments are not anticipated to change the water balance presented in the Environmental Impact Statement.	No
Contamination	The construction site footprint would not change as a result of the proposed amendments. As such, no additional or changed contamination impacts would result compared to the Environmental Impact Statement.	No
Hydrology and flooding	The proposed amendments would require increased excavation which may have the potential for both increased and decreased hydrology and flooding impacts depending on location. Assessment is required to identify any potential changes in impacts from the amendments.	Yes
Biodiversity	The proposed amendments would not result in any additional clearing of vegetation or fauna habitat than assessed in the Environmental Impact Statement.	No
Air quality	The proposed amendments would generate dust and other air quality emissions consistent with those assessed in the Environmental Impact Statement.	No
Spoil, waste management and resource use	The proposed amendments would generate spoil and waste and would have resource needs consistent with those assessed in the Environmental Impact Statement.	No
Hazards	The potential hazards associated with the proposed amendments would be consistent with those assessed in the Environmental Impact Statement.	No
Sustainability and climate change	The potential climate change risks and greenhouse gas emissions associated with the proposed amendments would be consistent with those assessed in the Environmental Impact Statement. The environmental and sustainability management system that would be implemented would be unchanged.	No

6.4 Environmental impact assessment

6.4.1 Noise and vibration

Consistent with the Environmental Impact Statement, the noise levels presented in the noise and vibration assessment are based on a realistic worst-case assessment of each works scenario, where construction equipment is at the closest point to each receiver. Stage 1 includes a number of base case environmental mitigation measures to minimise the potential airborne noise impacts, which are considered as part of the design or construction methodology in the impact assessment. As a result, the noise and vibration impacts described in this section have been assessed based on the inclusion of these base case environmental mitigation measures which are described in Table 11-61 and throughout Technical Paper 2 (Noise and vibration) of the Environmental Impact Statement.

The potential temporary construction noise and vibration impacts would be managed in accordance with the *Sydney Metro Construction Noise and Vibration Standard* (Sydney Metro, 2020c), which aims to manage noise and vibration levels through feasible and reasonable measures. The Standard provides a process for the development of Construction Noise and Vibration Impact Statements, standard environmental mitigation measures and additional environmental mitigation measures to be implemented based on noise and vibration trigger levels.

Airborne noise impacts

Number of noise management level exceedances

The amended works associated with the revised construction site layout at The Bays Station construction site results in a relatively minor increase in the number of receivers with predicted temporary exceedances of noise management levels during initial excavation works due to the additional excavation locations as follows:

- During worst-case daytime initial excavation (involving the use of rockbreakers) there are predicted to be an additional:
  - Three receivers with moderate impacts (an increase from 30 receivers as per the Environmental Impact Statement to 33 receivers with the proposed amendments)
  - Twenty-four receivers with minor impacts (an increase from 510 receivers as per the Environmental Impact Statement to 534 receivers with the proposed amendments)
- During all other initial excavation works there are predicted to be an additional three receivers with minor impacts (an increase from 30 receivers as per the Environmental Impact Statement to 33 receivers with the proposed amendments).

A larger increase in the number of receivers temporarily exceeding noise management levels is predicted during excavation with acoustic shed works and tunnel boring machine launch and support works during the night-time as follows:

- During worst-case night-time excavation (involving the use of rockbreakers with the door of the acoustic shed closed) there are predicted to be an additional:
  - Ten receivers with moderate impacts (an increase from two receivers as per the Environmental Impact Statement to 12 receivers with the proposed amendments)
  - Seventy-four receivers with minor impacts (an increase from 333 receivers as per the Environmental Impact Statement to 407 receivers with the proposed amendments)
- During worst-case night-time tunnel boring machine launch and support works there are predicted to be:
  - Three receivers with moderate impacts (none were predicted in the Environmental Impact Statement)
  - An additional 115 receivers with minor impacts (an increase from 182 receivers as per the Environmental Impact Statement to 297 receivers with the proposed amendments). These increases are primarily due to amended on-site truck routes.

Further details on the predicted airborne noise impacts from construction works are provided in Appendix A (Noise and vibration technical information).

Impacts during standard construction hours

As shown in Figure 6-3, the temporary noise impacts predicted from the amended excavation works at The Bays Station construction site are similar to the predictions presented in the Environmental Impact Statement. Although there is a slight increase in the number of receivers predicted in each exceedance band, the impacts are in the same areas and affect similar receivers.

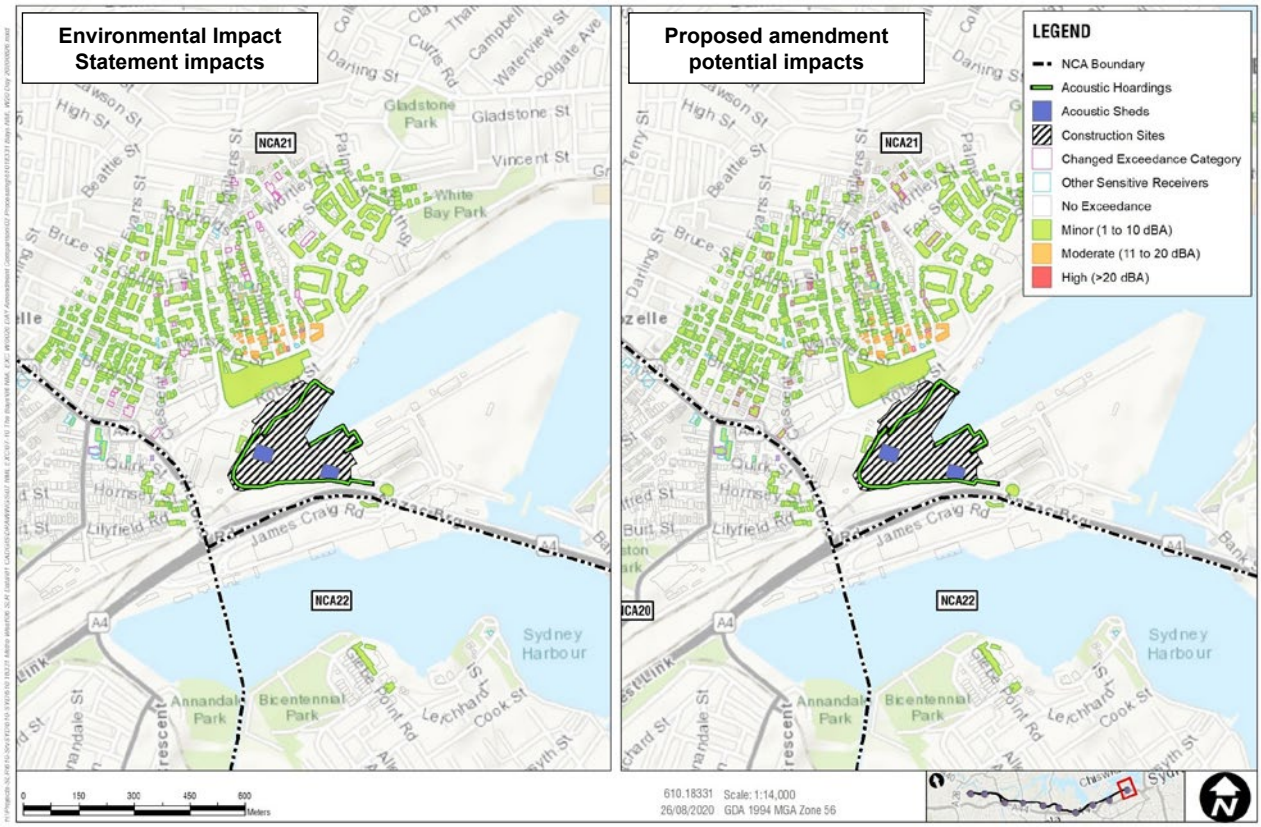

Figure 6-3: Worst-case daytime airborne noise impacts

Impacts during the night-time

As shown in Figure 6-4, the temporary noise impacts predicted from the amended excavation works would affect more receivers over a larger area during night-time works. The increased impacts are most apparent at the eastern and western extents of noise catchment area (NCA) 21, located to the north of The Bays Station construction site, due to the increased line of site between these receivers and the amended on-site truck route.

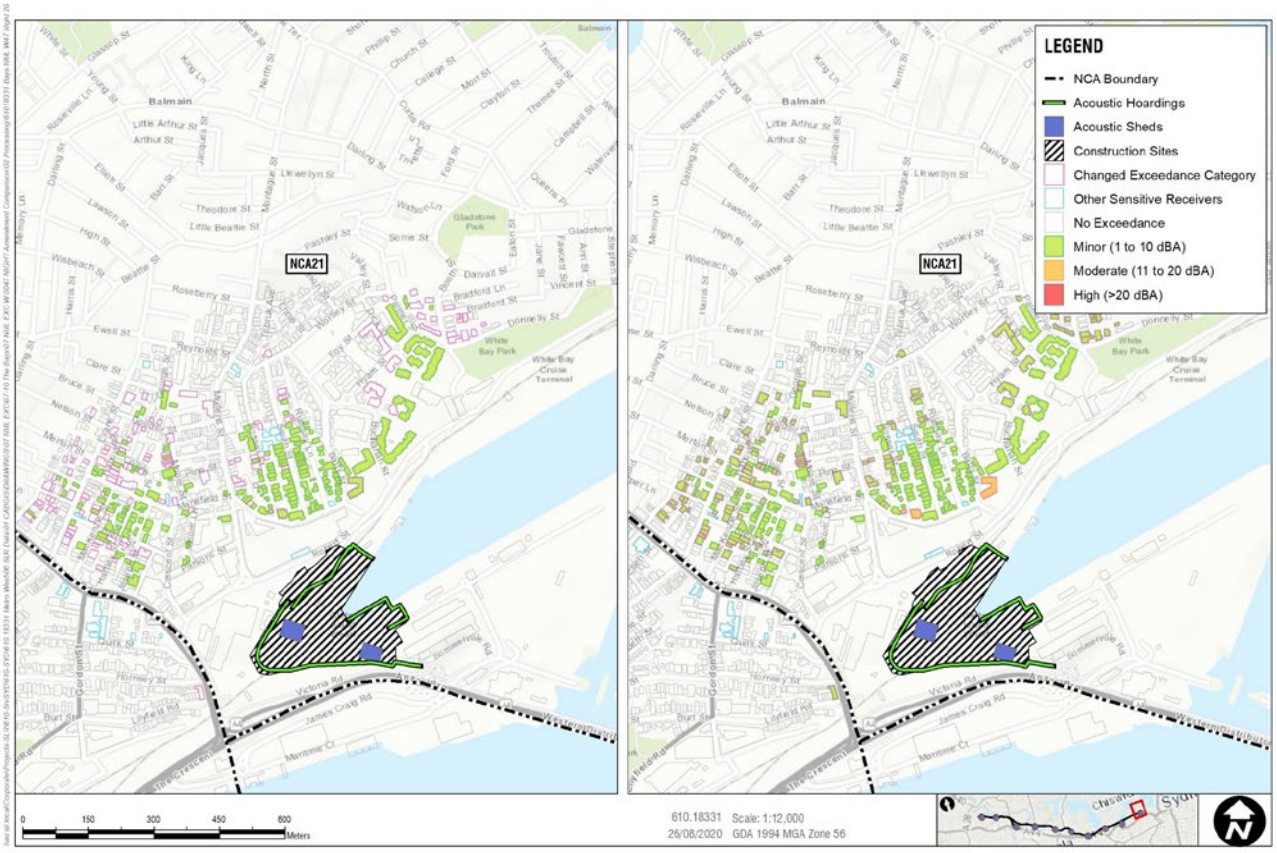

Figure 6-4: Worst-case night-time airborne noise impacts

Sleep disturbance

One additional residential receiver, located approximately 150 metres north of the construction site boundary, is predicted to have minor sleep disturbance impacts during noisy works. These impacts would potentially result from heavy vehicles movements in the outdoor areas of the site as well as from spoil loading activities located immediately north-east of the acoustic sheds.

Highly noise affected receivers

The proposed amendments would not alter the results of the highly noise affected residential receivers presented in the Environmental Impact Statement.

Ground-borne noise impacts

The proposed amendments would not alter predicted ground-borne noise impacts presented in the Environmental Impact Statement.

Vibration impacts

The proposed amendments would not alter predicted vibration impacts presented in the Environmental Impact Statement.

Changes to or additional environmental mitigation measures

The proposed amendments would not require any changes or additions to the noise and vibration environmental mitigation measures provided in the Environmental Impact Statement. The environmental mitigation measures described in Chapter 11 (Noise and vibration) of the Environmental Impact Statement would continue to be applied to impacted receivers, including any newly impacted receivers.

6.4.2 Non-Aboriginal heritage

Non-Aboriginal built heritage

The Environmental Impact Statement identified:

- An overall moderate impact on the State Heritage Register (SHR) listed White Bay Power Station (SHR No. 01015)
- A neutral – minor impact on the following locally listed heritage items:
  - The Valley Conservation Area (Leichhardt LEP C7)
  - White Bay Power Station (inlet) canal (Port Authority of NSW s170 4560062)
  - Glebe Island Silos (Port Authority of NSW s170 4560016)
- An overall neutral impact on the following heritage items:
  - The locally heritage listed White Bay Power Station (outlet) Canal (Port Authority of NSW s170 4560023)
  - The Beattie Street Stormwater Channel No. 15 (Sydney Water s170 4570329).

The excavation of a longer station box to support future eastern tunnelling and tunnel fit-out construction work would be outside the curtilage of the heritage items within the vicinity of The Bays Station construction site. As such, it would not result in changes to the impacts identified in the Environmental Impact Statement.

The proposed revised construction site layout to accommodate the retention of the Port Access Road on its current alignment and the longer station box would not alter the boundary of The Bays Station construction site. Proposed construction activities associated within the revised layout within the curtilage of White Bay Power Station and the White Bay Power Station (inlet) canal remain consistent with the Environmental Impact Statement which would continue to result in a moderate and minor impact respectively.

The revised layout remains outside the curtilage of The Valley Conservation Area, Glebe Island Silos, White Bay Power Station (outlet) Canal and the Beattie Street Stormwater Channel No. 15; as such impacts would remain consistent with the Environmental Impact Statement which are neutral.

Non-Aboriginal archaeological remains

The Environmental Impact Statement assessed that impacts to significant archaeological remains would be likely to occur during demolition and excavation works at The Bays Station construction site.

The amended layout of The Bays Station construction site and the longer station box would not result in additional impacts to non-Aboriginal archaeological resources and would remain consistent with the Environmental Impact Statement.

Changes to or additional environmental mitigation measures

The proposed amendments would not require any changes or additions to the non-Aboriginal environmental mitigation measures provided in the Environmental Impact Statement.

6.4.3 Aboriginal heritage

Design modifications associated with the proposed amendments would not be located within the portion of The Bays Station construction site which has been identified as containing Aboriginal archaeological potential and subsequently the amendment would not change the Aboriginal heritage impact assessment of The Bays Station construction site.

As a result, the Aboriginal heritage impact would remain consistent with the Environmental Impact Statement.

Changes to or additional environmental mitigation measures

The proposed amendments would not require any changes or additions to the Aboriginal heritage environmental mitigation measures provided in the Environmental Impact Statement.

6.4.4 Landscape character and visual amenity

Changes to landscape impact

The Environmental Impact Statement assessed the potential impact on the landscape and public realm including the site and Glebe Island portside industrial and commercial areas.

While the amendments would adjust the layout of some components within the site, there would be no change to the amount of vegetation to be removed within the construction site. As there is limited access to these areas, the change in layout would not affect the level of comfort and amenity for users of the area.

As such, there would be no perceived change in the landscape quality of the site and Glebe Island portside industrial and commercial areas. This is a landscape of neighbourhood sensitivity and there would be a negligible landscape impact. This impact level is unchanged from the Environmental Impact Statement.

Changes to daytime visual impact

Five representative viewpoints at The Bays Station construction site were assessed in the Environmental Impact Statement. Each of these has been reassessed as the proposed amendments would be seen in these views:

Viewpoint 1 – View south from Mansfield Street open space, Rozelle

- **Minor adverse visual impact**, unchanged from the Environmental Impact Statement

Viewpoint 2 – View south-west from Peacock Point Reserve, Balmain East

- **Negligible visual impact**, unchanged from the Environmental Impact Statement

Viewpoint 3 – View south-west from Barangaroo Reserve, Barangaroo

- **Negligible visual impact**, unchanged from the Environmental Impact Statement

Viewpoint 4 – View north-west from pedestrian path near Anzac bridge

- **Negligible visual impact**, unchanged from the Environmental Impact Statement

Viewpoint 5 – View east from Victoria Road, Rozelle

- **Negligible visual impact**, unchanged from the Environmental Impact Statement.

The changes to impacts at each are further described in the sections below.

Viewpoint 1 – View south from Mansfield Street open space, Rozelle

Figure 6-5: Viewpoint 1 – View south from Mansfield Street open space, Rozelle, existing view

Figure 6-5 presents the existing view at Viewpoint 1. The proposed amendments would not result in a change to the **minor adverse visual impact** described in the Environmental Impact Statement. While the construction activity would still be intensive and comprise a large portion of this view, the setting has a high absorption capacity for construction and industrial scale development.

The construction site as proposed in the Environmental Impact Statement, and with the proposed amendments would continue to be seen extending across a large portion of the middle to background of this view, extending from the water's edge and south west towards Victoria Road in the background. The amendments propose that the Port Access Road would remain in its current location and the position of the construction activities and structures be slightly adjusted. This would include adjustments to the location of the grout plant and silos, site offices and amenities, segment storage, spoil storage and parking areas. There would also be a slight adjustment to the location of the two acoustic sheds, which would still be located in the south-east and south-western part of the site, set back from the water edge (in the middle ground of the view). These structures may be slightly larger but would be of a similar scale to the nearby marine warehouse development at Rozelle Bay (background of view). Overall, there would still be a noticeable reduction in the amenity of this view.

Viewpoint 2 – View south-west from Peacock Point Reserve, Balmain East

Figure 6-6: Viewpoint 2 – View south-west from Peacock Point Reserve, Balmain East, existing view

Figure 6-6 presents the existing view at Viewpoint 2. The proposed amendments would not result in a change to the **negligible visual impact** described in the Environmental Impact Statement. The construction site, as proposed in the Environmental Impact Statement, would continue to be visible in the background of this view, partly screened by Glebe Island and the Glebe Island grain silos. There would be two acoustic sheds established in a slightly different position but still located on the south-east and south-western part of the site, set back from the water edge and in the far background of the view. These sheds and other tall equipment used on the site would be of a similar scale to some of the adjacent industrial buildings and absorbed into the surrounding industrial landscape.

