NSW GOVERNMENT | sydney METRO

West

Clyde stabling and maintenance facility Modification Report

November 2021

Contents

1 Introduction

This chapter provides an overview of the Sydney Metro West project, the proposed modification at the Clyde stabling and maintenance facility and the purpose of this report.

1.1 Overview

Sydney is expanding and the NSW Government is working hard 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 the Metro North West 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 Greater Sydney travels.

The Sydney Metro West project is part of the broader Sydney Metro network which includes:

- **Metro North West** – 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 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 (the approved project)** – A new 24-kilometre metro line that will connect Greater Parramatta with the Sydney CBD. Stations include Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock, The Bays, Pyrmont and Hunter Street (Sydney CBD). This infrastructure investment will double the rail capacity of the Greater Parramatta to Sydney CBD corridor 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.

The Sydney Metro program of work is shown on Figure 1-1.

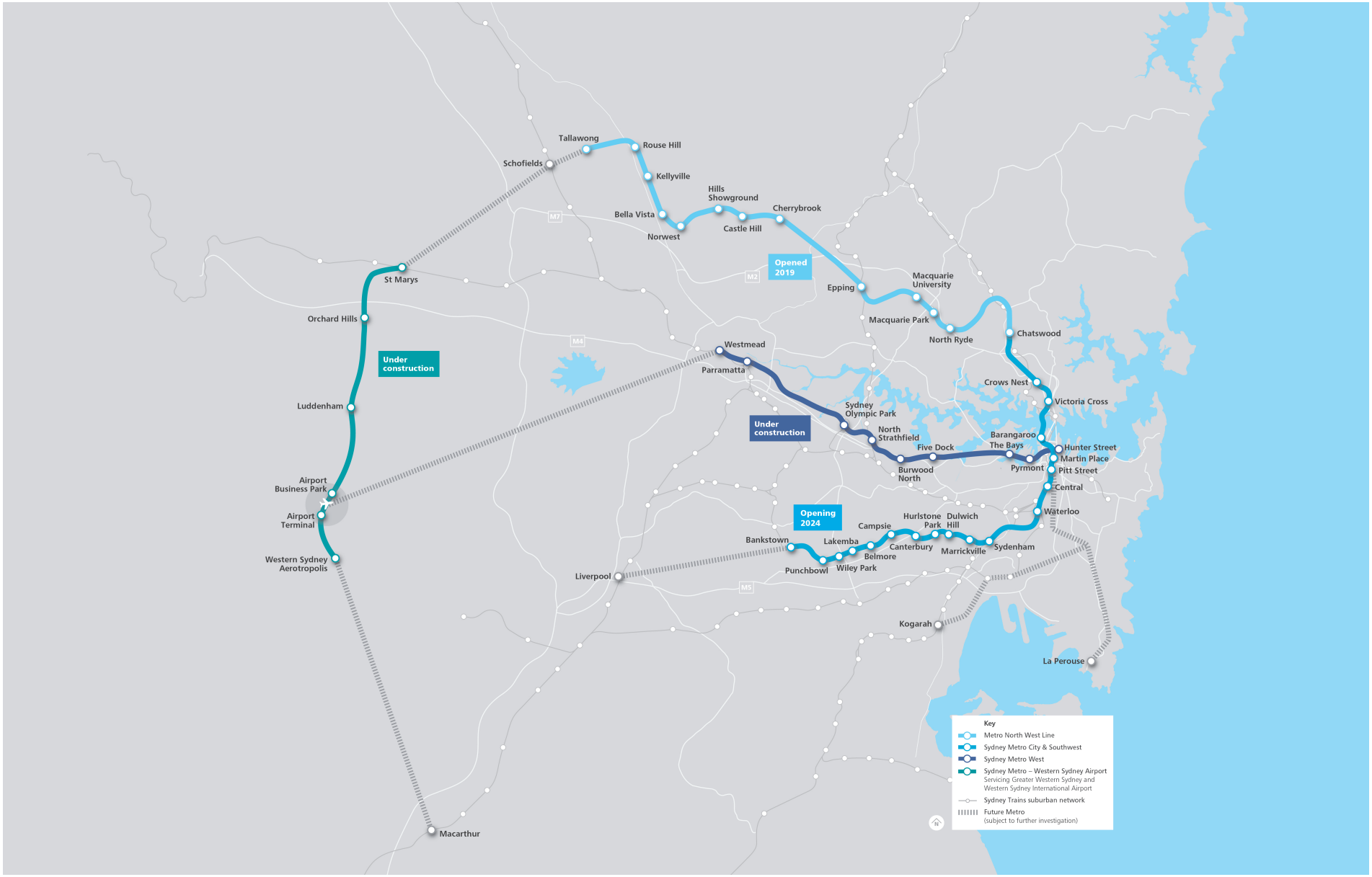

Figure 1-1 Sydney Metro Network

1.2 The approved project

The planning approval process for Sydney Metro West is being completed as a staged infrastructure application, in recognition of the size of the project, under section 5.20 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The approved Concept and major civil construction work between Westmead and The Bays (Stage 1 of the planning approval process)

The Sydney Metro West Concept, from Westmead to the Sydney CBD, as well as station excavation and tunnelling between Westmead and The Bays (the approved project) was granted approval by the Minister for Planning and Public Spaces on 11 March 2021 (SSI-10038) (see Figure 1-2) and is described in the following documents:

- The Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD (Sydney Metro, 2020a)
- Sydney Metro West Westmead to The Bays and Sydney CBD Amendment Report (Sydney Metro, 2020b) (Amendment Report)
- Sydney Metro West Westmead to The Bays and Sydney CBD Submissions Report (Sydney Metro, 2020c) (Submissions Report).

The approved Concept includes:

- Construction and operation of new passenger rail infrastructure between Westmead and the central business district of Sydney, including:
- Tunnels, stations (including surrounding areas) and associated rail facilities
- Stabling and maintenance facilities (including associated underground and overground connections to tunnels)
- Modification of existing rail infrastructure (including stations and surrounding areas).