Overall, due to the distance and visual compatibility of the construction work with the character of the background areas of this view, there would be no perceived change in the amenity of this view.

Viewpoint 3 – View south-west from Barangaroo Reserve, Barangaroo

Figure 6-7: Viewpoint 3 – View south-west from Barangaroo Reserve, Barangaroo, existing view

Figure 6-7 presents the existing view at Viewpoint 3. The proposed amendments would not result in a change to the **negligible visual impact** described in the Environmental Impact Statement. The proposed construction site would continue to be visible in the far background of this view, mostly screened by Glebe Island and the Glebe Island grain silos. The minor adjustments to the location of elements within this site would not be perceived at this distance. Works at the site would be of a similar scale to some of the adjacent industrial buildings and would be unlikely to be distinguished from other construction work in this view. Overall, due to the compatibility with the character of this view, there would be no perceived change in the amenity of this view.

Viewpoint 4 – View north-west from pedestrian path near Anzac bridge

Figure 6-8: Viewpoint 4 – View north-west from pedestrian path near Anzac bridge, existing view

Figure 6-8 presents the existing view at Viewpoint 4. The proposed amendments would not result in a change to the **negligible visual impact** described in the Environmental Impact Statement. The view to the site would continue to be glimpsed between the roadside trees and Glebe Island grain silos. This view would continue to include parts of the site including the eastern acoustic shed and spoil storage areas, which would be generally in the same location. There would be slight adjustments to the location of elements within the construction site around the Port Access Road, which would be retained in its current location. However, this would not have a material change in the character of this view.

Overall, despite the scale of the construction work that would continue to be visible in this view, due to the screening by roadside vegetation and the Glebe Island grain silos, and the visual absorption capacity of the existing setting, there would be no perceived change in the amenity of this view.

Viewpoint 5 – View east from Victoria Road, Rozelle

Figure 6-9: Viewpoint 5 – View east from Victoria Road, Rozelle, existing view

Figure 6-9 presents the existing view at Viewpoint 5. The proposed amendments would not result in a change to the **negligible visual impact** described in the Environmental Impact Statement. The construction site, as identified in the Environmental Impact Statement, would be established in the centre, middle ground of this view. The south-western acoustic shed would be seen in this view, in a slightly adjusted location, and would rise several storeys above the site. These temporary structures would further obstruct the glimpses to the bay.

While the construction site would continue to be seen extending across the middle ground of this view, intensifying the industrial character of this area, it would be consistent in character with the surrounding industrial landscape.

Changes to night time visual impact

Night works would still be required during construction. The proposed amendments would result in a **negligible visual impact** and this impact level is unchanged from the Environmental Impact Statement. The amendments would result in a slight adjustment in the excavation area and construction site layout. However, there would be no perceived changes to the impact as described in the Environmental Impact Statement.

The site is somewhat contained by landform, major roads and existing industrial buildings, so that the lighting of the site would be out of view, including from the elevated residential areas of Balmain and Rozelle. If alternative acoustic measures are used (instead of acoustic sheds), all lighting would be designed to minimise light spill and skyglow.

Overall, as this is an area of medium district brightness and the lighting would be consistent with the existing uses on the site, there would be no perceived change in the visual amenity of this area at night.

Changes to or additional environmental mitigation measures

The proposed amendments would not require any changes or additions to the landscape character and visual amenity environmental mitigation measures provided in the Environmental Impact Statement.

6.4.5 Groundwater and ground movement

As shown in Table 6-2, The Bays Station construction site excavation footprint has been increased from about 25 metres by 190 metres to about 30 metres by 235 metres. The excavation floor level remains the same at -28 metres Australian Height Datum (AHD). The groundwater model previously developed for impact assessment at The Bays Station construction site was updated to reflect the revised footprint. The results of the revised modelling and impact assessment are discussed below.

Table 6-2: Amendments to excavation at The Bays Station construction site

Dimension	Environmental Impact Statement	Proposed amendments
Length of station box (m)	190	235
Width of station box (m)	25	30
Elevation of excavation floor (m AHD)	-28	-28

Groundwater levels

The estimated magnitude and extent of groundwater level drawdown for the revised excavation footprint does not differ substantially from the drawdown estimated for the excavation footprint reported in the Environmental Impact Statement (see Table 6-3).

Potential changes in groundwater impacts due to these proposed amendments would be negligible from those described in the Environmental Impact Statement. Figure 6-10 shows the predicted groundwater level drawdown at The Bays Station construction site, as reported in the Environmental Impact Statement, and Figure 6-11 shows the predicted groundwater level drawdown at The Bays Station construction site for the amended station box footprint/excavation.

Table 6-3: Estimated total inflow across all Stage 1 components

Inflow	Environmental Impact Statement	Proposed amendments
Total inflow for Stage 1 (ML)	2,350	2,509
Percentage of long-term average annual extraction limit	Less than six per cent	Less than six per cent

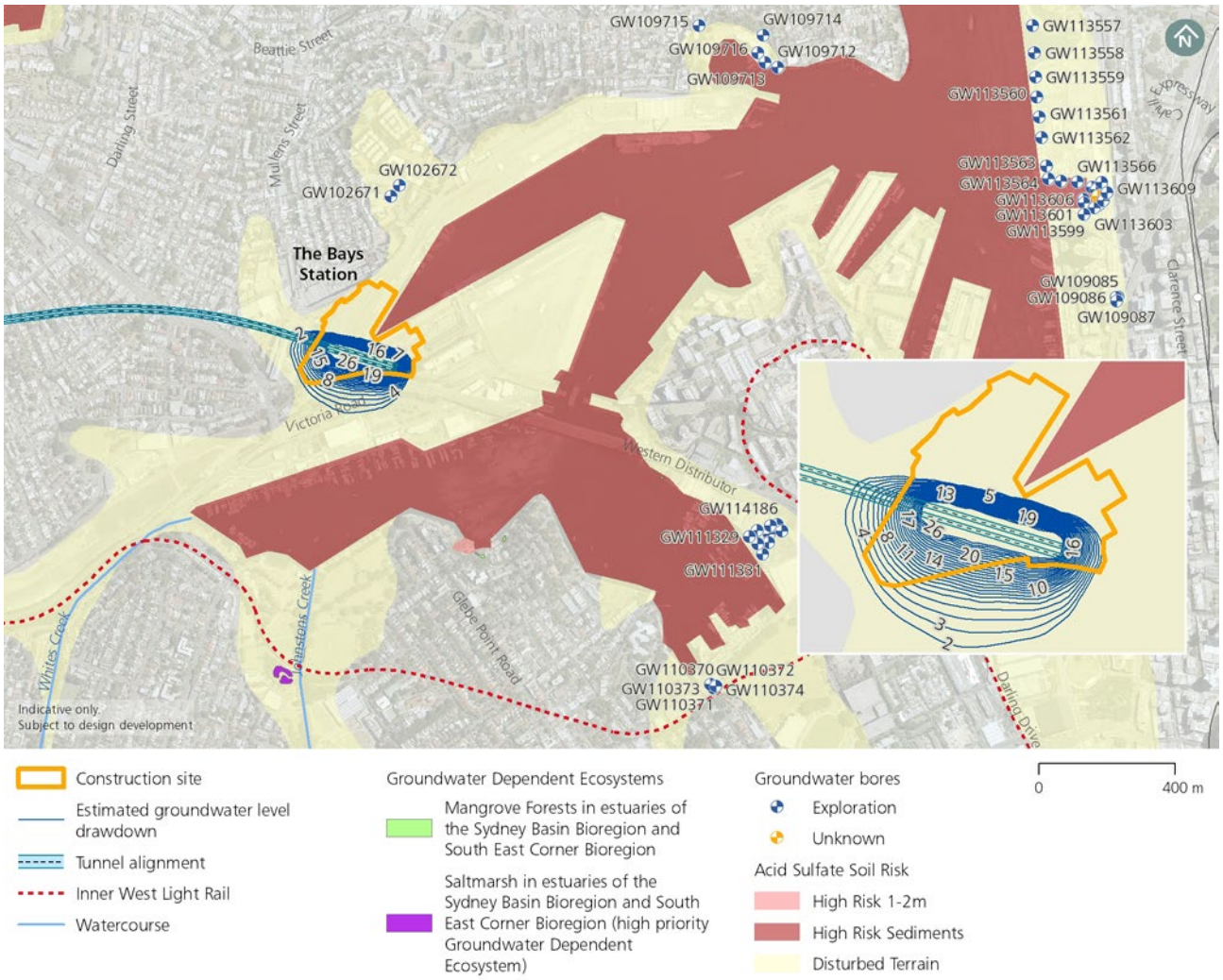

Figure 6-10: Estimated groundwater level drawdown from the current water level after two years due to Stage 1 excavation at The Bays Station construction site as reported in the Environmental Impact Statement

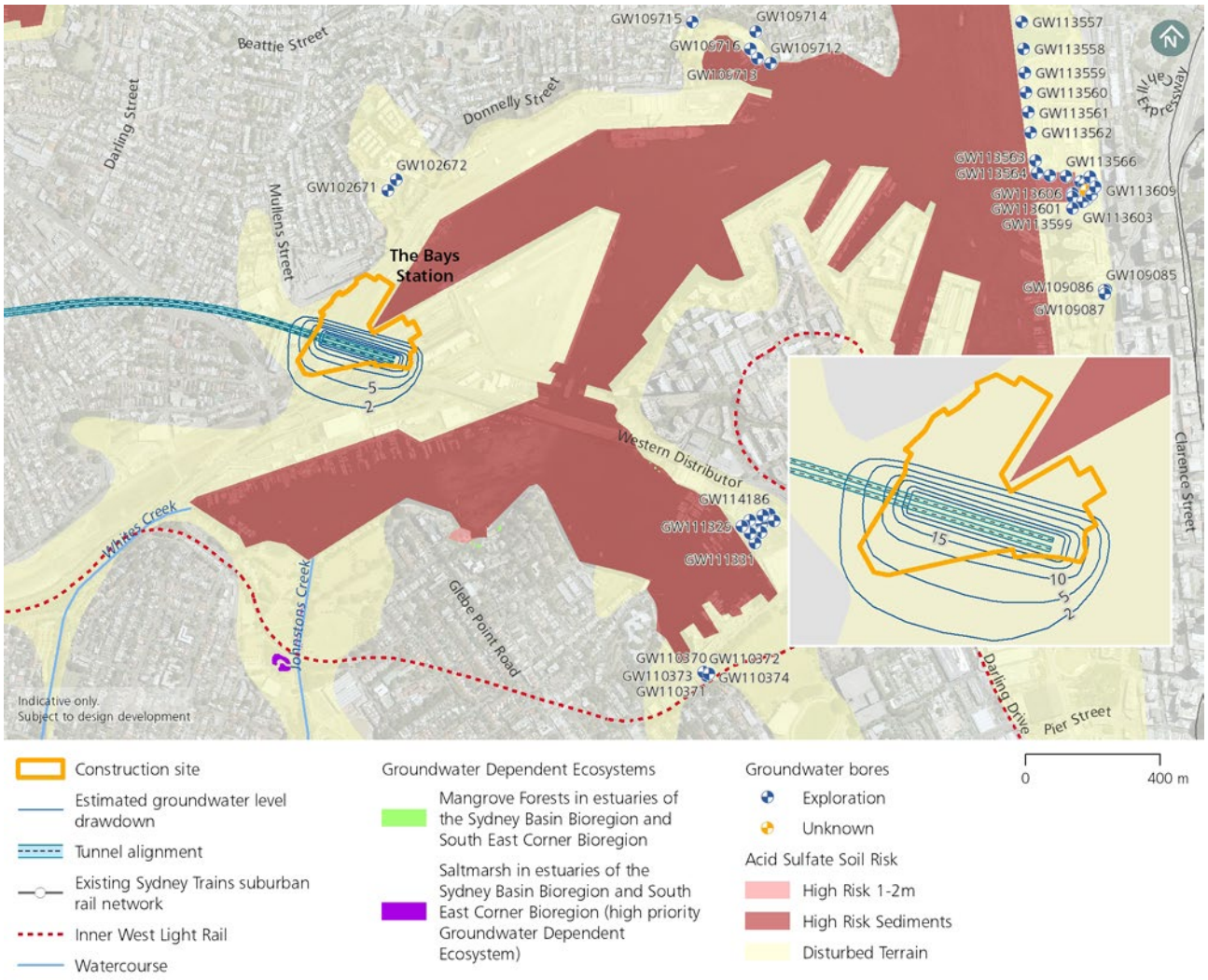

Figure 6-11: Estimated groundwater level drawdown from the current water level after two years due to Stage 1 excavation at The Bays Station construction site for the amended station box footprint

The estimated total inflow across all of the Stage 1 components assessed in the Environmental Impact Statement included 1,204 megalitres in the first year and up to 1,164 megalitres in the second year, yielding a total of 2,368 megalitres over both years. The proposed amendments of a larger station box at The Bays Station construction site would increase the total inflow to an estimated 1,285 megalitres in the first year and up to 1,244 megalitres in the second year, yielding a total of 2,529 megalitres over both years.

There is currently about 43,353 megalitres per year that is unassigned under the long-term average annual extraction limit of the *Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources* (NSW Department of Primary Industries, 2011). Annual inflows for Stage 1 works and for Stage 1 works with the proposed amendments would be less than six per cent of the unassigned water. A comparison with the amended annual inflows reported in the Environmental Impact Statement is provided in Table 6-3.

The estimated groundwater inflow to the excavation for the proposed amendments is up to 13 litres per second at both one and two years after excavation. This is compared to up to 10.1 litres per second at both one and two years after excavation reported in the Environmental Impact Statement.

The total groundwater inflow is sourced (taken) from the rock aquifer for the proposed amendments and is estimated to be up to 400 megalitres in both the first and second years. This is compared to 319 megalitres in the first year and 320 megalitres in the second year for the excavation reported in the Environmental Impact Statement (as shown in Table 6-4).

Table 6-4: Predicted groundwater inflow to The Bays Station construction site excavation

Inflow (ML/year)	Environmental Impact Statement	Proposed amendments
First year after excavation	319	400
Second year after excavation	320	400

Potential changes in groundwater impacts due to these amendments would be negligible from those described in the Environmental Impact Statement.

Consistent with the conclusions reported in the Environmental Impact Statement, Stage 1 is therefore not likely to impact the unassigned water available under the Water Sharing Plan.

Changes to or additional environmental mitigation measures

The proposed amendments would not require any changes or additions to the groundwater environmental mitigation measures provided in the Environmental Impact Statement.

6.4.6 Hydrology and flooding

The proposed amendments at The Bays Station construction site has the potential to change the impacts on hydrology and flooding as a result of the following changes:

- The longer station box at The Bays Station construction site would result in increased excavation
- The western acoustic shed would move about 10 metres further into the area affected by the probable maximum flood up to depths of 0.9 metres. It would not extend into the area affected by the one per cent flood
- The eastern acoustic shed would move, such that it is mostly out of an area of ponding which is affected by the one per cent AEP and probable maximum flood events.

In the Environmental Impact Statement, the eastern acoustic shed was affected by depths of up to 0.9 metres in the probable maximum flood event, covering 90 per cent of the shed footprint.

With the proposed amendments the acoustic shed would be affected by depths of up to 0.75 metres in the probable maximum flood, covering less than 10 per cent of the footprint.

Potential change in impacts on flood behaviour

The potential change in flooding impacts have been assessed for the proposed amendments and are summarised in Table 6-5.

Table 6-5: Potential change in flooding impacts for proposed amendments at The Bays Station construction site

Potential impact as per Environmental Impact Statement	Potential impact with amendments	Change in potential impact
Potential inundation of the construction site and ingress of floodwaters into the station excavation during the one per cent AEP event and the PMF event	Potential partial inundation of the construction site and ingress of floodwaters into the station excavation during the one per cent AEP event and mostly affected during the PMF event as a result of significant overland flood flows originating from the gully extending up into Rozelle.	The shift of the western acoustic shed 10 metres further into the PMF extent would result in: • Potential for minor increase in flood impact in PMF event compared to the Environmental Impact Statement • Increased potential for ingress of floodwaters into the station excavation at this location during the PMF event compared to the Environmental Impact Statement • No change expected in the one per cent AEP event at this location. The shift of the eastern acoustic shed 38 metres would result in: • Reductions in potential flooding impacts in one per cent and PMF events, an improvement compared to the Environmental Impact Statement • Substantially reduced potential for ingress of floodwaters into the station excavation at this location during the one per cent AEP and PMF events, an improvement compared to the Environmental Impact Statement.
Potential flooding impacts to Robert Street and surrounding areas from the obstruction of existing flow paths through the construction site. Flow paths may be obstructed by site filling works to raise and regrade the construction site.	Potential flooding impacts to Robert Street and surrounding areas from the obstruction of existing flow paths through the construction site. Flow paths may be obstructed by site filling works to raise and regrade the construction site.	No change compared to Environmental Impact Statement.

The flood protection level and feasible and reasonable protection based on the flood risks would be reviewed during detailed construction planning. The flood protection level varies across the site from 3.7 metres to 3.9 metres AHD and would be the greater of the probable maximum flood level and the one per cent AEP flood level plus 0.5 metres freeboard. Consideration of the protection level would also be required to account for coastal inundation (estimated at a minimum level of around 2.45 metres AHD which includes allowances for wind and wave effects).

Potential impacts to emergency management arrangements for flooding

The changes to potential impacts to emergency management arrangements as a result of the proposed amendments are summarised in Table 6-6.

Table 6-6: Changes to potential impacts to emergency management arrangements

Identified emergency management routes, facilities and sensitive properties	Changes to potential impacts compared to the Environmental Impact Statement
No change in emergency management routes identified in the Environmental Impact Statement • **Robert Street** • **Mullens Street** • **Victoria Road.**	The amendments may result in minor increase in flood depths in PMF event, which is not expected to reduce the capacity of the emergency management routes from those identified in the Environmental Impact Statement. No change in impacts to emergency management routes as identified in the Environmental Impact Statement for the one per cent AEP event are expected.

Changes to or additional environmental mitigation measures

The proposed amendments would not require any changes or additions to the hydrology and flooding environmental mitigation measures provided in the Environmental Impact Statement.