Approved major civil construction work for Sydney Metro West between Westmead and The Bays (Stage 1 of the planning approval process) includes:

- 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 between Westmead and The Bays
- 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
- Civil work for the stabling and maintenance facility at Clyde
- 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.

Other stages of the planning approval process

Other stages of the planning approval process for Sydney Metro West currently underway include:

- Major civil construction works including station excavation and tunnelling between The Bays and Sydney CBD (Stage 2 of the planning approval process)
- Tunnel fit-out, construction of stations, ancillary facilities and station precincts, and operation and maintenance of the Sydney Metro West line (Stage 3 of the planning approval process).

The proposed modification relates to the major civil construction work for Sydney Metro West between Westmead and The Bays (Stage 1 of the planning approval process).

Figure 1-2 Sydney Metro West network

1.2.1 Clyde stabling and maintenance facility construction site

Overview

The Clyde stabling and maintenance facility construction site covers about 380,000 square metres between the M4 Motorway, James Ruse Drive and Rosehill Gardens Racecourse. Section 9.5.3 of the Environmental Impact Statement described the works required at the Clyde stabling and maintenance facility construction site as part of the approved major civil construction work between Westmead and The Bays including:

- Construction of the land formation for the stabling and maintenance facility
- Construction of structures over A'Becketts Creek and Duck Creek, including creek realignment works
- Construction and operation of a temporary precast concrete segment production facility
- Excavation the Rosehill services facility
- Excavation and construction of the Rosehill dive structure and tunnel portal
- Permanent realignment of Unwin Street and Kay Street around the Clyde stabling and maintenance facility (as provided in the Amendment Report section 3.2).

The indicative layout of the Clyde stabling and maintenance facility construction site identified a larger section of the former T6 Carlingford Line to the north of the Rosehill dive structure to be required for the construction of future stages of Sydney Metro West (see Figure 1-3).

Rosehill dive structure

The Environmental Impact Statement for the approved project included a dive structure and tunnel portal, which is to be constructed in Rosehill (within the former T6 Carlingford Line) to provide for a future connection from the Clyde stabling and maintenance facility to the mainline tunnels.

The indicative location of the Rosehill dive structure was identified to be within the north-western corner of the Clyde stabling and maintenance facility construction site (see Figure 1-3).

The construction of the dive structure and tunnel portal involves:

- Piling work along the walls of the dive structure
- Excavation of existing material to below future track level - excavation of underground connecting tunnels would be excavated by road header from the tunnel portal to the mainline tunnels
- Placement of precast concrete for the cut-and-cover section and to form the tunnel portal.

The dive structure would be designed and constructed to be protected from the probable maximum flood level.

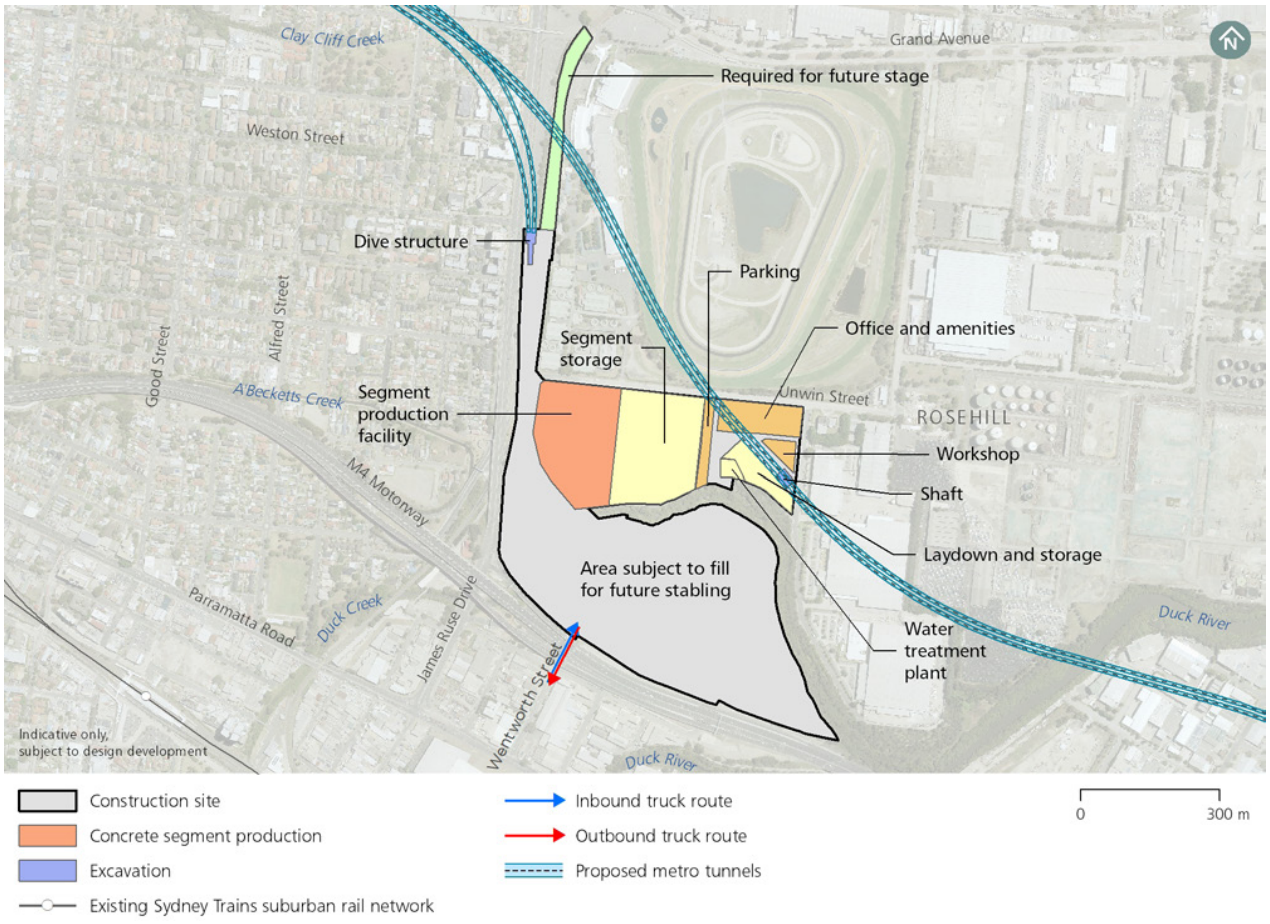

Figure 1-3 Clyde stabling and maintenance facility indicative construction site (approved project) (Sydney Metro, 2020a)

*** It is noted that, as part of design development and construction planning, elements shown on this figure have changed (including removal of segment production facility, segement storage, parking and changed shaft location) and have been determined to be consistent with the approved project. The changes are shown in** Figure 2-1**.**

Kay Street and Unwin Street realignment

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.