6.5 Revised environmental mitigation measures

The proposed amendments would not require any changes or additions to the environmental mitigation measures provided in the Environmental Impact Statement.

7 The Bays Station construction site and Rozelle power supply works

This chapter provides a description of the proposed amendment associated with The Bays Station construction site and Rozelle power supply works, an environmental impact screening assessment, additional assessment of the amendment where required and identifies any changes required to environmental mitigation measures.

Since the development of the Environmental Impact Statement, further planning has occurred between Sydney Metro and Transport for NSW (for the Western Harbour Tunnel project, subject to receipt of a separate planning approval), Ausgrid and Port Authority of NSW to consider their future power needs from the Rozelle sub-transmission substation.

It has been identified that these projects would potentially require future power connections from this location. It has been agreed to include additional conduits for these projects within the Sydney Metro West proposed power supply route scope of works in order to:

- Reduce the need for additional trenching activities in the future
- Reduce the overall future impacts on the surrounding community
- Ensure that this project does not remove the ability to provide for power supply for the other future projects.

If these works were undertaken separately this would result in trenching occurring through local streets multiple times over the next few years with the associated cumulative impacts to the local community such as traffic and noise. Additionally, if the design and construction of these works are not coordinated it may, due to the need to separation distances between power cables and other existing underground utilities, preclude some or all of these power connections from occurring in the future. This would limit the ability to undertake future infrastructure projects and to provide power to The Bays Precinct and the locality.

As described in Chapter 6 (Community submissions) of the Submissions Report, community submissions raised concern that the power supply works described in the Environmental Impact Statement would result in negative cumulative impacts to residents of local streets, when considering the other future projects that would also require power supply works in the area. These submissions identified a preference from the community for these works to be coordinated to avoid these cumulative impacts.

Based on the above, and in accordance with the cumulative impacts, environmental mitigation measure CI1 (as outlined in the Environmental Impact Statement and Chapter 8 of this report) which requires co-ordination and consultation with stakeholders to identify opportunities to manage potential cumulative impacts, the additional trenching and under bore works to provide empty conduits for future power supply works are proposed as part of the Sydney Metro West Stage 1 works. The power supply works to connect into these conduits would be undertaken by Transport for NSW (Western Harbour Tunnel), Ausgrid and Port Authority of NSW in the future. This would result in a substantial reduction in potential cumulative impacts and a reduced overall cumulative construction duration compared to if these works were undertaken separately, although there would be an increase in impacts to those described in the Environmental Impact Statement. The proposed Sydney Metro power supply would also provide sufficient power supply for the operational phase of the project, further reducing potential cumulative impacts in this location.

Although this proposed amendment would result in some potential additional temporary impacts (as outlined below), overall the proposed amendment would minimise future environmental impacts compared to the potential cumulative impacts of these works being progressed separately.

Sydney Metro is continuing to engage with the potentially affected community. As part of this ongoing engagement Sydney Metro would seek to:

- Communicate the rationale for combining work for additional projects within the scope of work to deliver Sydney Metro's power supply
- Reach all stakeholders potentially impacted by the work so that risks and any special needs can be identified and accommodated

- Provide accurate, timely updates of progress and upcoming activities so that the community is well informed
- Advise of all measures undertaken to minimise construction impacts.

Further information on future engagement during delivery of the project is provide in Chapter 5 (Stakeholder and community engagement) of the Environmental Impact Statement and Chapter 4 (Stakeholder and community engagement) of the Submissions Report.

7.1 Design proposed in the Environmental Impact Statement

The Bays Station construction site would include tunnel boring machine support services, including high voltage power supply. The Bays Station would require a power supply of 35 mega volt amperes, which would be supplied from the Rozelle sub-transmission station along routes that would generally be located within existing road reserves. The indicative power supply route as described in the Environmental Impact Statement is reproduced in Figure 7-1.

Figure 7-1: Exhibited power supply route for The Bays Station

Section 9.6.6 of the Environmental Impact Statement identified that power supply routes would generally be located within existing road reserves and would generally be carried out by open trench with under bores used when crossing major infrastructure. These works would have required partial road closures.

The Environmental Impact Statement identified that the power supply works would progress along the route and would be temporary in nature. The excavation work along power supply routes is anticipated to progress at about 30 metres per day, although may have been slower in some locations due to local conditions. Further details regarding construction durations along each section of the route were not available at that time, however the works for Sydney Metro West alone would be expected to impact any one receiver for a period of around three to six weeks for the majority of locations.

The power supply for each site would need to be brought in from existing substations outside the Stage 1 corridor.

7.2 Description of amendment

The proposed amendment at The Bays Station construction site and Rozelle includes the construction of conduits to provide future capacity for the power supply works for the following:

- Transport for NSW's Western Harbour Tunnel project
- Future power provision by Ausgrid and Port Authority of NSW from the Rozelle sub-transmission substation to the local area including to The Bays Precinct and locality.

The power supply route is consistent with the route shown in the Environmental Impact Statement. The locations along the power supply route where Sydney Metro would undertake additional work are identified in Figure 7-2.

Figure 7-2: Proposed amended power supply works for The Bays Station

The additional power supply work would result in an increase to the duration of works in each location and in some locations would require full road closures. However, overall the proposed amendment would minimise future environmental impacts compared to the potential cumulative impacts of these works being progressed separately.

The duration of excavation work along the power supply route between Manning Street and Darling Street to include the additional work to make provision for future projects is anticipated to take about twice as long as the duration anticipated for the Sydney Metro work alone as described in the Environmental Impact Statement. Partial road closures would still be required, consistent with the Environmental Impact Statement. The duration of these partial closures may be extended, however, as a result of the proposed amendment. In addition, in some locations full road closures would be required and where these would be required, there would be no vehicle access in and out of properties.

The duration of excavation works from Merton Street to The Bays Station construction site is anticipated to increase by about 10 per cent compared to the Stage 1 works assessed in the Environmental Impact Statement. Partial road closures would still be required, consistent with the Environmental Impact Statement. The duration of these partial closures may be extended slightly, however, as a result of the proposed amendment.

7.3 Environmental impact screening assessment

This screening assessment considers whether the proposed amendment could change the potential impacts in the Environmental Impact Statement. Table 7-1 assesses whether additional environmental assessment of the proposed amendment would be required and if the assessment in the Environmental Impact Statement remains applicable. Where the requirement for further detailed assessment has been identified, this has been provided with any revised environmental mitigation measures in sections 7.4 and 7.5 respectively.

Table 7-1: Amended The Bays Station construction site and Rozelle power supply works environmental screening

Environmental aspect	Comparison of proposed amendments against Environmental Impact Statement	Further detailed assessment required?
Transport and traffic	The proposed amendment would result in an increase in the duration of temporary partial and full road closures with the potential for additional transport and traffic impacts compared to the Environmental Impact Statement.	Yes
Noise and vibration	The proposed amendment would extend the duration of excavation works for power supply routes compared to the Environmental Impact Statement. Additional information available on the power supply works locations has also been made available, requiring an update of noise assessment.	Yes
Non-Aboriginal heritage	The Valley Heritage Conservation Area and archaeological resources are within the power supply route. As this route would not be changed as a result of the proposed amendment, no changes to non-Aboriginal heritage impacts described in the Environmental Impact Statement at this location are expected. Further, the proposed amendment would not include any additional footprint changes or changes to methodology for works to be carried out at the White Bay Power Station and as such, no changes to non-Aboriginal heritage impacts described in the Environmental Impact Statement at this location are expected.	No
Aboriginal heritage	The archaeological potential associated with the power supply route, as described in the Environmental Impact Statement, is considered to be low. As the route would not be changed as a result of the proposed amendment, no changes to Aboriginal heritage impacts described in the Environmental Impact Statement are expected.	No
Property and land use	As the route would not be changed as a result of the proposed amendment, no changes to property and land use impacts described in the Environmental Impact Statement are expected.	No
Landscape character and visual amenity	Works for the installation of utilities would be temporary. As described in the Environmental Impact Statement and above, works would be undertaken within existing road reserves and it is not anticipated that removal of trees beyond those predicted in the Environmental Impact Statement would be required. As the route for installation of the utilities would not be changed as a result of the proposed amendment and given the temporary nature of the works, no changes to landscape character and visual amenity are expected.	No
Business impacts	Changes to traffic access and longer duration of works within the vicinity of businesses would alter the amenity impacts from those assessed in the Environmental Impact Statement. Delivery of the power supply works as a single package of work across multiple projects would reduce the cumulative impacts potentially experienced by businesses.	Yes
Social impacts	Changes to traffic access and longer duration of works within the vicinity of residences would alter the social impacts from those assessed in the Environmental Impact Statement. Delivery of the power supply works for multiple future projects as a single package of work would reduce the cumulative social impacts compared to these works being progressed separately.	Yes

Environmental aspect	Comparison of proposed amendments against Environmental Impact Statement	Further detailed assessment required?
Groundwater and ground movement	There would be no additional trenching or boring as a result of the amendment and so no changes to groundwater and ground movement impacts described in the Environmental Impact Statement are expected.	No
Soils and surface water quality	The proposed power supply route is unchanged and does not traverse any surface water flows. Therefore the potential soils and surface water quality impacts would be consistent with those described in the Environmental Impact Statement.	No
Contamination	West of Victoria Road, the proposed amendment would require larger trenches and a larger volume of spoil to be managed. The types of potential contamination and the approach to manage the impacts would remain the same. East of Victoria Road, the size of the trench required would remain the same and so the amendment would not result in any change to potential contamination impacts as described in the Environmental Impact Statement.	No
Hydrology and flooding	As the route would not be changed as a result of the proposed amendment, no changes to hydrology and flooding impacts described in the Environmental Impact Statement are expected.	No
Biodiversity	As the route would not be changed as a result of the proposed amendment, no changes to biodiversity impacts described in the Environmental Impact Statement are expected.	No
Air quality	The proposed amendment would generate dust and other air quality emissions consistent with those assessed in the Environmental Impact Statement. The small footprint of the active work area and the linear nature of the construction means potential dust impacts would be limited. In some locations, the size of the trenches would be larger than those described in the Environmental Impact Statement and the duration of works would be extended but these would be managed in accordance with the measures proposed in the Environmental Impact Statement.	No
Spoil, waste management and resource use	The amendment would result in a minor increase in the volume of spoil. The approach to manage this spoil would remain the same as described in the Environmental Impact Statement.	No
Hazards	The high voltage power lines located throughout the Stage 1 route present a potential hazard or risk as described in the Environmental Impact Statement. As the route would not be changed as a result of the amendment, no changes to hazards described in the Environmental Impact Statement are expected.	No
Sustainability and climate change	The potential climate change risks and greenhouse gas emissions associated with the proposed amendment would be consistent with those assessed in the Environmental Impact Statement. The environmental and sustainability management system that would be implemented would be unchanged.	No

7.4 Environmental impact assessment

7.4.1 Transport and traffic

Impacts on road network performance

The potential change in impacts on road network performance, as compared to that described in the Environmental Impact Statement, as listed below for each section of the proposed power supply works.

The potential temporary transport and traffic impacts would be managed in accordance with the *Construction Traffic Management Framework* (Sydney Metro, 2020e), provided in Appendix F of the Environmental Impact Statement. The *Construction Traffic Management Framework* provides the overall strategy and approach for construction traffic management for Sydney Metro West, and an outline of the traffic management requirements and processes common to each of the proposed construction sites. It establishes the traffic management processes (including the use of directional signage and variable message signs), emergency services consultation requirements for access impacts and acceptable criteria to be considered and followed in managing roads and footpaths adjacent to construction sites.

Section 1 – Manning Street works

Figure 7-3 shows the proposed road closures and detours at Manning Street. These works would require partial closure of the northern side of Manning Street, with a single traffic lane maintained under traffic control. Pedestrian and cyclist access would be maintained.

Given that Manning Street and Callan Street are local roads with existing low volumes, it is expected that the impact of the proposed detour to road network performance would be minor.

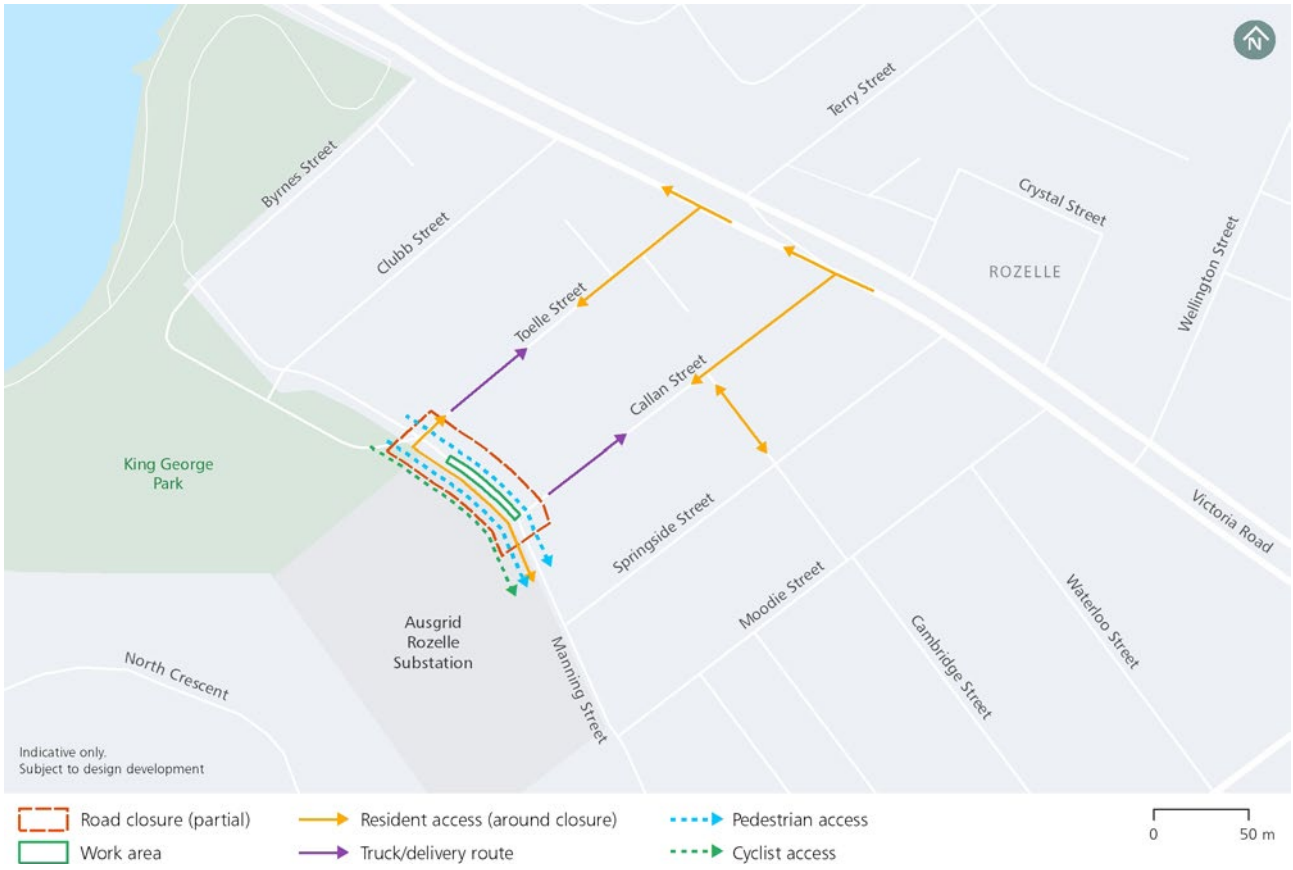

Figure 7-3: Section 1 – Manning Street road closures and detours

Section 2– Callan Street works

Figure 7-4 shows the proposed road closures and detours at Callan Street. These works would require full closure of Callan Street near the work area.

Northbound traffic would be temporarily detoured via Springside Street and McCleer Street and southbound traffic would be temporarily detoured via McCleer Street, Springside Street, Victoria Road and Toelle Street with an additional travel distance of up to 450 metres and increase in travel time of up to two minutes. Furthermore, intersection works would be carried out at the Callan Street/McCleer Street intersection over an indicative duration of five days. Access at the intersection would be maintained at all times via one weekend or daytime stop/slow traffic arrangements and night time lane closures. Given the existing low volumes on Callan Street, which is a local road, it is expected that impacts to road network performance would be minor.

Pedestrian access along Callan Street would be maintained. Cyclist access would be via the above detour routes.

Figure 7-4: Section 2 – Callan Street road closures and detours

Section 3 – McCleer Street works

Figure 7-5 shows the proposed road closures and detours at McCleer Street. Full closure of McCleer Street would be required near the work area.

Eastbound traffic would be temporarily detoured via Manning Street and westbound traffic would be detoured via Victoria Road with an additional travel distance of up to 290 metres and increase in travel time of up to one minute.

Intersection works would be undertaken at the McCleer Street/Springside Street intersection over an indicative duration of five days. Access at the intersection would be maintained at all times via one weekend or daytime stop/slow traffic arrangements and night-time lane closures.

Given the existing low traffic volumes on McCleer Street, it is expected that impacts to road network performance would be minor.

Pedestrian access along McCleer Street would be maintained. Cyclist access would be via the above detour routes.