The Amendment Report (Sydney Metro, 2020b) involved a change to the Kay Street and Unwin Street route. The proposed road bridge over the future metro rail tracks as identified in the Environmental Impact Statement was changed to an at-grade road and a road underpass designed to accommodate B-double trucks (see Figure 1-4). 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.

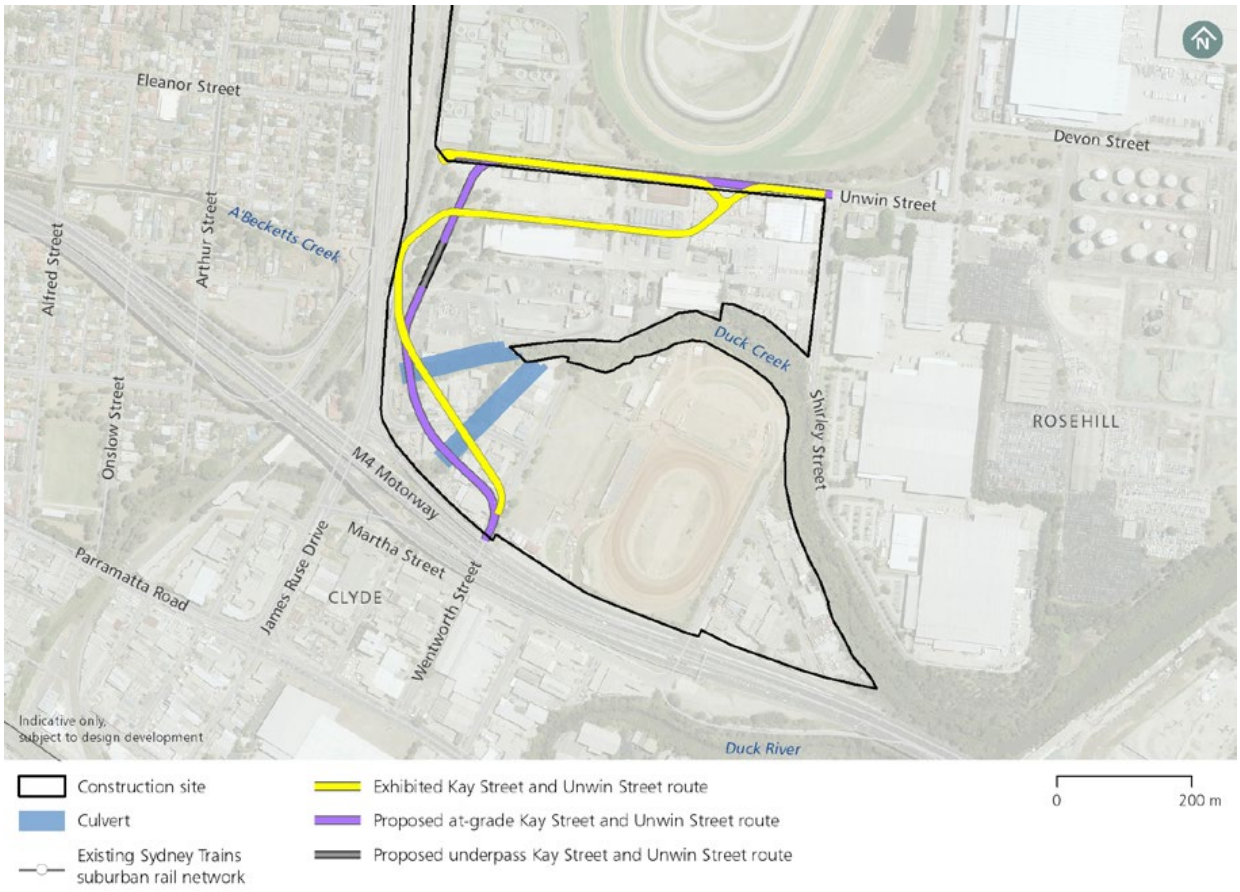

Figure 1-4 Kay Street and Unwin Street route realignment – (approved project) (Sydney Metro, 2020b)

1.3 The proposed modification

The proposed modification relates to the major civil construction work at the Clyde stabling and maintenance facility and would include:

- Rosehill dive structure relocation and extension
- Kay Street and Unwin Street realignment.

These changes to the design for the approved project would require:

- Additional land required for future planning applications brought forward
- Additional impact to heritage not assessed as part of the approved project
- Additional impact to biodiversity not assessed as part of the approved project.

The relocation and extension of the Rosehill dive structure is required to avoid major utilities on site and the change to the Kay Street and Unwin Street realignment is avoid reduce the need to disturb potentially contaminated soils.

In addition, following approval of the major civil construction work between Westmead and The Bays, a new threatened flora species was located within the approved construction site at Clyde. This modification provides an assessment of the impacts to this species, that were not previously assessed as part of the approved project.

There would be no changes proposed to the Concept as described in Chapter 6 (Concept description) of the Environmental Impact Statement.

1.4 Purpose and structure of this report

This report provides an assessment of the proposed modification in accordance with Section 5.25 of the *Environmental Planning and Assessment Act 1979.* The proponent may request the Minister to modify the Minister's approval for State significant infrastructure. The Minister's approval for a modification is not required if the infrastructure as modified will be consistent with the existing approval under this Division.