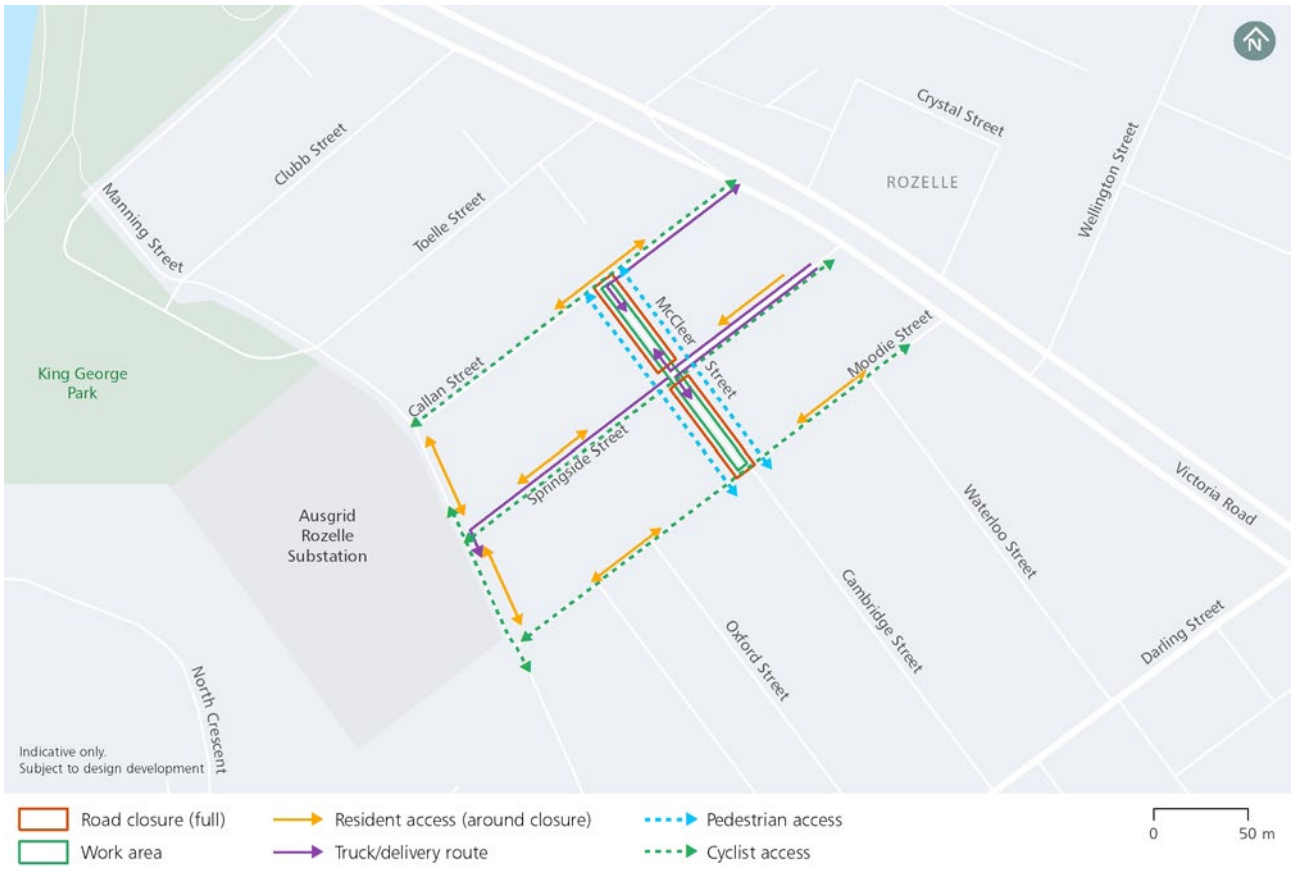

Figure 7-5: Section 3 – McCleer Street road closures and detours

Section 4 – Moodie Street works

Figure 7-6 shows the proposed temporary road closures and detours at Moodie Street. Partial closure of the southern side of Moodie Street would be required near the work area and a single traffic lane would be maintained under traffic control. Pedestrian and cyclist access would be maintained.

Intersection works would be undertaken at the Moodie Street/McCleer Street/Cambridge Street intersection over an indicative duration of five days followed by works at the Moodie Street/Waterloo Street intersection over an indicative duration of 10 days. Access at these intersections would be maintained at all times via one weekend or daytime stop/slow traffic arrangements and night-time lane closures.

Given the existing low traffic volumes on Moodie Street, it is expected that impacts to road network performance would be minor.

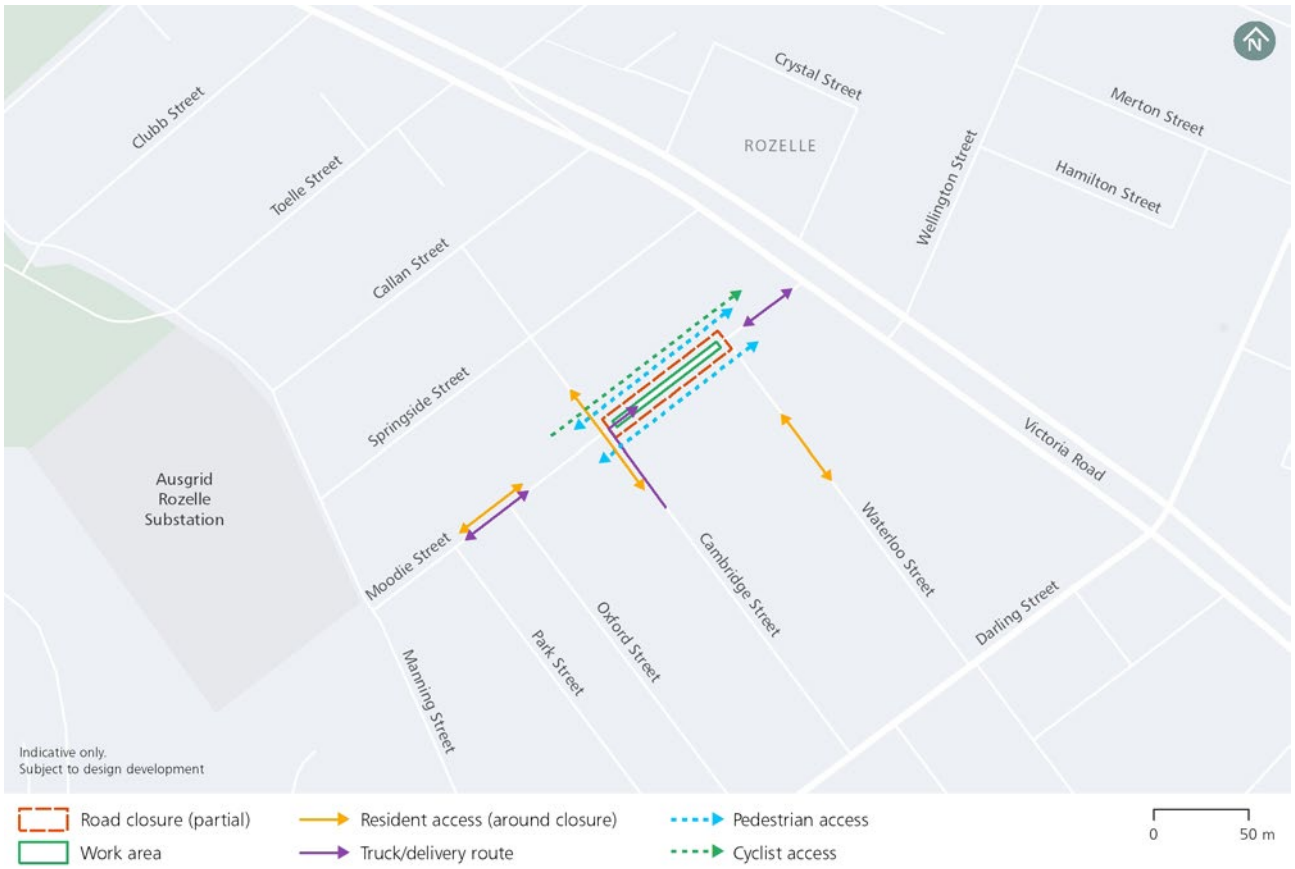

Figure 7-6: Section 4 – Moodie Street road closures and detours

Section 5 – Waterloo Street (north) works

Figure 7-7 shows the proposed temporary road closures and detours at Waterloo Street between Moodie Street and 20 Waterloo Street. These works would require partial closure of the eastern side of Waterloo Street with the maintenance of a single traffic lane under traffic control. Pedestrian and cyclist access would be maintained.

Given the existing low traffic volumes on Waterloo Street, it is expected that impacts to road network performance would be minor.

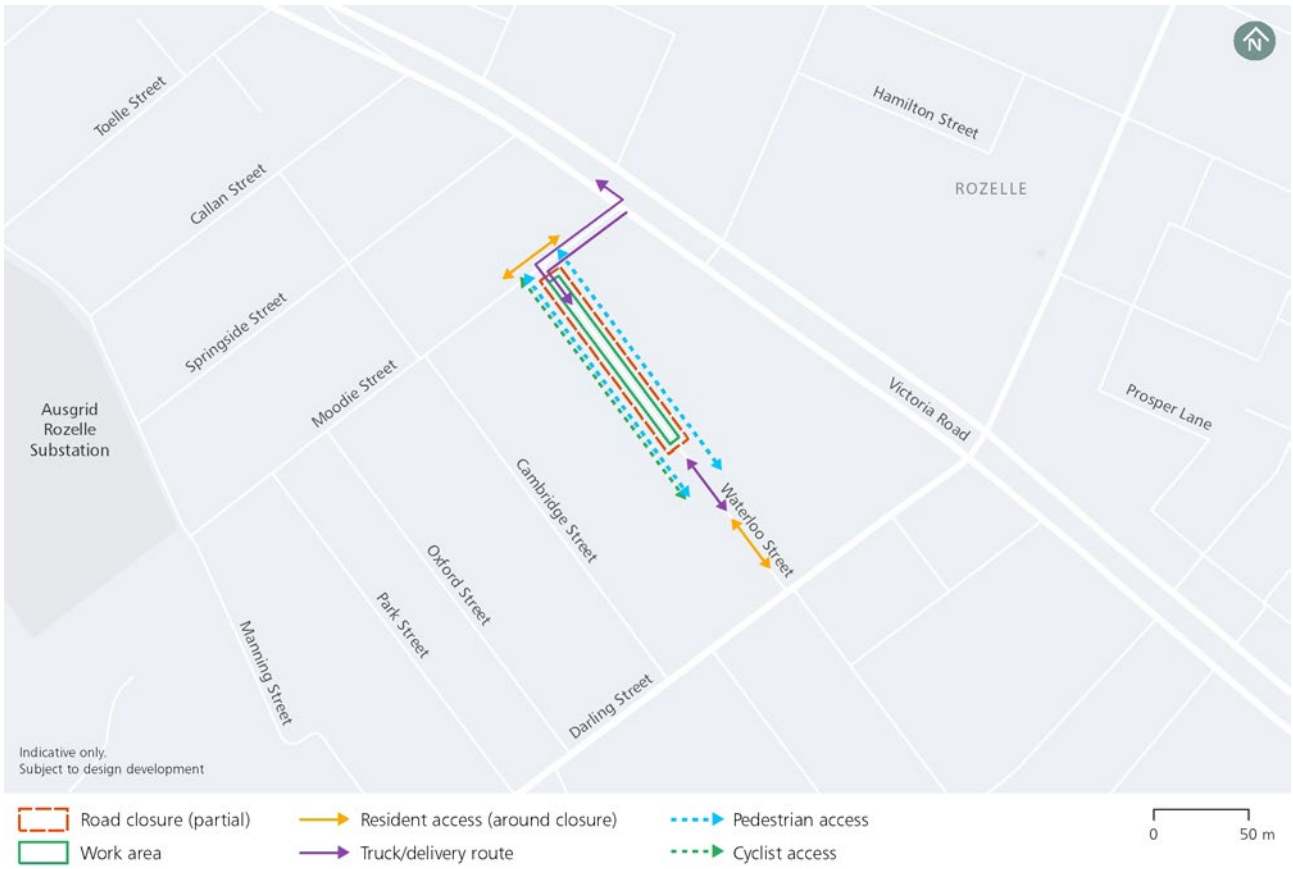

Figure 7-7: Section 5 – Waterloo Street (north) road closures and detours

Section 5 – Waterloo Street (south) works

Figure 7-8 shows the proposed temporary road closures and detours at Waterloo Street between 20 Waterloo Street and Darling Street. These works would require partial closure of the eastern side of Waterloo Street with the maintenance of a single traffic lane under traffic control. Pedestrian and cyclist access would be maintained.

Section 5 would be followed by intersection works at the Darling Street/Waterloo Street intersection over an indicative duration of 15 days (Section 5b). Intersection works would be undertaken on one weekend or night time lane closures only and access would be maintained at all times to minimise road network impacts.

Given the existing low traffic volumes on Waterloo Street, it is expected that impacts to road network performance would be minor.

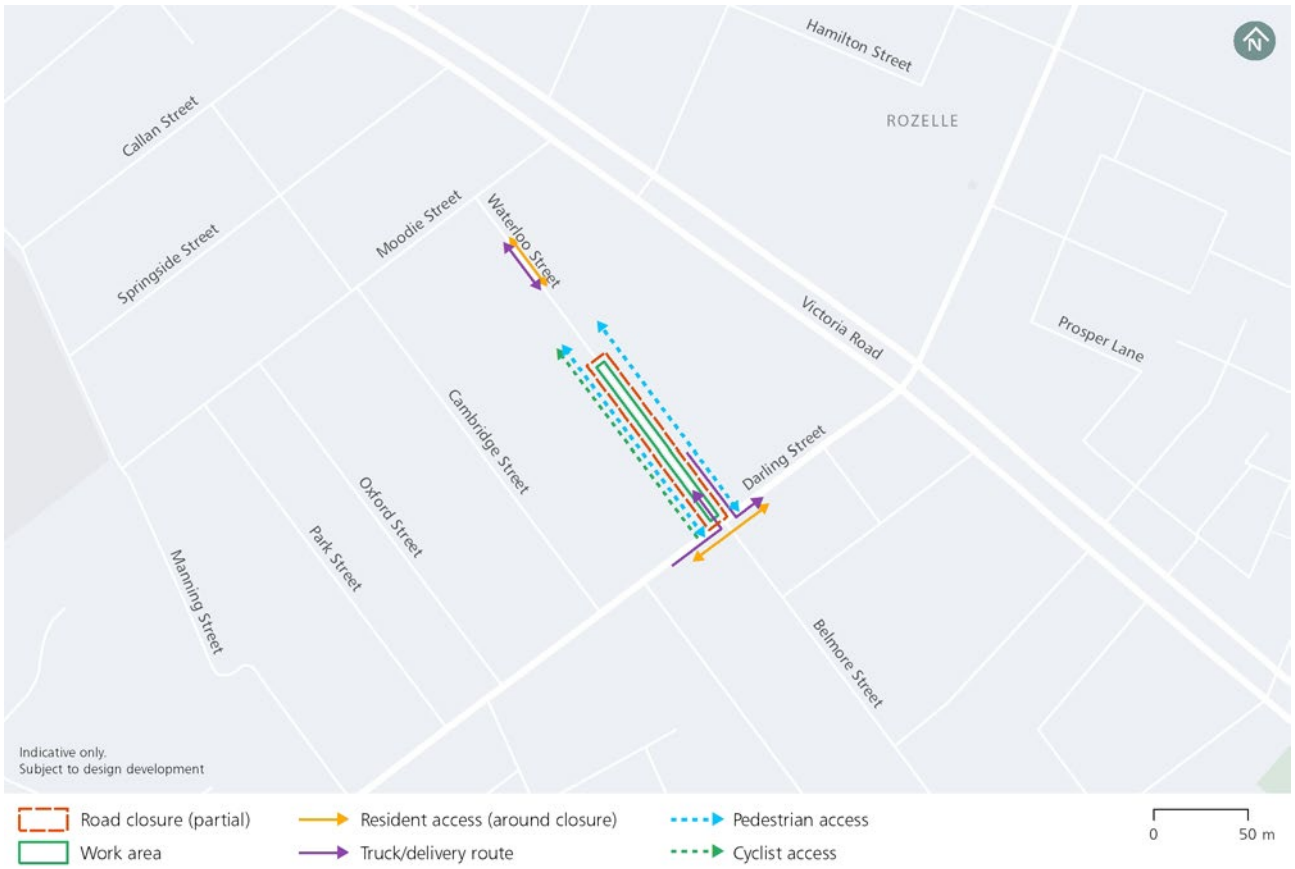

Figure 7-8: Section 5 – Waterloo Street (south) road closures and detours

Section 6 – Darling Street south

Figure 7-9 shows the proposed temporary road closures and detours at Darling Street between Waterloo Street and north of Hancock Lane. These temporary works would involve partial closure of the southern side of Darling Street near the work area. In the vicinity of the works, the lane configuration of Darling Street would be one southbound slow lane and no change to the existing two northbound lanes. Pedestrian and cyclist access would be maintained.

Due to existing traffic volumes on Darling Street and the localised nature of this partial closure (approximately 100 metres in length), impacts to road network performance are expected to be moderate. Potential temporary impacts as a result of this partial closure would be managed as per the environmental mitigation measures provided in the Environmental Impact Statement.

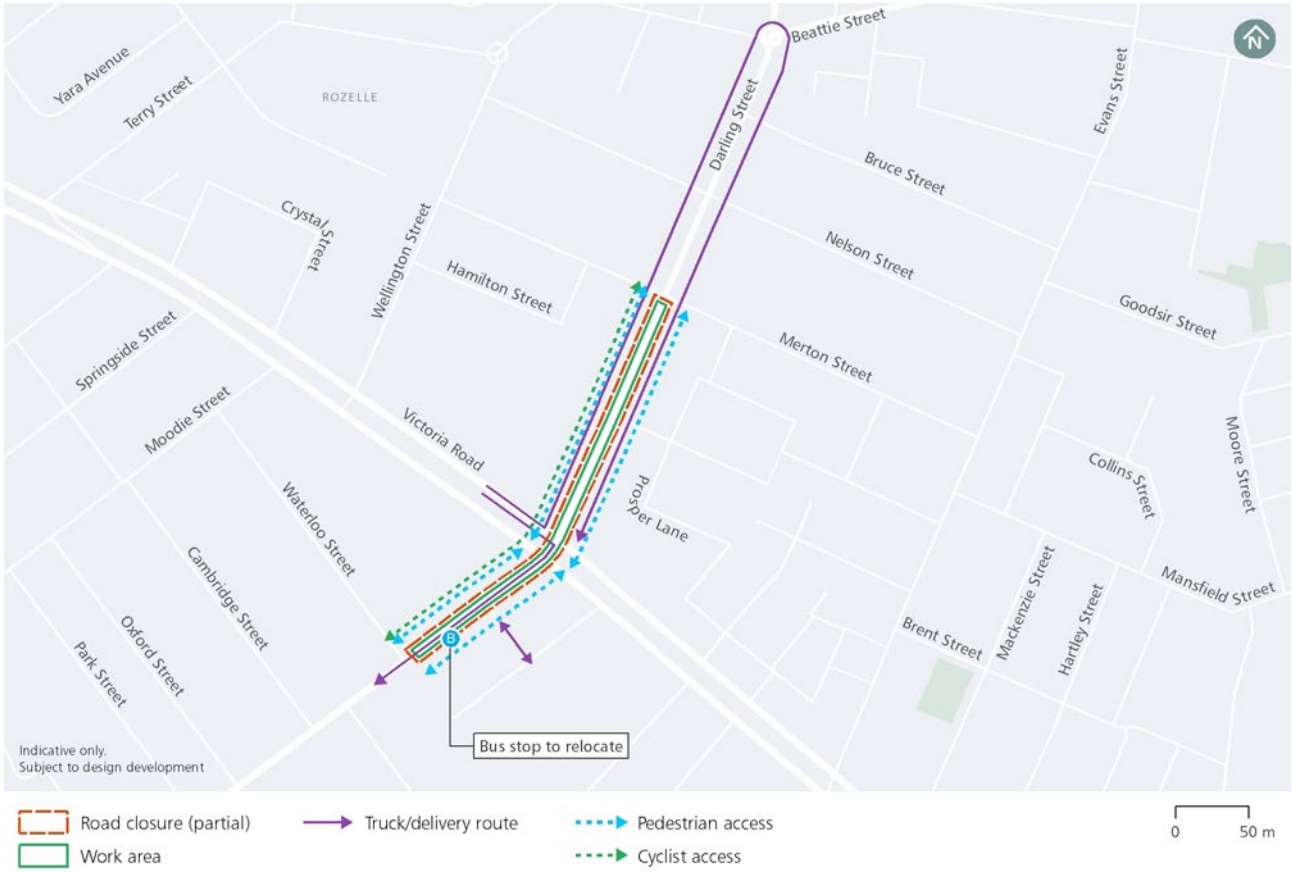

Figure 7-9: Section 6 – Darling Street road closures and detours

Combined impacts

Overall, the potential impact on road network performance as a result of the proposed power supply work would be minor.