No revised or additional Secretary's Environmental Assessment Requirements (SEARs) have been issued for the proposed modification. Assessment has been undertaken in accordance with the SEARs issued for the approved project.

This modification report includes a description and justification for the proposed modification and an assessment of the potential changes in environmental and social impacts and benefits resulting from the proposed modification. The structure and content of this report is as follows:

- Section 1 – provides an introduction to the approved project and the proposed modification
- Section 2 – provides a justification for the proposed modification, a description of options considered and development of the proposed modification
- Section 3 – provides an overview of the early community consultation and stakeholder engagement carried out for the proposed modification to date and future consultation and engagement with the community and other key stakeholders
- Section 4 – provides a description of the proposed modification
- Section 5 – provides an environmental screening assessment and additional environmental assessment of changes in potential impacts from the proposed modification
- Section 6 – provides the approach to environmental management and revised mitigation measures resulting from changes in potential impacts from the proposed modification
- Section 7 – provides the recommended revised conditions of approval resulting from the proposed modification
- Section 8 – provides the justification for the proposed modification and conclusion of the environmental assessment.

2 Strategic need and justification

This chapter outlines the strategic justification, need for the proposed modification and identifies the alternatives considered for the proposed modification.

2.1 Need and justification the approved project

Sydney Metro West would double rail capacity from Parramatta to the Sydney CBD with the delivery of a new high-capacity rail connection. At ultimate capacity, Sydney Metro West would be able to move more than 40,000 people an hour in each direction and would complement the suburban and intercity services between Parramatta and the Sydney CBD.

The need and justification for Sydney Metro West is described further in Chapter 2 (Strategic need and justification) of the Environmental Impact Statement.

2.2 Need, alternatives and justification for proposed modification

The proposed modification relates to the major civil construction work at the Clyde stabling and maintenance facility and would include:

- Rosehill dive structure relocation and extension
- Kay Street and Unwin Street realignment.

The need, alternatives and justification of the proposed design changes that form part of the modification are provided in the sections to follow.

The additional biodiversity assessment to identify and assess the impacts to the new threatened flora species located within the approved construction site is required to ensure a complete assessment of the impacts of the project is undertaken.

2.2.1 Rosehill dive structure and tunnel portal

The revised location for the Rosehill dive structure is required to avoid major utilities. The location for the Rosehill dive structure for the approved project would involve diversion of a major Sydney Water sewer. The sewer was built in 1925 and serves about 1.5 million people in western Sydney. Diversion of the sewer would involve intensive construction works adjacent to sensitive receivers and within an area that is at risk from flooding. As part of this modification, the revised location of the Rosehill dive structure would avoid these works and the associated impacts to the community.

The revised location was selected to avoid further impacts to private property and public roads to the west and commercial property to the east by remaining within the former T6 Carlingford Line rail corridor. Remaining within the rail corridor with a revised location south or north of the revised location would require relocation of the sewer and not allow sufficient space for other construction activities on site.

To support the revised location of the dive structure, the proposed modification requires removal of the former Rosehill Railway Station (no buildings are part of the station), its platforms and associated footbridge (described further in Section 4.1.1). Construction of the dive structure would not be possible if the footbridge is retained in situ as the location within the cutting and elevation of the footbridge would impede construction equipment access

These works are located in an area that was identified for future use in the Environmental Impact Statement and would have required removal as part of future stages of the project. The dive structure for the approved project and proposed for the modification are presented in Figure 2-1.