Parking and property access

On-street kerbside parking on both sides of Manning Street, both sides of Callan Street, and both sides of McCleer Street would be temporarily removed to facilitate works during Section 1, Section 2, and Section 3 respectively. To mitigate this impact, parking spaces would be provided within the Ausgrid Rozelle sub-transmission substation, subject to final agreement between Sydney Metro and Ausgrid. The final number of parking spaces would be determined in consultation with Ausgrid. In addition, assistance with carrying shopping, luggage and other heavy or large goods to and from nearby residences will be provided during times when access is limited to mitigate the impact for those unable to use these spaces.

Pedestrian access to residential properties on Manning Street, Callan Street and McCleer Street, and emergency access would be maintained at all times.

On-street kerbside parking on both sides of Moodie Street, both sides of Waterloo Street, and on the southern side of Darling Street would be temporarily removed to facilitate works during Section 4, Section 5, and Section 6 respectively. To mitigate this impact, consultation with local businesses and Rozelle Public School or Schools Infrastructure NSW as appropriate would be carried out to provide alternative parking spaces near Moodie Street. The final number of parking spaces would be determined following consultation.

Access to residential properties on Moodie Street and on Waterloo Street, and emergency access would be maintained at all times. During work hours, garage access would be facilitated using steel road plates. No property access would be impacted by the Section 6 works along Darling Street. Emergency access and pedestrian and cyclist access would be maintained along Darling Street at all times. As such, impacts to pedestrians and cyclists are considered minor.

Furthermore, pedestrian and cyclist access would be maintained along Waterloo Street at all times. As such, impacts to property access, pedestrians and cyclists are considered minor during Section 5 works.

Overall, the potential impact on parking and property access as a result of the proposed power supply work would be minor to moderate.

Public transport network

Section 1, Section 2, Section 3, Section 4 and Section 5 (north) works are not likely to result in a change to public transport network impacts as described in the Environmental Impact Statement. Works that would result potential impacts to public transport are discussed below.

Section 5 – Waterloo Street (south) works

To facilitate Section 5 works, the bus stops on Darling Street at Waterloo Street and at Hancock Lane would be closed during one weekend or night works only. The following bus routes would be impacted:

- Route 440 (Bondi Junction to Rozelle): passengers would be required to use bus stops located at Sydney College of the Arts, Balmain Road and Balmain Road opposite Sydney College of the Arts, which are located around 370 metres away
- Route 445 (Campsie to Balmain via Leichhardt Marketplace): passengers would be required to use bus stops located at Rozelle Public School, Darling Street and Darling Street opposite Rozelle Public School, which are located around 215 metres away.

Route L37 would not be impacted as services do not operate at night.

Given the short-term nature of bus stop closures during one weekend or night works only as well as the proximity of nearby bus stops, impacts to bus customers are considered minor. Opportunities to minimise the impacts of these closures would be explored in consultation with Transport for NSW, Inner West Council and relevant bus operators.

Section 6 – Darling Street south

To facilitate Section 6 works, the bus stop on Darling Street at Hancock Lane would be temporarily relocated. The location of the relocated bus stops would be determined in consultation with Transport for NSW, Inner West Council and relevant bus operators.

Combined impact of proposed amendment

Overall, the potential temporary impact on public transport networks as a result of the proposed power supply work would be minor and managed as per the environmental mitigation measures provided in the Environmental Impact Statement.

Active transport network

Pedestrian and cyclist access would be maintained along Manning Street, Moodie Street, Waterloo Street, and Darling Street at all times. As such, impacts to pedestrians and cyclists during Section 1, Section 4, Section 5, and Section 6 are considered minor. Works that would result in potential impacts to active transport are discussed below.

Section 2 – Callan Street works

Pedestrian access would be maintained along Callan Street at all times. However, cyclists would be detoured via McCleer Street and Springside Street with an additional travel distance of approximately 120 metres and increase in travel time of approximately one minute. As such, impacts to pedestrians and cyclists are considered minor.

Section 3 – McCleer Street works

Pedestrian access would be maintained along McCleer Street at all times. However, cyclists would be temporarily detoured via Manning Street with an additional travel distance of up to approximately 290 metres and increase in travel time of approximately two minutes. As such, impacts to pedestrians and cyclists are considered minor.

Cumulative benefits of proposed amendment

The proposed amendment to The Bays power supply route would result in cumulative benefits when compared to the alternative case where the installation of conduits would be carried out separately by Sydney Metro, Transport for NSW (Western Harbour Tunnel), Ausgrid and Port Authority of NSW. The proposed amendment involves conduit installation as part of the Sydney Metro West Stage 1 works to make provision for the future power supply works associated with the other projects.

In the alternative case, conduit installation works would be carried out separately and potentially concurrently along multiple sections of the power supply route. Without coordination, this would result in repeated impacts and could result in a higher peak cumulative impact on road network performance, parking, property access and the public and active transport network. Additionally, it may preclude some or all of these power connections from occurring in the future, due to the need for separation distances required between power cables and other existing underground utilities. This would limit the ability to undertake future infrastructure projects and to provide power to The Bays Precinct and the locality.

The key cumulative traffic and transport benefits of the proposed amendment when compared to the alternative case of works are reduced cumulative impacts on road network performance, parking, and on the active transport network.

Changes to or additional environmental mitigation measures

The proposed amendment would require that one of the environmental mitigation measures identified in the Environmental Impact Statement (TT12) be revised to mitigate potential impacts to the public transport network. In addition, two new environmental mitigation measures are proposed to mitigate access and parking impacts due to road closures.

These revised environmental mitigation measures are provided in Section 7.5.

7.4.2 Noise and vibration

Potential noise impacts

The potential temporary construction noise and vibration impacts would be managed in accordance with the *Sydney Metro Construction Noise and Vibration Standard* (Sydney Metro, 2020c), which aims to manage noise and vibration levels through feasible and reasonable measures. The Standard provides a process for the development of Construction Noise and Vibration Impact Statements, standard environmental mitigation measures and additional environmental mitigation measures to be implemented based on noise and vibration trigger levels.

An assessment of the potential noise levels from the likely equipment associated with utility works was provided in Section 11.5.5 of the Environmental Impact Statement. Noting that methodology and equipment would not change as a result of the proposed amendment, relatively high noise levels are likely when noise intensive equipment, such as a concrete saw or excavator with rockbreaker, is required to be used near to receivers.

Most of the streets along the route have adjacent residential receivers, with the closest to the proposed power supply works likely to be around 10 metres from the works. This is five metres closer than the receivers assessed during the high level assessment of utility works in the Environmental Impact Statement.

In this situation, worst-case noise levels in the region of 80 to 90 dBA are possible during noisy phases of the works. This is higher than the Environmental Impact Statement predicted noise levels of 80 to 86 dBA for receivers at 15 metres distance. This change is due to the additional information available on the power supply works locations and not a result of noisier works. Noise levels during less noise intensive works or at receivers which are further away would be substantially lower.

Consistent with the Environmental Impact Statement, where night-time works are required, worst-case exceedances of greater than 25 to 30 dB above NML are possible where noise intensive plant items are in use. In these cases, the additional environmental mitigation measures identified in the *Sydney Metro Construction Noise and Vibration Standard* (Sydney Metro, 2020c) would be implemented.

It is noted that this amendment consolidates works that are required across several future projects in the area. This would result in a longer construction duration compared to that anticipated in the Environmental Impact Statement. The overall duration of the works and impacts would be shorter, however, as they would all be completed during the same period. It would also remove the need for multiple excavator (breaker) use, minimising cumulative impacts.

Potential vibration impacts

Buildings adjacent to the works and as close as 10 metres away are likely to be within the minimum working distances for both human response and cosmetic damage when rockbreakers (hydraulic hammers) or vibratory rollers are being used, meaning occupants of affected buildings may be able to perceive vibration impacts at times when vibration intensive equipment is in use nearby. Potential temporary vibration impacts would be managed through the implementation of environmental mitigation measures identified in the Environmental Impact Statement and Chapter 8 (Revised environmental mitigation measures) of this report, including pre-condition surveys of properties adjacent to the works.

Changes to or additional environmental mitigation measures

The proposed amendment would not require any changes or additions to the noise and vibration environmental mitigation measures provided in the Environmental Impact Statement.

7.4.3 Business impacts

The Environmental Impact Statement identified potential temporary impacts to businesses due to disruptions to traffic and transport services and potential interruption of utilities associated with works for The Bays Station. Changes to the traffic impacts are described in Section 7.4.1, above, and due to the temporary nature of the works are not predicted to change impacts to businesses beyond those assessed in the Environmental Impact Statement. Similarly, interruptions to utilities are not predicted to change as a result of the proposed amendment. Power supply interruptions would be reduced compared to those assessed in the Environmental Impact Statement, as power supply works that would be requiring interruptions would be consolidated into the one program of proposed works.

Cumulative benefits of proposed amendment

Section 16.15 of the Environmental Impact Statement concludes that cumulative impacts on local business is considered to be minimal. The commitment to coordinate construction planning and delivery of projects within the vicinity of The Bays Station is considered in the Environmental Impact Statement. Delivery of power supply capacity requirements for several future projects as a single package of work would mitigate the potential for cumulative impacts from multiple projects delivering works within the same locality and limit the timeframe that businesses would experience impacts.

In summary, negative impacts to businesses beyond those assessed in the Environmental Impact Statement are not expected; however delivery of the power supply works for multiple projects as a single package of work would reduce the cumulative and future construction impacts that local businesses would experience due to the shorter construction timeframe overall and the coordination of delivery of the works by a single construction contractor.

Changes to or additional environmental mitigation measures

The proposed amendment would not require any changes or additions to the business impacts environmental mitigation measures provided in the Environmental Impact Statement.

7.4.4 Social impacts

The Environmental Impact Statement identified some potential temporary disruption to the way of life for residents and visitors associated with trenching activities for power supply connections between the construction site and Rozelle sub-transmission substation. Changes to social impacts from those assessed in the Environmental Impact Statement would result from disruption as a result of the temporary loss of vehicle access to residences and temporary construction noise impacts associated with the longer duration of construction activities within the vicinity of residences. Measures to mitigate the temporary inconvenience of residents along the power supply routes would include:

- Provision of alternative parking arrangements (see further discussion in Section 7.4.1)
- Provision of assistance to carry shopping, luggage and other heavy or large goods to and from residences during times when access is limited
- Offers of respite or alternative accommodation in line with the *Sydney Metro Construction Noise and Vibration Standard* (Sydney Metro, 2020c).

The social risk rating calculated for the impact on way of life (see Table 17-15 of the Environmental Impact Statement), to which the power supply works would impact on, would remain as a low risk rating (unlikely likelihood with minor consequence).

Cumulative benefits of proposed amendment

The Environmental Impact Statement identifies the potential for the community to experience 'construction fatigue' due to concurrent construction activities associated with various projects within the vicinity of The Bays Station. Delivery of the power supply works as a single package of work would reduce the potential for cumulative social impacts, including construction fatigue, along the power supply route as the period of disruption due to power supply installation works across the four projects would be reduced.

The social risk rating calculated for cumulative impacts (see Table 17-15 of the Environmental Impact Statement), which refers to all of the proposed construction activities (not just power supply works) was rated as a high risk rating (likely likelihood with moderate consequence). The proposed amendment would reduce the anticipated cumulative and future impact of the power supply works component of the overall construction activity, providing a benefit for this component of work however due to the anticipated duration of works the potential cumulative risk rating would remain unchanged as a high risk.

Changes to or additional environmental mitigation measures

The proposed amendment would not require any changes or additions to the social impacts environmental mitigation measures provided in the Environmental Impact Statement.

7.5 Revised environmental mitigation measures

The revised environmental mitigation measures proposed to manage any potential impacts as a result of the proposed amendment to The Bays Station construction site and Rozelle power supply works are provided in Table 7-2. New mitigation measures or additions to mitigation measures included in the Environmental Impact Statement are shown in bold text, with deletions shown with a strikethrough.

Table 7-2: Revised environmental mitigation measures – The Bays Station construction site and Rozelle power supply works

Reference	Impact/issue	Environmental mitigation measure	Revised environmental mitigation measure	Application location(s)
Transport and traffic				
TT12	Temporary closure of bus stops as a result of intersection works	Any relocation of bus stops and kiss-and-ride facilities would be carried out in consultation with Transport for NSW including Transport Coordination (for relevant locations), the relevant local council and bus operators. Wayfinding and customer information would be provided to notify customers of relocated bus stops.	Any **temporary closure or** relocation of bus stops and kiss-and-ride facilities would be carried out in consultation with Transport for NSW including Transport Coordination (for relevant locations), the relevant local council and bus operators. Wayfinding and customer information would be provided to notify customers of relocated bus stops.	The Bays Station
TT31	Potential parking impacts as a result of partial and full road closures required to facilitate construction works	N/A	**Where existing parking is removed to facilitate construction activities for The Bays Station construction site power supply route, consultation would occur with the relevant local council, local businesses, the community and schools (where appropriate) to investigate opportunities to provide alternative parking facilities.**	The Bays Station

Reference	Impact/issue	Environmental mitigation measure	Revised environmental mitigation measure	Application location(s)
TT32	Potential access and parking impacts as a result of partial and full road closures.	N/A	**Provision of assistance to carry shopping, luggage and other heavy or large goods between the alternative parking area at Ausgrid Rozelle sub-transmission substation (subject to final agreement between Sydney Metro and Ausgrid) and residences during times when access is limited.**	The Bays Station

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8 Consolidated revised environmental mitigation measures

This chapter provides a complete set of revised environmental management measures, highlighting how they have changed compared with the management measures in the Environmental Impact Statement.

The approach to environmental management is provided in Chapter 27 (Synthesis of the Environmental Impact Statement) of the Environmental Impact Statement.

At this stage measures to avoid or minimise impacts have been developed only for Stage 1 works – which involves construction only. Measures applicable to the Concept including operation stage environmental mitigation measures would be developed when planning approval applications are made for future stages.

The *Sydney Metro Construction Environmental Management Framework* (Sydney Metro, 2020d), *Construction Noise and Vibration Standard* (Sydney Metro, 2020c) and *Construction Traffic Management Framework* (Sydney Metro, 2020e) set out the overall approach to environmental management. Both the *Construction Environmental Management Framework* (Sydney Metro, 2020d) and the *Construction Noise and Vibration Standard* (Sydney Metro, 2020c) have been revised since exhibition of the Environmental Impact Statement. The revised versions are provided in Appendix C and Appendix D of the Submissions Report, respectively. Key changes to these documents are discussed in Chapter 2 (Environmental Impact Statement clarifications) of the Submissions Report.

The list of environmental mitigation measures presented in Chapter 27 (Synthesis of the Environmental Impact Statement) of the Environmental Impact Statement has been updated with consideration given to:

- The proposed amendments (as addressed in this Amendment Report)
- Additional assessment work carried out in the Submissions Report and/or this Amendment Report to address clarifications and/or proposed amendments
- Clarifications to the Environmental Impact Statement (as outlined in the Submissions Report)
- Submissions received (as addressed in the Submissions Report).

Some new measures have been added, and the wording of existing measures has been revised.

Table 8-1 provides the full set of revised environmental mitigation measures to avoid, mitigate and/or manage the potential impacts of Stage 1 works. This table supersedes the measures presented in the Environmental Impact Statement.

New mitigation measures or additions to mitigation measures included in the Environmental Impact Statement are shown in bold text, with deletions shown with a strikethrough.

Measures that have changed as a result of the proposed amendments (as outlined in this report) are presented in green. Measures that have changed as a result of responding to community and agency submissions or the clarifications identified in Chapter 2 (Clarifications of the Environmental Impact Statement) of the Submissions Report are presented in yellow.