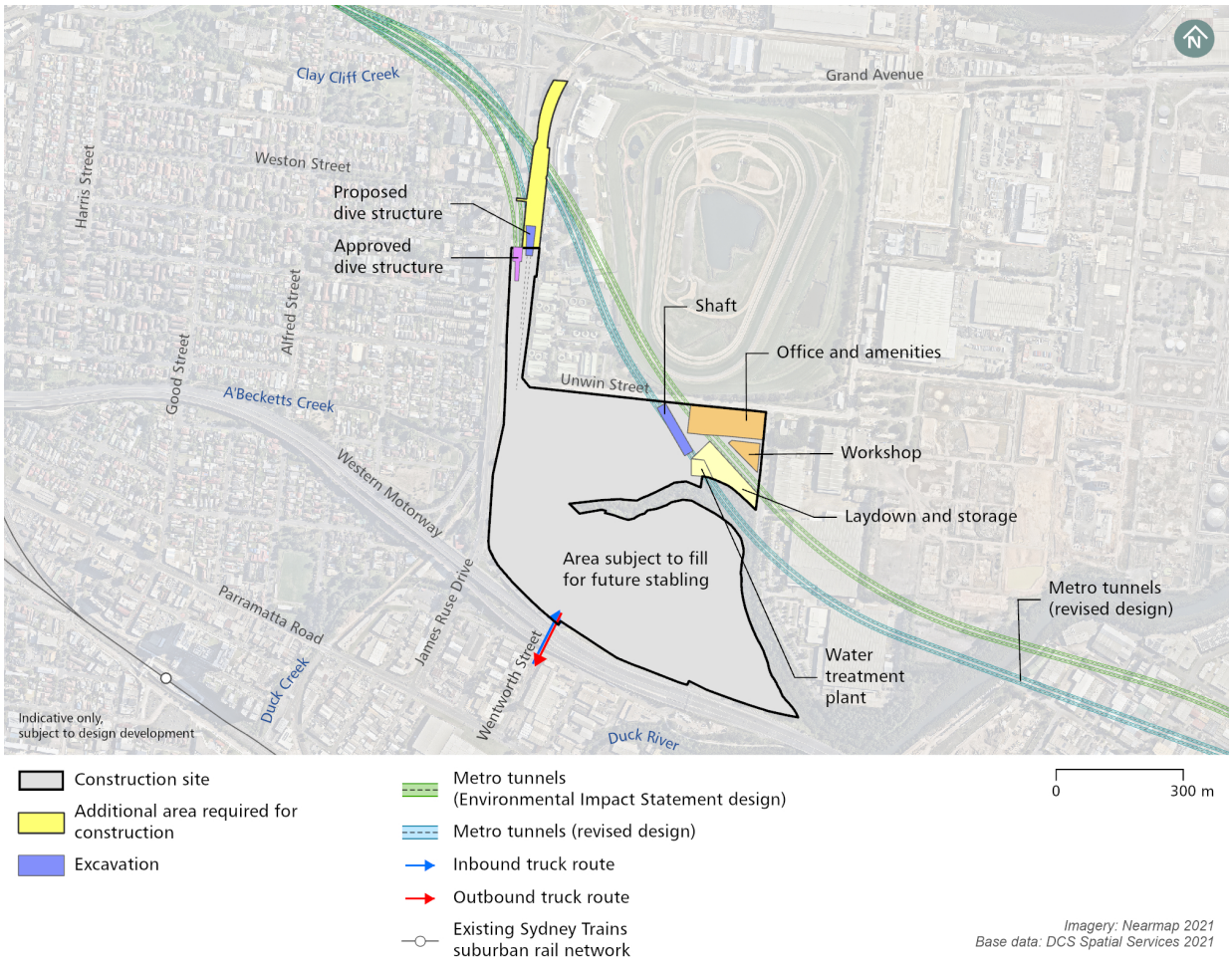

Figure 2-1 Clyde stabling and maintenance facility indicative construction site layout – dive structure (approved project and proposed modification)

Options for Rosehill Railway Station Footbridge

An options assessment was undertaken for the Rosehill Railway Station Footbridge, to identify if alternatives to the removal of this structure, such as retention or reinstatement, could be pursued. The options are identified and considered in Table 2-1.

Table 2-1 Options for Rosehill Railway Station Footbridge

#	Option	Consideration
1	**Retain in situ**	The Rosehill Railway Station Footbridge would impede construction equipment access due to its existing location within the cutting and elevation of the footbridge. Construction of the dive structure would not be possible if the footbridge is retained in situ. Therefore, this option is not considered further.

#	Option	Consideration
2	**Reinstate in same location following construction completion**	The Rosehill Railway Station Footbridge connects the former Rosehill Railway Station with Rosehill Gardens Racecourse. The purpose of this footbridge was made redundant when the T6 Carlingford rail line was decommissioned as a part of Parramatta Light Rail Stage 1. This connection will continue to be redundant into the future without Rosehill Railway Station. Reinstatement of Rosehill Railway Station Footbridge in its existing location following construction would not have a future functional purpose as the Rosehill Railway Station is no longer functional. Reinstatement in the same location would require the bridge to be changed to span over the wider metro rail corridor and require adjustments to meet *Disability Discrimination Act 1992* requirements. These changes would significantly affect the heritage fabric of the footbridge. The Rosehill Railway Station Footbridge is currently informally used to access Rosehill Gardens Racecourse from the associated car park. Provision for an alternative crossing of the former T6 Carlingford Line would be provided during construction to maintain this access. A permanent pedestrian and cycling crossing will be considered in future planning applications Therefore, this option is not considered further.
3	**Reuse in alternative location**	The Rosehill Railway Station Footbridge heritage significance is due to its location in the context of a Rosehill Railway Station and Rosehill Gardens Racecourse. If the footbridge was reused in an alternative location, its heritage significance would be reduced by removing it from its rail and Rosehill Racecourse context. If the footbridge was reused in an alternative location, it would require significant changes to ensure it is *Disability Discrimination Act 1992* compliant. These changes would significantly affect the heritage fabric of the footbridge. Therefore, this option is not considered further.
4	**Salvage**	This option would require Sydney Metro to prepare a salvage schedule prior to demolition that identifies and assesses the significance of fabric and opportunities for reuse of any identified significant fabric in interpretation. Salvage and retention for future use or display is unlikely to be successful due to the low likelihood of an alternative use for the structure in its current condition being found. However, Sydney Metro will continue to consider salvage and reuse opportunities for significant heritage fabric ahead of removal of the footbridge.
5	**Removal (archival recording)**	Given the other options are not viable, the preferred option is to remove the Rosehill Railway Station Footbridge and archivally record. The footbridge would be recorded in accordance with ‘How to Prepare Archival Records of Heritage Items’ and ‘Photographic Recording of Heritage Items Using Film and Digital Capture’ prior to removal. This record would be provided to Sydney Trains and the local library.

2.2.2 Kay Street and Unwin Street realignment

The realignment of Kay Street and Unwin Street is required to allow for the future metro rail to connect to the Clyde stabling and maintenance facility. As part of ongoing design development for the approved project, further consideration of the design of the realignment of Kay Street and Unwin Street has been undertaken. The three alternatives (see Figure 2-2) include the Environmental Impact Statement design (described in Chapter 9 of the Environmental Impact Statement), the approved project design (described in Chapter 3 of the Amendment Report), and the proposed modification design (described in Section 4.1.2 of this report).

The proposed modification was developed following project approval and includes a road bridge over the future metro rail, similar to the design presented in the Environmental Impact Statement, however with an updated alignment. This design would reduce the need to disturb potentially contaminated soils that could occur through approved project design. Other benefits of the proposed modification compared to the approved project design include:

- Reduced ongoing maintenance for an underpass (reduced power and no dewatering)
- Improved safety, compared to an underpass (as users, including vehicles, are visible)
- Ability to the reuse of materials onsite (into the retaining structures)
- Reduced requirements for the relocation of underground utilities
- Better value for money (due to reduced excavation).

Compared to the Environmental Impact Statement design, the proposed modification design reduces the operational footprint of the road, improves driver safety through better sight lines from a reduced curve in the road and allows for a shared use path. Alternative options for the road to be aligned elsewhere within the construction site is limited as this site would be used for facilities and track required for the configuration of the Clyde stabling and maintenance facility.

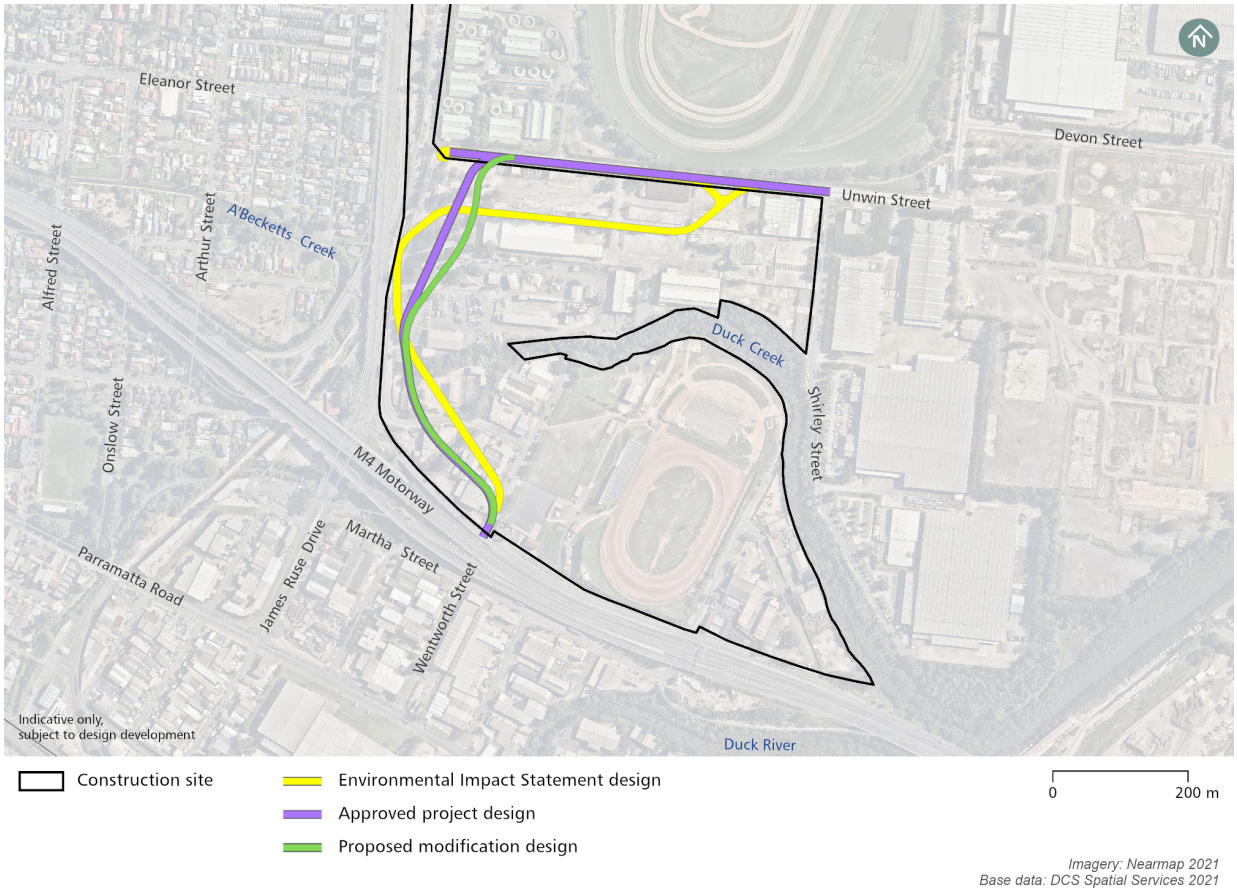

Figure 2-2 Kay Street and Unwin Street realignment (alternatives)

3 Stakeholder and community consultation

This chapter summarises consultation for the proposed modification. It identifies how the consultation was carried out, those consulted and the issues raised during engagement.

3.1 Overview

Engagement with the community and stakeholders about the Clyde stabling and maintenance facility began in October 2019 following lodgement of the Scoping Report for the approved project. Consultation and engagement has continued through project planning and design development to ensure the community and other stakeholders are informed.

This chapter outlines consultation and engagement specific to the proposed modification.

3.2 Consultation to date

3.2.1 Organisations and Government agencies

Specific engagement for this modification with the stakeholders listed in Section 3.1 has been undertaken. A summary of their feedback is provided in Section 3.3.

3.2.2 Community

Consultation with the community for the proposed modification was undertaken in November 2021 through preparation activities for public display of the Modification Report and included an advertisement in the local paper where the community was encouraged to have their say about the proposed modification. See Section 3.4 for further information on consultation and engagement during public exhibition.

3.3 Feedback received

Feedback during consultation and engagement was received from the following stakeholders:

- Australian Turf Club
- City of Parramatta Council
- Department of Planning, Industry and Environment (Place, Design and Public Spaces)
- Schools Infrastructure NSW
- Sydney Trains.

The feedback received during consultation and engagement relevant to the proposed modification is summarised in Table 3-1.

Table 3-1 Summary of feedback considered in this Modification Report

Feedback	Response
Concerns regarding traffic	Vehicle numbers and traffic routes would not change from the approved project. Refer to Section 5.1 for further information on traffic.

Feedback	Response
Interest if the Kay Street and Unwin Street realignment would provide access for B-double sized trucks.	The Kay Street and Unwin Street realignment would be able to be used by B-double trucks. Refer to Section 4.1.2 for further information on the Kay Street and Unwin Street realignment.
Interest if the Kay Street and Unwin Street realignment would include a path for pedestrian and cyclists.	The Kay Street and Unwin Street realignment would include a shared path for pedestrian and cyclists on one side of the road. Refer to Section 4.1.2 for further information on the Kay Street and Unwin Street realignment.
Interest if other options have been considered rather than the removal of the Rosehill Railway Station Footbridge.	An options analysis was completed for the Rosehill Railway Station Footbridge and determined that removal was the most feasible option. Refer to Section 2.2.2 for the options analysis for the Rosehill Railway Station Footbridge.
Interest if a crossing over the rail corridor would be provided to replace the Rosehill Railway Station Footbridge.	Permanent pedestrian and cycling and paths in the area will be considered in future planning applications. Provision for an alternative crossing of the former T6 Carlingford Line would be provided during construction. Refer to Section 5.1 for further information on transport and access.
Interest if the modification proposes changes to the pedestrian and cycling connectivity in the area.	The proposed modification includes a shared path along the realignment of Kay Street and Unwin Street and removes the Rosehill Railway Station Footbridge. Other pedestrian and cycling and paths and will be considered in future planning applications in the area. Refer to Section 5.1 for further information on transport and access.
Concerns regarding flood impacts from the Kay Street and Unwin Street realignment as a result of the proposed modification	The potential for flooding and hydrology changes as a result of the modification would be negligible to minor. Refer to Section 5.6 for an assessment of hydrology and flooding as a result of the modification.
Concerns regarding additional noise to Rosehill Gardens Racecourse	Sydney Metro will continue to work with the Australian Turf Club to identify noise and vibration objectives and mitigation measures. Refer to Section 5.2 for an assessment of noise and vibration as a result of the modification.