Table 8-1: Revised environmental mitigation measures

Reference	Impact/issue	Mitigation measure	Application location(s)[1]
Traffic and transport			
TT1	Changes to the network	The community would be notified in advance of proposed road and pedestrian network changes through appropriate forms of community liaison.	All
TT2	Traffic incidents	In the event of a traffic related incident, coordination would be carried out with Transport for NSW, including Transport Coordination and/or the Transport Management Centre's Operations Manager.	All

Reference	Impact/issue	Mitigation measure	Application location(s)[1]
TT3	Emergency vehicles access	Access to properties for emergency vehicles would be provided at all times.	All
TT4	Road safety	Vehicle access to and from construction sites would be managed to maintain pedestrian, cyclist and motorist safety. Depending on the location, this may require manual supervision, physical barriers, temporary traffic signals and modifications to existing signals or, on occasions, police presence.	All
TT5	Road safety	Additional enhancements for pedestrian, cyclist and motorist safety near the construction sites would be implemented during construction. This would include measures such as: • Assessing the suitability of construction haulage routes through sensitive land use areas with respect to road safety • Deployment of speed awareness signs in conjunction with variable message signs near construction sites to provide alerts to drivers • Providing community education and awareness about sharing the road safely with heavy vehicles • Specific construction driver training to understand route constraints, safety and environmental considerations such as sharing the road safely with other road users and limiting the use of compression braking • Requiring technology and equipment to improve vehicle safety, eliminate heavy vehicle blind spots, and monitor vehicle location and driver behaviour.	All
TT6	Road safety	All trucks would enter and exit construction sites in a forward direction, where feasible and reasonable.	All
TT7	Congestion	Construction site traffic would be managed to minimise movements during peak periods.	All
TT8	Congestion	Construction site traffic immediately around construction sites would be managed to minimise vehicle movements through school zones during pick up and drop off times.	WMS, PMS, BNS, FDS
TT9	Congestion	Opportunities to minimise impacts at the Alexandra Avenue/ Bridge Road intersection would be determined in consultation with Transport for NSW.	WMS
TT10	Loss of parking	Where existing parking is removed to facilitate construction activities, consultation would occur with the relevant local council to investigate opportunities to provide alternative parking facilities.	All
TT11	Loss of parking	Construction sites would be managed to minimise the number of construction workers parking on surrounding streets by: • Encouraging workers to use public or active transport • Encouraging ride sharing • Provision of alternative parking locations and shuttle bus transfers where feasible and reasonable.	All
TT12	Change of bus stop locations	Any **temporary closure or** relocation of bus stops and kiss-and-ride facilities would be carried out in consultation with Transport for NSW including Transport Coordination (for relevant locations), the relevant local council and bus operators. Wayfinding and customer information would be provided to notify customers of relocated bus stops.	WMS, NSMS, BNS, **TBS**

Reference	Impact/issue	Mitigation measure	Application location(s)[1]
TT13	Bus priority	Opportunities to improve bus priority along the temporary detour at Westmead metro station construction site would be investigated during detailed design.	WMS
TT14	Active transport	Pedestrian and cyclist access would be maintained during the temporary closure of Alexandra Avenue at Westmead. Wayfinding and customer information would be provided to guide pedestrians and cyclists to alternative routes.	WMS
TT15	Impacts on active transport	Where existing cyclist facilities (e.g. bicycle parking) would be temporarily unavailable to facilitate construction activities, suitable replacement facilities would be provided for this duration.	WMS, PMS
TT16	Taxi relocation	Any relocation of taxi ranks would be carried out in consultation with Transport for NSW, the relevant local council and taxi operators. Wayfinding and customer information would be provided to notify customers of relocated taxi ranks.	SOPMS
TT17	Impacts on special events	During major special events, impacts to the transport and traffic network would be reduced by (as necessary): • Minimising the level of construction activity, and if necessary, ceasing all construction activity • Maintaining appropriate access to all areas within the event precinct • Erection of hoardings, site fencing and gates at key locations within the construction site boundary to permit pedestrian movements adjacent to the construction site and separate pedestrians from construction vehicles • Scheduling deliveries to the construction site outside of event periods. For special events that require specific traffic measures, those measures would be developed in consultation with Transport for NSW, including Transport Coordination (for relevant locations) and the organisers of the event.	PMS, CSMF, SOPMS
TT18	Property access	Access to existing properties and buildings would be maintained in consultation with property owners.	All
TT19	Construction vehicle impacts	Traffic control measures required at the Parramatta metro station construction site access on George Street would be determined in consultation with Transport for NSW.	PMS
TT20	Construction vehicle impacts	Adjustments to site access arrangements and the local road network would be explored during detailed design to minimise conflicts with heavy vehicle movements.	NSMS, FDS
TT21	Construction vehicle impacts	Construction site traffic generated at the Five Dock Station construction site would be managed to avoid or minimise travel during the evening peak period.	FDS
TT22	Construction vehicle impacts	Construction site traffic generated at the Five Dock Station construction site would be managed to minimise movements during church service times at St Albans Anglican Church.	FDS
TT23	Construction vehicle impacts	Opportunities to provide vehicle access and egress directly to Parramatta Road and minimise the use of Loftus Street at the Burwood North Station construction site would be explored during detailed design.	BNS

Reference	Impact/issue	Mitigation measure	Application location(s)[1]
TT24	Cumulative construction traffic impacts	Co-ordination of traffic management arrangements between major construction projects would occur in consultation with Transport for NSW including Transport Coordination.	TBS
TT25	Impacts on maritime traffic and waterway users	If barging of spoil is progressed, a Marine Traffic Management Plan would be developed by the construction contractor. The plan would outline the general operational plan for the movement and management of barging vessels in accordance with TT27, TT28 and TT29. The Plan would also outline the process for consultation in accordance with TT26.	TBS
TT26	Impacts on maritime traffic and waterway users	If barging of spoil is progressed, clubs which operate watercraft would be consulted about potential barging and potential changes to courses for watercraft such as yachts before the start of barging.	TBS
TT27	Impacts on maritime traffic and waterway users	If barging of spoil is progressed, barging vessel movements would be scheduled to avoid times and locations of high recreational marine traffic where feasible and reasonable in consultation with Transport for NSW.	TBS
TT28	Impacts on maritime traffic and waterway users	If barging of spoil is progressed, barging vessel movements would be managed to not interfere with port operations or the navigation of seagoing ships and ferries, unless prior approval has been obtained from the Harbour Master.	TBS
TT29	Impacts on maritime traffic and waterway users	If barging of spoil is progressed, barging vessel movements would not be undertaken during special events when navigation restrictions are in place.	TBS
TT30	Construction and operation of vehicular traffic	The design of the temporary traffic arrangements at Westmead metro station construction site would consider construction traffic, alternate bus routes and bus stops, local vehicular traffic and pedestrian safety. The design of the temporary traffic arrangements would be undertaken in consultation with Transport for NSW, Schools Infrastructure, Heath Infrastructure, relevant local councils and bus operators.	WMS
TT31	Potential parking impacts as a result of partial and full road closures required to facilitate construction works	Where existing parking is removed to facilitate construction activities for The Bays Station construction site power supply route, consultation would occur with the relevant local council, local businesses, the community and schools (where appropriate) to investigate opportunities to provide alternative parking facilities.	TBS
TT32	Potential access and parking impacts as a result of partial and full road closures	Provision of assistance to carry shopping, luggage and other heavy or large goods between the alternative parking area at Ausgrid Rozelle sub-transmission substation (subject to final agreement between Sydney Metro and Ausgrid) and residences during times when access is limited.	TBS

Reference	Impact/issue	Mitigation measure	Application location(s)[1]
Noise and vibration			
NV01	Community preference for noise mitigation and management	Further engagement and consultation would be carried out with: • The affected communities to understand their preferences for mitigation and management measures. • 'Other sensitive' receivers such as schools, medical facilities or places of worship to understand periods in which they are more sensitive to impacts. Based on this consultation, appropriate mitigation and management options would be considered and implemented where feasible and reasonable to minimise the impacts.	All
NV02	Alternative construction methodologies	Alternative construction methodologies and measures that minimise noise and vibration levels during noise intensive works would be investigated and implemented where feasible and reasonable. This would include consideration of: • The use of hydraulic concrete shears in lieu of hammers/rock breakers • Sequencing works to shield noise sensitive receivers by retaining building wall elements • Locating demolition load out areas away from the nearby noise sensitive receivers • Providing respite periods for noise intensive works • Minimising structural-borne noise to adjacent buildings including separating the structural connection prior to demolition through saw-cutting and propping, using hand held splitters and pulverisers or hand demolition • Installing sound barrier screening to scaffolding facing noise sensitive neighbours • Using portable noise barriers around particularly noisy equipment, such as concrete saws • Modifying demolition works sequencing / hours to minimise impacts during peak pedestrian times and / or adjoining neighbour outdoor activity periods.	All
NV03	Construction noise – respite periods	Appropriate respite would be provided to affected receivers in accordance with the *Sydney Metro Construction Noise and Vibration Standard*. This would include consideration of impacts from Stage 1 utility and power supply works when determining appropriate respite periods for affected receivers. When determining appropriate respite, the need to efficiently undertake construction would be balanced against the communities' preferred noise and vibration management approach.	All
NV04	Construction noise – out of hours work	The use of noise intensive equipment at construction sites with 'moderate' and 'high' out-of-hours noise management level exceedances would be scheduled for standard construction hours, where feasible and reasonable. Where this is not feasible and reasonable, the works would be undertaken as early as possible in each work shift.	All
NV05	Night-time noise impacts	Air brake silencers would be used on heavy vehicles that access construction sites multiple times per night or over multiple nights.	All

Reference	Impact/issue	Mitigation measure	Application location(s)[1]
NV06	Sleep disturbance impacts from heavy vehicles	Perimeter site hoarding would be designed with consideration of on-site heavy vehicle movements with the aim of minimising sleep disturbance impacts.	All
NV07	Noise emissions from equipment	Long term construction site support equipment and machinery would be low noise emitting and suitable for use in residential areas, where feasible and reasonable. Examples include: • Low noise water pumps for use in water treatment facilities • Low noise generators and compressors • Low noise air conditioner units for use of amenities buildings.	All
NV08	Acoustic sheds	For all sites where acoustic sheds are proposed, the sheds would be designed and constructed to minimise noise emissions. This would likely include the following considerations: • All significant noise producing equipment that would be used during the night-time would be inside the shed, where feasible and reasonable • Noise generating ventilation systems such as compressors, scrubbers, etc, would also be inside the shed and external air intake/discharge ports would be appropriately acoustically treated • The door of the acoustic shed would be kept closed during the night-time period, where feasible and reasonable. Where night-time vehicle access is required, the doors would be designed and constructed to minimise noise breakout.	WMS, SOPMS, BNS, FDS, TBS
NV09	Ground-borne noise	Feasible and reasonable measures would be implemented to minimise ground-borne noise where exceedances are predicted. This may require implementation of less ground-borne noise and less vibration intensive alternative construction methodologies.	All
NV10	Ground-borne noise – cross passages	The proximity of cross passages to nearby receivers and the corresponding construction ground-borne noise and vibration impacts during the excavation works would be considered when determining locations. Relocation of cross passages to be further away from sensitive receivers to mitigate potential construction impacts would be considered, where feasible and reasonable.	Metro rail tunnels
NV11	Ground-borne noise – underground rockbreaking	An activity specific Construction Noise and Vibration Impact Statement (in accordance with the requirements of the *Construction Noise and Vibration Standard*) would be developed for rockbreaking in the tunnel and at cross passages, specifically addressing the activity where it is required between 10pm-7am.	Metro rail tunnels
NV12	Blasting Management Strategies	Blasting would be planned during hours that would cause the least disruption and disturbance to the nearest receivers. Notification protocols prior to blasting for the nearest sensitive receivers would be established.	WMS, PMS, SSF, SOPMS, NSMS, BMS, FDS, TBS
NV13	Blasting Monitoring	~~Attended~~ Vibration and overpressure measurements would be completed at the start of any blasting activities to confirm that vibration levels are within the blasting criteria.	WMS, PMS, SSF, SOPMS, NSMS, BMS, FDS, TBS

Reference	Impact/issue	Mitigation measure	Application location(s)[1]
NV14	Construction traffic noise	Further assessment of construction traffic would be completed during detailed design, including consideration of the potential for exceedances of the *NSW Road Noise Policy* base criteria (where greater than 2 dB increases are predicted). The potential impacts would be managed using the following approaches, where feasible and reasonable: • On-site spoil storage capacity would be maximised to reduce the need for truck movements during sensitive times • Vehicle movements would be redirected away from sensitive receiver areas and scheduled during less sensitive times • The speed of vehicles would be limited and the use of engine compression brakes would be avoided • Heavy vehicles would not be permitted to idle near sensitive receivers.	All
NV15	Noise impacts to horses at Rosehill Racecourse Stables	Consultation with the owners and operators of the horse stables near the Clyde stabling and maintenance facility construction site would be carried out so that potential impacts to horses are appropriately managed.	CSMF
NV16	Construction vibration	Where vibration levels are predicted to exceed the screening criteria, a more detailed assessment of the structure (in consultation with a structural engineer) and ~~attended~~ vibration monitoring would be carried out to ensure vibration levels remain below appropriate limits for that structure. For heritage items, the more detailed assessment would specifically consider the heritage values of the structure in consultation with a heritage specialist to ensure sensitive heritage fabric is adequately monitored and managed.	All
NV17	Building condition surveys – construction vibration	Condition surveys of buildings and structures near to the tunnel and excavations would be undertaken prior to the commencement of excavation at each site, where appropriate. For heritage buildings and structures the surveys would consider the heritage values of the structure in consultation with a heritage specialist.	All
NV18	Cumulative construction noise impacts	The likelihood of cumulative construction noise impacts would be reviewed during detailed design when detailed construction schedules are available. Co-ordination would occur between potentially interacting projects to minimise concurrent or consecutive works in the same areas, where possible. Specific mitigation strategies would be developed to manage impacts. Depending on the nature of the impact, this could involve adjustments to construction program or activities of Sydney Metro West or of other construction projects.	All

Reference	Impact/issue	Mitigation measure	Application location(s)[1]
NV19	Operational road traffic noise impacts	Further assessment of operational road traffic noise mitigation would be undertaken for receivers identified as being eligible for consideration of treatment. The mitigation would likely include at-property treatment. Receivers that are identified as requiring at-receiver noise mitigation would be identified and, where possible, offered treatment prior to the start of construction works which have the potential to affect them.	WMS
Non-Aboriginal heritage			
NAH1	Archival recording	Archival recording and reporting of the following heritage items would be carried out in accordance with the NSW Heritage Office's *How to Prepare Archival Records of Heritage Items* (1998), and *Photographic Recording of Heritage Items Using Film or Digital Capture* (2006): • Shops (and potential archaeological site) (Parramatta LEP Item No. I703) • Kia Ora (and potential archaeological site) (Parramatta LEP Item No. I716) • RTA Depot (Parramatta LEP Item No. I576) • State Abattoirs (SEPP Listing No. A) • White Bay Power Station (SHR Listing No. 01015).	PMS, CSMF, SOPMS, TBS
NAH2	Demolition	A method for the demolition of existing buildings and/or structures at specified construction sites would be developed to minimise direct and indirect impacts to adjacent and/or adjoining heritage items.	PMS, CSMF, SOPMS, TBS
NAH3	Salvage	Prior to commencement of demolition of heritage elements at White Bay Power Station within The Bays construction site, significant heritage fabric would be identified for salvage and reuse opportunities for salvaged fabric considered.	TBS
NAH4	Visual impacts	The policies of the *White Bay Power Station Conservation Management Plan* would be considered in regard to visual impacts of the Stage 1 works, particularly the acoustic shed (or other acoustic measures) and any temporary structures. Significant view lines would be retained during Stage 1 works.	TBS
NAH5	Heritage interpretation	Where heritage items, including significant archaeology are impacted by Stage 1 works, consideration would be given to their inclusion in the Heritage Interpretation Plan for future stages.	All
NAH6	Archaeology	~~An archaeological research design(s) would be prepared and implemented identifying archaeological testing or monitoring requirements, which would be carried out in accordance with Heritage Council guidelines, and where appropriate supervised by a suitably qualified Excavation Director with experience in managing State significant archaeology.~~ **The archaeological research design would be implemented.** **Significant archaeological findings would be considered for inclusion in heritage interpretation (as per NAH5) for the project and be developed in consultation with the relevant local council.**	**All**
NAH7	Archaeology	An Archaeological Excavation Report would be prepared by the Excavation Director and be provided to the NSW Heritage Division within two years of the completion of archaeological excavations specified in the archaeological research design(s).	All

Reference	Impact/issue	Mitigation measure	Application location(s)[1]
NAH8	Archaeology	In the event that State significant archaeology associated with early convict occupation is located at Parramatta metro station: • In situ conservation would be considered. If in situ conservation is not feasible and reasonable, a strategy to mitigate impacts would be prepared in consultation with the NSW Heritage Council (or delegate) • An Archaeological Method Statement would be prepared in consultation with the NSW Heritage Council (or delegate) for management of the archaeological remains, whether for conservation or archaeological investigation and recording • An accessible publication would be prepared within two years of archaeological excavations to document the archaeological investigations • Sydney Metro would provide for the meaningful curation, display and public access of any artefacts collected. This may involve partnerships with museums, local heritage centres and/or universities.	PMS
~~**NAH9**~~	~~Direct heritage impacts~~	~~The impacted gardens within the State Abattoirs would be reinstated with sympathetic landscaping that is in keeping with the provisions of the Conservation Management plan~~	~~SOPMS~~
NAH10	**Archival recording**	**An assessment of significance would be prepared in consultation with the relevant local council for the following potential unlisted heritage items:** • **220 Church Street, Parramatta** • **48 Macquarie Street, Parramatta** • **Pine Inn at 19 Parramatta Road, Concord** • **338-340 Parramatta Road, Burwood** • **Former warehouse shed, Glebe Island.** **If the assessment of significance confirms these items have local heritage value, an archival recording would be undertaken.**	**PMS, BNS, TBS**
Aboriginal heritage			
AH1	Consultation	Aboriginal stakeholder consultation would be carried out in accordance with the **Heritage NSW, Department of Premier and Cabinet's *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, 2010).** ~~NSW Department of Planning, Industry and Environment's (Environment, Energy and Science Group), Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010.~~	All
AH2	Test excavation	Archaeological test excavation (and salvage when required) would be carried out where intact natural profiles with the potential to contain significant archaeological deposits are encountered at the specified construction sites and the Parramatta power supply route. Excavations would be conducted in accordance with the methodology outlined in the Aboriginal cultural heritage assessment report.	PMS, CSMF, TBS and PSR
AH3	Aboriginal heritage interpretation	If Aboriginal archaeological remains are recovered during Stage 1, results would be incorporated into Aboriginal heritage interpretation for the Concept in consultation with registered Aboriginal parties.	All