3.4 Public exhibition of this report

3.4.1 Consultation and engagement during public exhibition

The Department of Planning, Industry and Environment will place this Modification Report on exhibition for a period of two weeks. During the exhibition period, the community, organisations and government agencies are invited to provide feedback and make a submission. The Department of Planning, Industry and Environment will consider these submissions in their assessment of the proposed modification.

In addition to exhibition of the Modification Report, Sydney Metro will continue to consult with the community though the following communication channels:

- The Sydney Metro West website and Sydney Metro West interactive portal
- A letterbox drop notification to the local community
- A direct email notification to a local database of people signed up for project alerts.

3.4.2 Consideration of submissions

The Department of Planning, Industry and Environment will provide Sydney Metro with a copy of all submissions received following the closure of public exhibition of the Modification Report. If required the Department of Planning, Industry and Environment may request Sydney Metro to respond to issues raised in the submissions. If responses to the submissions are required, these will be made available on the Department of Planning, Industry and Environment website with anyone who made a submission to receive a letter to notify them a publication of the response will be available on the Department of Planning, Industry and Environment website.

3.5 Future consultation and engagement

If the proposed modification is approved, Sydney Metro would continue to engage with the community and other stakeholders including:

- Ongoing consultation with relevant stakeholders
- Implementation of the *Overarching Community Communications Strategy* located on the Sydney Metro website (https://www.sydneymetro.info/sites/default/files/document-library/Sydney_Metro_Overarching_Community_Communication_Strategy.pdf).

4 Modification description

4.1 Proposed modification description

4.1.1 Rosehill dive structure

The Rosehill dive structure is required to provide for a future connection from the Clyde stabling and maintenance facility to the mainline tunnels. The proposed modification includes:

- Relocation east and extension of the Rosehill dive structure further north-east within the former T6 Carlingford Line
- Additional construction area, previously identified in the Environmental Impact Statement as required for future use, to allow for:
    - Enabling works as outlined in Section 9.4.1 of the Environmental Impact Statement
    - Removal of the Rosehill Railway Station Footbridge which is of local heritage significance, listed under the RailCorp Heritage and Conservation Register under Section 170 of the *Heritage Act 1977* (NSW) and provision for an alternative crossing of the former T6 Carlingford Line prior to removal of the footbridge
    - Removal of the platforms and station furniture at the former Rosehill Railway Station
- Minor realignment of the tunnel portal connecting the mainline tunnels to the revised Rosehill dive structure location.

The proposed modification of the Rosehill dive structure is presented in Figure 4-1. Further investigation into temporary facilities to support additional access to the tunnels would be considered as part of detailed construction planning.

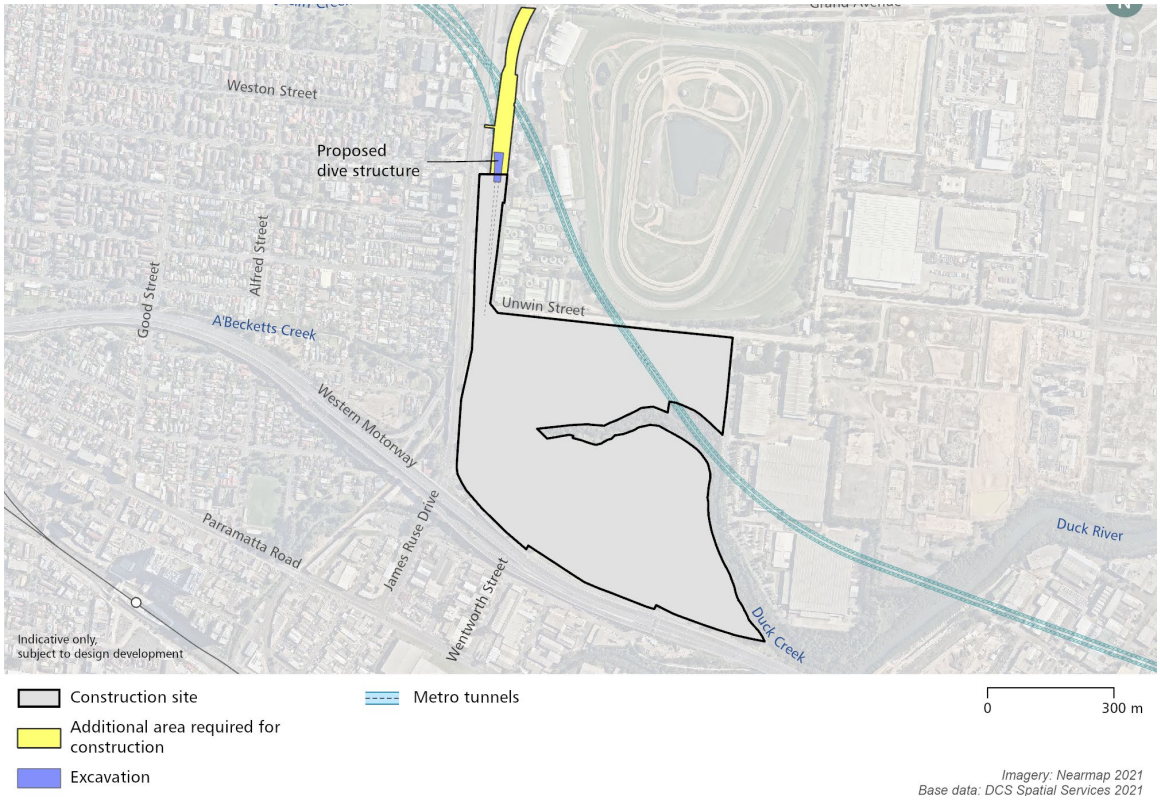

Figure 4-1 Clyde stabling and maintenance facility indicative construction site (proposed modification)