Reference	Impact/issue	Mitigation measure	Application location(s)[1]
AH4	Unexpected finds	In the event that a potential burial site or potential human skeletal material is exposed during construction, the *Sydney Metro Exhumation Management Plan* would be implemented.	All
Property and land use			
LU1	Temporary use	Except where required for subsequent construction activities associated with future stages of the Concept, temporary use areas for construction purposes would be stabilised and appropriately rehabilitated as soon as feasible and reasonable following completion of construction. This would be carried out in consultation with the relevant landowner.	All
Landscape character and visual amenity			
LV1	Visual impacts	Where feasible and reasonable, the elements within construction sites would be located to minimise visual impacts (for example storing materials and machinery behind fencing).	All
LV2	Visual impacts	The design and maintenance of construction site hoardings would aim to minimise visual amenity and landscape character impact.	All
LV3	Visual impacts	Graffiti would be removed promptly from hoardings and any other aspects of construction sites.	All
LV4	Visual impacts	All structures (including acoustic sheds or other acoustic measures, site offices and workshop sheds) would be finished in a colour which aims to minimise their visual impact, if visible from areas external to the construction site. This finish is to be applied to all visible fixtures and fittings (including exposed downpipes).	WMS, PMS, SOPMS, SNMS, BNS, FDS
LV5	Lighting impacts	Lighting of construction sites would be orientated to minimise glare and light spill impacts on adjacent receivers.	All
LV6	Public art	~~Public art would be adopted on temporary hoarding, particularly around future station precincts. Implementation would be as soon as feasible and reasonable after the commencement of construction, and any public art would remain for the duration of the construction period.~~ **Construction site hoardings would be designed in accordance with *Sydney Metro Brand Design Guidelines* and opportunities for public art on hoardings would be considered in high pedestrian locations.**	All
LV7	Visual impacts affecting events	Works would be coordinated with the Department of Planning, Industry and Environment to manage the potential impact of construction on sporting events in other areas of Sydney Olympic Park.	SOPMS
LV8	Visual impacts affecting events	Works would be coordinated with City of Canada Bay Council to manage the potential impact of construction on sporting events at Concord Oval.	BNS
LV9	Overshadowing	Where feasible and reasonable the location and height of the acoustic shed at the Five Dock Station (if required) would be designed to minimise overshadowing of Fred Kelly Place between 10am and 3pm in mid-winter.	FDS
LV10	Activation of streetscapes	Opportunities to provide temporary activation in the vicinity of the Five Dock Station western construction site during construction would be explored in consultation with the City of Canada Bay Council.	FDS

Reference	Impact/issue	Mitigation measure	Application location(s)[1]
LV11	Trees	Opportunities for the retention and protection of existing street trees and trees within the site would be identified during detailed construction planning.	All
LV12	Trees	Existing trees to be retained would be protected prior to the commencement of construction in accordance with Australian Standard AS4970 the Australian Standard for Protection of Trees on Development Sites and Adjoining Properties.	All
LV13	Trees	Trees removed by Stage 1 would be replaced to achieve no net loss to tree numbers and/or canopy in proximity to the site as a minimum in the long term (and part of future stages of Metro West).	All
LV14	Trees	Opportunities would be investigated with the relevant local council to provide plantings in proximity to the impacted areas prior to construction commencing where feasible and reasonable.	All
Business impacts			
BI1	General business impacts	Small business owner engagement would be undertaken to assist small business owners adversely impacted by construction.	All
BI2	Power and utility interruptions	Planned power and utility interruptions would be scheduled to before or after typical business hours where feasible and reasonable. Prior notice would be provided to all affected business owners of the interruptions.	All
BI3	Business visibility and accessibility	Hoarding and screening impacting the visibility of business would be minimised where feasible and reasonable, without compromising public safety or the effective management of construction airborne noise. Clear pathways and signage would be implemented around construction sites to maximise visibility of retained businesses, including sufficient lighting along pedestrian footpaths during night-time where relevant.	All
Social impacts			
S1	Impacts on social infrastructure	Consultation would be carried out with managers of social infrastructure located near construction sites about the timing and duration of construction works and management of potential impacts, with the aim of minimising potential disruptions to the use of the social infrastructure from construction activity.	WMS, PMS, CSMF, SSF, SOPMS, NSMS, BNS, FDS, TBS
S2	Loss of social infrastructure	Engagement would be carried out with Parramatta City Council to identify alternative locations for the Parramatta Artist Studios to provide opportunities for facilitating local creative and cultural activities.	PMS
S3	Social impacts	A Community Benefit Plan would be developed to guide the development of community benefit initiatives (by Principal Contractors) during construction of Stage 1 to make a positive contribution to the potentially affected community. The key objectives of the plan would include: • Identify opportunities to create environmental and community benefits and provide positive social outcomes • Respond to community priorities and needs in the locality of each relevant construction site.	WMS, PMS, SOPMS, NSMS, BNS, FDS, TBS

Reference	Impact/issue	Mitigation measure	Application location(s)[1]
S4	Impacts on events or festivals	In addition to mitigation measure TT17, consultation would be carried out with festival and event organisers in proximity to construction sites to mitigate potential impacts on the operation of the festival or event.	PMS, FDS
S5	Promote local cultural and identity	In addition to mitigation measure LV16, consultation would be carried out with stakeholders to identify opportunities for public art to reflect community values, culture and identity of the local community.	WMS, PMS, SOPMS, NSMS, BNS, FDS
S6	Activation of streetscapes	In addition to mitigation measure LV10, potential temporary activation in the vicinity of the Five Dock Station western construction site would include opportunities to provide spaces and places for the community to gather and meet each other, culture and identity.	FDS
S7	**Potential impacts on school infrastructure**	**In addition to mitigation measure S1, ongoing engagement would be undertaken with NSW Department of Education to continue to investigate feasible and reasonable mitigation measures related to construction traffic, pedestrian safety, construction noise and vibration, and air quality.**	**WMS, PMS, BNS, FDS**
Groundwater and ground movement			
GW1	Loss of groundwater available to existing groundwater (bore supply) users	Site inspection would be carried out on private domestic supply bore GW305646 to confirm the current viability of that bore. If found to be viable~~, the bore would be monitored throughout construction. M~~ **and predicted to be significantly impacted by the project, m**ake good measures would be implemented if a loss of yield were to occur.	BNS
GW2	Potential reduced baseflow to Toongabbie Creek, Domain Creek, A'Becketts Creek, Duck Creek, Haslams Creek, Powells Creek and the Mason Park wetlands, Bicentennial Park wetlands, Brickpit and Powells Creek Reserve	A review of additional geotechnical and hydrogeology data would be undertaken to confirm the geological and groundwater conditions and determine, based on these local conditions, whether predicted groundwater drawdown from Stage 1 is likely to occur in the vicinity of these creeks. Where the additional data review shows local conditions and predicted groundwater drawdown are likely to cause surface water/groundwater interaction, then additional site investigations (in accordance with GW3) would be undertaken for those creeks or surface water bodies.	WMS, CSMF, SOPMS, NSMS
GW3	Potential reduced baseflow to Toongabbie Creek, Domain Creek, A'Becketts Creek, Duck Creek, Haslams Creek, Powells Creek and the Mason Park wetlands, Bicentennial Park wetlands, Brickpit and Powells Creek Reserve Requirements for baseline monitoring of hydrological attributes	Additional site investigations would be carried out at creeks or surface water bodies where the additional data review in GW2 shows there is a likely surface water/groundwater interaction. This would involve baseline monitoring of creek flows (streamflow gauging) prior to construction, and baseflow streamflow analysis to confirm the existing groundwater baseflow contribution to streamflow for each creek. Where a significant reduction in baseflow is predicted due to Stage 1, design responses would be implemented at station and shaft excavations to reduce potential baseflow loss.	WMS, CSMF, SOPMS, NSMS

Reference	Impact/issue	Mitigation measure	Application location(s)[1]
GW4	Requirements for baseline monitoring of hydrological attributes. Migration of contaminants in groundwater and reduction in beneficial uses of aquifers	Monitoring of groundwater levels and quality at the site area would occur before, during and after construction. This would also include monitoring of potential contaminants of concern. Groundwater level data would be regularly reviewed during and after construction by a qualified hydrogeologist. **Groundwater monitoring data would be provided to the NSW Environment Protection Authority and Department of Planning, Industry and Environment and the Natural Resources Access Regulator for information.**	WMS, PMS, CSMF, SSF, SOPMS, NSMS, BNS, FDS, TBS
GW5	Ground movement and settlement	A detailed geotechnical **and hydrogeological** model for Stage 1 would be developed and progressively updated during design and construction. The detailed geotechnical **and hydrogeological** model would include: • Assessment of the potential for damage to structures, services, basements and other sub-surface elements through settlement or strain • Predicted **groundwater inflows, groundwater take** and changes to groundwater levels including at nearby water supply works. • Where building damage risk is rated as moderate or higher (as per the CIRIA 1996 risk-based criteria), a structural assessment of the affected buildings/structures would be carried out and specific measures implemented to address the risk of damage. • Where a significant exceedance of target changes to groundwater levels are predicted at surrounding land uses and nearby water supply works, an appropriate groundwater monitoring program would be developed and implemented. The program would aim to confirm no adverse impacts on groundwater levels or to appropriately manage any impacts. Monitoring at any specific location would be subject to the status of the water supply work and agreement with the landowner.	Where required
GW6	Ground movement and settlement	Condition surveys of buildings and structures in the vicinity of the tunnel and excavations would be carried out prior to the commencement of excavation at each site.	Where required
Soils			
SSWQ1	Acid sulfate soils	Prior to ground disturbance in areas of potential acid sulfate soil occurrence, testing would be carried out to determine the presence of actual and/or potential acid sulfate soils. If acid sulfate soils are encountered, they would be managed in accordance with the *Acid Sulfate Soil Manual* (ASSMAC, 1998).	PMS, CSMF, TBS
SSWQ2	Soil salinity	Prior to ground disturbance in high probability salinity areas, testing would be carried out to determine the presence of saline soils. If salinity is encountered, excavated soils would not be reused or would be managed in accordance with *Book 4 Dryland Salinity: Productive Use of Saline Land and Water* (NSW DECC, 2008). Erosion controls would be implemented in accordance with the 'Blue Book' (Landcom, 2004).	All

Reference	Impact/issue	Mitigation measure	Application location(s)[1]
Surface water quality			
SSWQ3	Erosion and sedimentation	Erosion and sediment measures would be implemented at all construction sites in accordance with the principles and requirements in *Managing Urban Stormwater – Soils and Construction, Volume 1* (Landcom, 2004) and *Volume 2D* (NSW Department of Environment, Climate Change and Water 2008), commonly referred to as the 'Blue Book'. Additionally, any water collected from construction sites would be appropriately treated and discharged to avoid any potential contamination or local stormwater impacts. Temporary sediment basins would be designed in accordance with *Managing Urban Stormwater: Soils and Construction* and *Managing Urban Stormwater, Volume 2D: Main Road Construction* (DECC, 2008).	All
SSWQ4	Working in waterways and surrounding low lying areas	Works in waterways and surrounding low lying areas would be carried out in accordance with progressive erosion and sediment control plans.	CSMF
SSWQ5	Wastewater discharge	The water treatment plants would be designed so that wastewater is treated to a level that is compliant with the ANZECC/ARMCANZ (2000), ANZG (2018) **and draft ANZG (2020)** default guidelines for 95 per cent species protection **and 99 per cent species protection for toxicants that bioaccumulate unless other discharge criteria are agreed with relevant authorities.**	All
SSWQ6	Water quality monitoring	A surface water monitoring program would be implemented to observe any changes in surface water quality that may be attributable to Stage 1 and inform appropriate management responses. The program would be developed in consultation with the EPA and relevant Councils. The program would consider monitoring being undertaken as part of other infrastructure projects such as the WestConnex M4 East monitoring. Monitoring would occur during pre-construction and during construction at all waterways with the potential to be impacted. Monitoring sites could be located upstream and downstream of the potential discharges and would include sampling for key indicators of concern.	All
SSWQ7	Local stormwater capacity	Further design development would confirm the local stormwater system capacity to receive construction water treatment plant inflows. In the event there is a stormwater infrastructure capacity issue with existing infrastructure, mitigation measures such as storage detention to control water outflow during wet weather events would be implemented.	All
Contamination			
C1	Management of low risk contamination	For sites where potential contamination risk is moderate, high or very high, a further review of data would be performed. Where the additional data review provides sufficient information to confirm that contamination is likely to have a very low or low risk, the site would then be managed in accordance with the Soil and Water Management Plan. This would typically occur where there is minor, isolated contamination that can be readily remediated through standard construction practices such as excavation and off-site disposal.	All

Reference	Impact/issue	Mitigation measure	Application location(s)[1]
C2	Detailed Site Investigation	Where data from the additional data review (mitigation measure C1) is insufficient to understand the risk of contamination, a Detailed Site Investigation would be carried out in accordance with the *National Environment Protection Measure* (2013) and other guidelines made or endorsed by the NSW EPA. The sites requiring a Detailed Site Investigation would be confirmed following the additional data review (mitigation measure C1), however on the basis of the Stage 1 assessment, it is anticipated that Detailed Site Investigations would be required at the specified application locations.	CSMF, SSF, SOPMS, TBS
C3	Remediation	Where data from the additional data review (mitigation measure C1) or the Detailed Site Investigation (mitigation measure C2) confirms that contamination would have a moderate, high or very high risk, a Remediation Action Plan would be developed for the area of the construction footprint. Each Remediation Action Plan would detail the remediation works required to mitigate risks from contamination throughout and following completion of construction. The Remediation Action Plan would be prepared in accordance with relevant NSW EPA guidelines and where applicable, detail remediation methodologies in accordance with Australian Standards and other relevant government guidelines and codes of practice. Remediation would be performed as an integrated component of construction and to a standard commensurate with the proposed end use of the land. The sites requiring Remediation Action Plans and remediation would be confirmed following the additional data review (mitigation measure C1) and Detailed Site Investigation (mitigation measure C2), however on the basis of the Stage 1 assessment, it is anticipated that Remediation Action Plans and remediation could be required at the specified application locations.	CSMF, SSF, SOPMS, TBS
C4	Site Audit Statement	Where contamination is highly complex, such as significant groundwater contamination; contamination associated with vapour; contamination that requires specialised remediation techniques; or contamination that requires ongoing active management during and beyond construction, an accredited Site Auditor would review and approve the Remediation Action Plan, and would develop a Site Audit Statement and Site Audit Report upon completion of remediation. The sites requiring Site Audit Statements would be confirmed following the preparation of Remediation Action Plans (mitigation measure C3), however on the basis of the Stage 1 assessment, it is anticipated that Site Audit Statements would be required at the specified application locations.	CSMF, SOPMS, TBS, and as applicable
C5	Residual contamination following construction	Ongoing management and monitoring measures would be documented in an appropriate form and implemented for any areas where minor, residual contamination remains following construction.	As applicable

Reference	Impact/issue	Mitigation measure	Application location(s)[1]
Hydrology and flooding			
HF1	Flooding behaviour impacts	Detailed construction planning would consider flood risk at construction sites. This would include: • Identification of measures to not worsen flood impacts on the community and on other property and infrastructure during construction up to and including the one per cent AEP flood event • Provide flood-proofing to excavations at risk of flooding or coastal inundation during construction, where feasible and reasonable, such as raised entry into shafts and/or pump-out facilities to minimise ingress of floodwaters into shafts and the dive structure • Review of site layout and staging of construction works to avoid or minimise obstruction of overland flow paths and limit the extent of flow diversion required. This includes design of site hoardings to minimise disruption to flow paths (if possible). Not worsen is defined as: • A maximum increase in flood levels of 50mm in a one per cent AEP flood event • A maximum increase in time of inundation on one hour in a one per cent AEP flood event • No increase in potential soil erosion and scouring from any increase in flow velocity in a one per cent AEP flood event.	PMS, CSMF, SSF, NSMS, TBS
~~**HF2**~~	~~Flooding behaviour impacts~~	~~On-site stormwater detention would be provided for the Clyde stabling and maintenance facility to manage peak site runoff rates and volumes due to increased imperviousness of the site.~~	~~CSMF~~
HF3	Flooding behaviour impacts	Further design refinement at the Clyde stabling and maintenance facility construction site would occur during detailed design to mitigate the identified potential impacts including: • The increases in flood levels of up to ~~0.08~~ **0.03** metres in Duck Creek and adjacent properties in the one per cent AEP flood event • Increases in flow velocities and the potential increased risk of scour at the proposed creek crossings and in the downstream channels • The potential flooding impacts from filled features ~~including the road overbridge approach~~.	CSMF
HF4	Flooding behaviour impacts	Drainage at construction sites would be designed, where feasible and reasonable, to mitigate potential alterations to local runoff conditions due to construction sites.	All
HF5	Flooding behaviour impacts	Detailed construction planning for The Bays Station construction would aim to minimise changes to existing levels in relation to potential impacts on flood behaviour, along the north-western side of site adjacent to low-lying property, to minimise reduction in floodplain storage.	TBS
HF6	Flood protection	Consultation would occur with the proponent of the Camellia Town Centre redevelopment to understand potential flood impacts from the redevelopment on Stage 1 and to identify any additional flood protection (if required).	PMS

Reference	Impact/issue	Mitigation measure	Application location(s)[1]
HF7	Flooding emergency management	Construction planning regarding flooding matters would be carried out in consultation with the NSW State Emergency Service and the relevant local council.	PMS, CSMF, TBS
HF8	Impacts to flood mitigation works	Detailed construction planning for The Bays Station construction site would aim to avoid conflicts with the potential construction of flood mitigation works in Robert Street, Rozelle in consultation with Inner West Council.	TBS
Biodiversity			
B1	Impacts to fish passage	During construction, sufficient flow and fish passage would be maintained similar to current conditions during in-stream works where feasible and reasonable.	CSMF
B2	Impacts of proposed creek crossings	The A'Becketts Creek and Duck Creek crossings would be designed to: • Provide sufficient fish passage is accordance with *Policy and guidelines for fish habitat conservation and management Update 2013* (DPI (Fisheries NSW) 2013) • Incorporate suitable scour protection • Avoid worsening existing flow velocities downstream from the crossing locations • Incorporate a vegetated riparian zone within the realigned open channel sections where feasible and reasonable.	CSMF
B3	Impacts to groundwater dependent ecosystems	Additional investigations and assessment would be completed to confirm the potential for impacts to groundwater dependant ecosystems due to groundwater drawdown, and to identify any required mitigation through design.	WMS, **PMS**, CMSF, NSMS, BNS, FDS
Air quality			
AQ1	Dust impacts	The following best-practice dust management measures would be implemented during all construction works: • Regularly wet-down exposed and disturbed areas including stockpiles, especially during dry weather • Adjust the intensity of activities based on measured and observed dust levels and weather forecasts • Minimise the amount of materials stockpiled and position stockpiles away from surrounding receivers • Regularly inspect dust emissions and apply additional controls as required • ~~Implement~~ **Consider** all relevant measures listed in the UK IAQM corresponding to the highest level of risk determined around each Stage 1 construction site.	All
AQ2	Exhaust emissions from the combustion of fossil fuels	Plant and equipment would be maintained in a proper and efficient manner. Visual inspections of emissions from plant would be carried out as part of preacceptance checks.	All

Reference	Impact/issue	Mitigation measure	Application location(s)[1]
AQ3	Odour emissions	The following best-practice odour management measures would be implemented during relevant construction works: • The extent of opened and disturbed contaminated soil at any given time would be minimised • Temporary coverings or odour supressing agents would be applied to excavated areas where appropriate • Regular monitoring would be conducted during excavation to verify that no offensive odours are being ~~generated~~ **detected beyond the site boundary**.	All
Spoil, waste management and resource use			
WR1	Compliance with legislative and policy requirements	All waste would be assessed, classified, managed, transported and disposed of in accordance with the *Waste Classification Guidelines* **and the Protection of the Environment Operations (Waste) Regulation 2014**.	All
WR2	Disposal of hazardous materials	A hazardous material survey would be completed for those buildings and structures suspected of containing hazardous or special waste materials (particularly asbestos) prior to their demolition. If hazardous waste or special waste (e.g. asbestos) is encountered, it would be handled and managed in accordance with relevant legislation, codes of practice and Australian standards.	All
WR3	Waste minimisation	Construction waste would be minimised by accurately calculating materials brought to the site and limiting materials packaging.	All
WR4	Reuse and recycling	Waste streams would be segregated to avoid cross-contamination of materials and maximise reuse and recycling opportunities.	All
WR5	Reuse on Sydney Metro West sites	A materials tracking system would be implemented for material transferred between Sydney Metro West sites and to offsite locations such as licensed waste management facilities.	All
Hazards			
HA1	Risks to people, property and the environment associated with transport and storage of explosives	The method for delivery of explosives would be developed prior to the commencement of blasting (if proposed) in consultation with the Department of Planning, Industry and Environment and be timed to avoid the need for on-site storage.	All
HA2	Impacts on underground utilities	Dial before you dig searches and non-destructive digging would be carried out to identify the presence of underground utilities.	All
HA3	Impacts on underground utilities	Ongoing consultation would be carried out with utility providers for high pressure gas or petroleum pipelines to identify appropriate construction methodologies to be implemented. Any interaction with high pressure gas or petroleum pipelines would comply with the relevant standards, including AS 2885 Pipelines – Gas and Liquid Petroleum.	All
Sustainability and climate change			
SCC1	Sustainability implementation	Sustainability initiatives would be incorporated into the detailed design and construction to support the achievement of the Sydney Metro West sustainability objectives.	All

Reference	Impact/issue	Mitigation measure	Application location(s)[1]
SCC2	Sustainability implementation	Best practice level of performance would be achieved using market leading sustainability rating tools during design and construction.	All
SCC3	Climate change risks	Climate change risk treatments would be confirmed and incorporated into the detailed design.	All
SCC4	Greenhouse gas emissions	An iterative process of greenhouse gas assessments and design refinements would be carried out during detailed design and construction to identify opportunities to minimise greenhouse gas emissions. Performance would be measured in terms of a percentage reduction in greenhouse gas emissions from a baseline inventory calculated at the detailed design stage.	All
SCC5	Greenhouse gas emissions	25 per cent of the greenhouse gas emissions associated with consumption of electricity during construction would be offset.	All
Cumulative impacts			

CI1	Occurrence of cumulative impacts	Co-ordination and consultation with the following stakeholders would occur where required to manage the interface of projects under construction at the same time:
		• ~~Other parts of~~ Transport for NSW including Transport Coordination
		• Department of Planning, Industry and Environment
		• Sydney Trains
		• NSW Trains
		• Sydney Buses
		• Sydney Water
		• Port Authority of NSW
		• Sydney Motorways Corporation
		• Emergency service providers
		• Utility providers
		• Construction contractors.
		Co-ordination and consultation with these stakeholders would include:
		• Provision of regular updates to the detailed construction program, construction sites and haul routes
		• Identification of key potential conflict points with other construction projects
		• Developing mitigation strategies in order to manage conflicts. Depending on the nature of the conflict, this could involve:
		  • Adjustments to the Sydney Metro construction program, work activities or haul routes; or adjustments to the program, activities or haul routes of other construction projects
		  • Co-ordination of traffic management arrangements between projects.
			All

1 *Westmead metro station; PMS: Parramatta metro station; CSMF: Clyde stabling and maintenance facility; SSF: Silverwater services facility; SOPMS: Sydney Olympic Park metro station; NSMS: North Strathfield metro station; BNS: Burwood North Station; FDS: Five Dock Station; TBS: The Bays Station; Metro rail tunnels: Metro rail tunnels not related to other sites (e.g. tunnel boring machine works); PSR: Power supply routes.*

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9 Conclusion and next steps

This chapter provides a conclusion to the Amendment Report and outlines the next steps in the approvals process.

Sydney Metro West has been assessed as State significant infrastructure in accordance with the provisions under Division 5.2 of Part 5 of the EP&A Act. An Environmental Impact Statement was prepared and exhibited that addresses the requirements of the Secretary of the Department of Planning, Industry and Environment.

This Amendment Report describes and assess the proposed amendments related to the Stage 1 construction sites as a result of continued design development and refinement to minimise environmental impacts and to respond to matters raised in submissions received during the exhibition of the Environmental Impact Statement, in accordance with the EP&A Act and EP&A Regulations. The proposed amendments are:

Clyde stabling and maintenance facility construction site

- Kay Street and Unwin Street route realignment amended from a proposed road bridge to a road underpass

Sydney Olympic Park metro station construction site

- Northern pedestrian entry amended from proposed cut-and-cover construction method to a mined construction method

Five Dock Station construction site

- Waterview Street to be converted to one-way general traffic flow for the duration of construction; for the section north of the main Five Dock car park, from the corner of First Avenue and Waterview Street to Second Avenue

The Bays Station construction site

- A longer station box to support future eastern tunnelling and tunnel fit-out construction work
- Revised construction site layout to accommodate the Port Access Road to be retained on its current alignment and the longer station box

The Bays Station construction site and Rozelle power supply works

- Provision of empty conduits for future power supply works for other future major projects to minimise cumulative and future construction impacts.

A Submissions Report has been prepared that includes consideration of the issues raised by the community and stakeholders during the exhibition of the Environmental Impact Statement for Sydney Metro West. In some cases, the proposed amendments above relate to and address issues raised within submissions received. This includes:

- The overall improvement in flooding impacts at Clyde compared to the Environmental Impact Statement would address a submission from Sydney Water raising concern that the design of the Clyde stabling and maintenance facility would increase flood levels in and adjacent to Duck Creek and Duck River
- The improved road safety outcomes at Five Dock from the conversion of part of Waterview Street to one-way would address issues raised in community submissions regarding the use of heavy vehicles on local roads
- Retainment of the Port Access Road at The Bays Station would address an issue raised in a business submission regarding the realignment of the Port Access Road and the potential to constrain the long-term development of the White Bay Precinct
- Consolidation of power supply works to The Bays Station construction site from the Ausgrid Rozelle Substation would address concerns raised in community submissions regarding cumulative and future impacts of power supply works from multiple future major projects to be undertaken in local streets.

Although the proposed amendments would result in some potential additional impacts compared to the Environmental Impact Statement, overall the proposed amendments would result in reduced impacts or overall benefits when compared to those assessed in the Environmental Impact Statement. The changes in potential impacts associated with the proposed amendments compared to those described in the Environmental Impact Statement are identified in Chapters 3 to 7 and would largely include:

- Potential minor changes in hydrology and flooding impacts at Clyde stabling and maintenance facility construction site and The Bays Station construction site, most of which are beneficial
- Reduced non-Aboriginal heritage impacts to the State significant State Abattoirs at Sydney Olympic Park metro station construction site
- Reduced visual impacts at Sydney Olympic Park metro station construction site
- Potential minor changes to the construction noise and vibration impacts at Sydney Olympic Park metro station and The Bays Station construction sites
- Reduced predicted operational traffic noise levels at the Clyde stabling and maintenance facility
- Improved traffic safety and community outcomes through reducing potential conflicts with heavy vehicles at the Five Dock eastern construction site
- Minor increased travel distance and travel time for residents of Waterview Street, Five Dock
- Increased duration of impacts associated with The Bays Station power supply compared to the Environmental Impact Statement. However, there would be an overall reduction in cumulative impacts and duration of works when compared to these works from multiple major projects being progressed separately.

The potential changes in impacts identified would not result in any unacceptable impacts and revised environmental mitigation measures have been proposed where required.

On balancing the strategic need and benefits of Sydney Metro West (as outlined in the Environmental Impact Statement) with the potential changes in impacts as a result of the proposed amendments, there has been no change to the overall strategic merit of Sydney Metro West.

The Department of Planning, Industry and Environment will consider this Amendment Report and the Submissions Report during its assessment of the Concept and Stage 1 of Sydney Metro West. The Secretary of the Department of Planning, Industry and Environment will prepare an Environmental Assessment Report in accordance with section 5.18 of the *Environmental Planning and Assessment Act 1979*. The Minister for Planning and Public Spaces will then make a determination on the project and identify any conditions of approval which would apply.

This Amendment Report and the Submissions Report will be available on the Department of Planning, Industry and Environment website and on the Sydney Metro website at **https://www.sydneymetro.info/**.

If approved by the Department of Planning, Industry and Environment, Sydney Metro will continue to consult with community members, government agencies and stakeholders during the detailed design and construction phases of the Concept and Stage 1, and as part of the environmental impact assessment of future stages.

10 References

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Appendix A

Noise and vibration technical information

Appendix A

Noise and vibration technical information

A.1 Sydney Olympic Park metro station construction site – northern pedestrian entry

Airborne noise impacts

Number of noise management level (NML) exceedances

The predicted airborne noise impacts from the amended construction site works in this study area are summarised in Table 1 for all receiver types. The predictions are representative of the highest noise levels that would likely be experienced at the surrounding receivers when the works are at their nearest point.

The number of receivers predicted to experience exceedances of the NMLs are summarised in bands of 10 decibels (dB) and are separated into day, evening and night-time periods, as appropriate. All predicted values that have changed due to the amendment are shown in bold with the increased number of impacted receivers from the Environmental Impact Statement assessment shown in brackets.

Table 1: Overview of NML exceedances – All receiver types

Scenario	Activity		No. weeks[1]	Number of receivers (increase from Environmental Impact Statement)[5]																
				Total	HNA[2]	With NML exceedance[3]														
						Standard construction hours – daytime			Out-of-hours work[4]											
									Daytime OOH			Evening			Night-time			Sleep disturbance		
						1-10 dB	11- 20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB
Enabling works	'Typical'	Supporting and loading	13	99	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	'Peak'	Demolition using a rockbreaker	13	99	-	21	8	1	-	-	-	-	-	-	-	-	-	-	-	-
Piling	'Typical'	Supporting works	28	99	-	**3(+2)**	1	-	-	-	-	-	-	-	-	-	-	-	-	-
	'Peak'	Bored piling with support plant	28	99	-	4	**2(+1)**	-	-	-	-	-	-	-	-	-	-	-	-	-
Surface construction	'Typical'	General works	20	99	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	'Peak'	Noise intensive works	20	99	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-

Scenario		Activity	No. weeks[1]	Number of receivers (increase from Environmental Impact Statement)[5]																
				Total	HNA[2]	With NML exceedance[3]														
						Standard construction hours – daytime			Out-of-hours work[4]											
									Daytime OOH			Evening			Night-time			Sleep disturbance		
						1-10 dB	11- 20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB
Initial excavation	'Typical'	Mucking out	4	99	-	**3(+2)**	1	-	-	-	-	-	-	-	-	-	-	-	-	-
	'Peak'	Through soft soil/rock	2	99	-	6	**2(+1)**	-	-	-	-	-	-	-	-	-	-	-	-	-
		Through rock using rockbreaker	2	99	-	21	6	**2(+1)**	-	-	-	-	-	-	-	-	-	-	-	-
Excavation with sheds	'Typical'	Mucking out (Doors Closed)	33	99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	'Peak'	Through rock using rockbreaker (Doors Closed)	33	99	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
		Through rock using rockbreaker (Doors Open)	33	99	-	6	-	-	8	-	-	4	-	-	7	-	-	1	-	-
TBM retrieval	'Typical'	Deliveries and on/off loading	7	99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	'Peak'	TBM disassembly	7	99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mined cavern with shed	'Typical'	Spoil removal (Doors Closed)	12	99		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	'Peak'	Mining with support (Doors Closed)	12	99		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Mining with support (Doors Open)	12	99		-	-	-	-	-	-	-	-	-	1	-	-	-	-	-

1 Durations should be regarded as indicative and represent a typical worksite.
The duration of these impacts is less than the overall duration, and depends on the rate of progress in the works areas.
2 Highly Noise Affected, based on Interim Construction Noise Guideline (ICNG) definition (i.e. predicted LAeq(15minute) noise at residential receiver is 75 dBA or greater).
3 Based on worst-case predicted noise levels.
4 OOH = Out of hours. During the daytime, this refers to the period on Saturday between 7am – 8am, and 1pm – 10pm.
5 Results that have changed due to the amendment are shown in bold with increases from the Environmental Impact Statement assessment shown in (brackets).

Ground-borne noise impacts from construction sites

The predicted ground-borne impacts from vibration intensive mined tunnel excavation and shaft excavation works inside the acoustic sheds are summarised in Table 2. All predicted values that have changed due to the amendment are shown in bold with the increased number of impacted receivers from the Environmental Impact Statement assessment shown in brackets.

Table 2: Overview of ground-borne NML exceedances

NCA	Receiver classification	Number of receivers (increase from Environmental Impact Statement)[2]									
		Total	With NML exceedance[1]								
			Daytime			Out-of-hours work					
						Evening			Night-time		
			1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB
NCA08	Residential	6	-	-	-	-	-	-	-	-	-
	Commercial	55	**1 (+1)**	**1 (+1)**	**1 (+1)**	-	-	-	-	-	-
	Other sensitive	33	1	-	-	-	-	-	**1 (+1)**	-	-
NCA09	Residential	6	-	-	-	-	-	-	-	-	-
	Commercial	15	-	-	-	-	-	-	-	-	-
	Other sensitive	10	-	-	-	-	-	-	-	-	-

1 Based on worst-case predicted noise levels.
2 Results that have changed due to the amendments are shown in bold with increases from the Environmental Impact Statement assessment shown in (brackets).

A.2 The Bays Station construction site – longer station box and site layout

Airborne noise impacts from construction sites

Number of noise management level (NML) exceedances

The predicted airborne noise impacts from construction site works in this study area are summarised in Table 3 for all receiver types. The predictions are representative of the highest noise levels that would likely be experienced at the surrounding receivers when the works are at their nearest.

The number of receivers predicted to experience exceedances of the NMLs are summarised in bands of 10 dB and are separated into day, evening and night-time periods, as appropriate. All predicted values that have changed due to the amendment are shown in bold with the increased number of impacted receivers from the Environmental Impact Statement assessment shown in brackets.

Table 3: Overview of NML exceedances – all receiver types

Scenario		Activity	No. weeks[1]	Number of receivers (increase from Environmental Impact Statement)[5]																
						With NML exceedance[3]														
						Standard construction hours – daytime			Out-of-hours work[4]											
									Daytime OOH			Evening			Night-time			Sleep disturbance		
				Total	HNA[2]	1-10 dB	11- 20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB
Enabling works	'Typical'	Supporting and loading	4	1126	-	2	-	-	13	-	-	-	-	-	-	-	-	-	-	-
	'Peak'	Demolition using a rockbreaker	4	1126	-	554	44	1	636	186	6	-	-	-	-	-	-	-	-	-
Piling	'Typical'	Supporting works	30	1126	-	-	-	-	15	-	-	-	-	-	-	-	-	-	-	-
	'Peak'	Bored piling with support plant	30	1126	-	4	-	-	89	-	-	-	-	-	-	-	-	-	-	-
Surface construction	'Typical'	General works	12	1126	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
	'Peak'	Noise intensive works	12	1126	-	6	-	-	40	-	-	-	-	-	-	-	-	-	-	-
Initial excavation	'Typical'	Mucking out	8	1126	-	**1 (+1)**	-	-	**42 (+3)**	-	-	-	-	-	-	-	-	-	-	-
	'Peak'	Through soft soil/ rock	1	1126	-	**33 (+3)**	-	-	**158**	-	-	-	-	-	-	-	-	-	-	-
		Through rock using rockbreaker	7	1126	-	**534 (+24)**	**33 (+3)**	-	**639 (+6)**	158	-	-	-	-	-	-	-	-	-	-

Scenario	Activity		No. weeks[1]	Number of receivers (increase from Environmental Impact Statement)[5]															
				Total	HNA[2]	With NML exceedance[3]													
						Standard construction hours – daytime			Out-of-hours work[4]										
									Daytime OOH			Evening			Night-time			Sleep disturbance	
						1-10 dB	11- 20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB
Excavation with sheds	'Typical'	Mucking out (Doors Closed)	26	1126	-	-	-	-	**3 (+2)**	-	-	**3 (+2)**	-	-	**160 (+42)**	**1**	-	**4 (+1)**	-	-
	'Peak'	Through rock using rockbreaker (Doors Closed)	26	1126	-	2	-	-	**36 (+15)**	-	-	**36 (+15)**	-	-	**407 (+74)**	**12 (+10)**	-	**4 (+1)**	-	-
TBM launch and support	'Typical'	TBM support and spoil removal	78	1126	-	-	-	-	-	-	-	-	-	-	**72 (+51)**	-	-	**4 (+1)**	-	-
	'Peak'	TBM assembly and launch	2	1126	-	-	-	-	**18 (+15)**	-	-	**18 (+15)**	-	-	**297 (+115)**	**3 (+3)**	-	**4 (+1)**	-	-

1 Durations should be regarded as indicative and represent a typical worksite.
The duration of these impacts is less than the overall duration, and depends on the rate of progress in the works areas.
2 Highly Noise Affected, based on ICNG definition (i.e. predicted LAeq(15minute) noise at residential receiver is 75 dBA or greater).
3 Based on worst-case predicted noise levels.
4 OOH = Out of hours. During the daytime, this refers to the period on Saturday between 7am – 8am, and 1pm – 10pm.
5 Results that have changed due to the amendment are shown in bold with increases from the Environmental Impact Statement assessment shown in (brackets).