4.1.2 Kay Street and Unwin Street realignment

The realignment of Kay Street and Unwin Street is required to provide general traffic and B-double access around the Clyde stabling and maintenance facility construction site. The proposed modification includes the following changes to the Kay Street and Unwin Street realignment:

- A road bridge as opposed to an underpass to cross the future metro rail tracks
- Elevation of the Kay Street and Unwin Street realignment for about 250 metres
- Minor realignment of the Kay Street and Unwin Street route
- A shared path to accommodate pedestrians and cyclists on one side.

The realignment of Kay Street and Unwin Street would be completed by the end of 2024 with access maintained throughout construction via a temporary road. The Kay Street and Unwin Street realignment is presented in Figure 4-2.

The proposed modification does not include any changes to the culverts located at A'Becketts Creek and Duck Creek assessed as part of the approved project. These structures and the changes to A'Becketts Creek and Duck Creek as part of the approved project are subject to ongoing design development to ensure project outcomes are met.

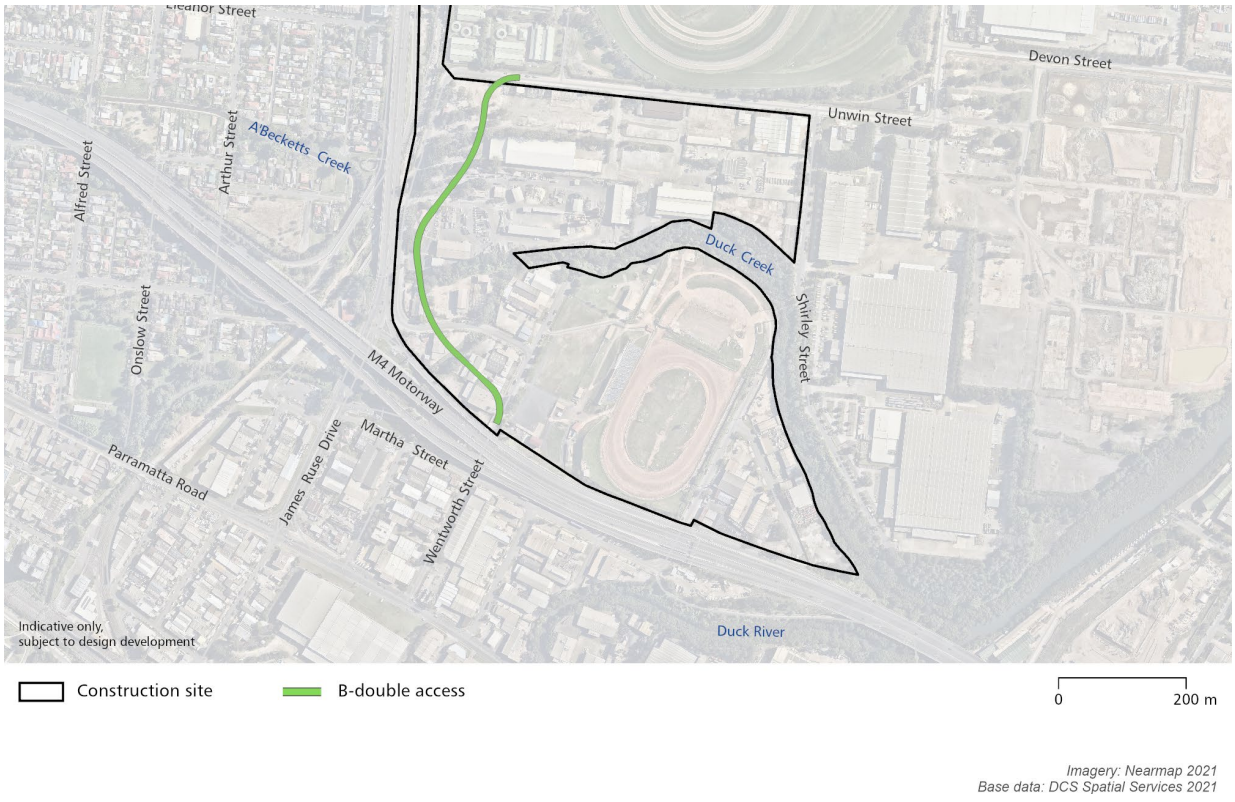

Figure 4-2 Kay Street and Unwin Street route realignment (proposed modification)

4.1.3 Additional impacts to threatened flora species

Following approval of the major civil construction work between Westmead and The Bays, a new threatened flora species (Downy Wattle) has been located within the approved construction site at Clyde, as well as within the additional construction area required to support the proposed modification to the Rosehill diver structure. This modification provides an assessment of the impacts to this species, that were not previously assessed as part of the approved project.

5 Environmental screening and assessment

This chapter provides a consideration of the potential for change to the impacts as assessed for the approved project and whether further assessment of each aspect is required. If further assessment is required, it is then provided later in this chapter.

5.1 Environmental impact screening

This screening assessment considers whether the proposed modification could change the potential impacts for the approved project. Table 5-1 identifies whether additional environmental assessment of the proposed modification would be required. Where the requirement for further detailed assessment has been identified, this has been provided with any revised environmental mitigation measures in Section 5.2.

Table 5-1 Environmental screening assessment

Environmental aspect	Comparison of proposed modification against the approved project	Further detailed assessment required?
Transport and traffic	The transport and traffic impacts associated with the proposed modification would be consistent with those assessed for the approved project. Vehicle numbers and traffic routes would not change from the approved project. Provision for an alternative crossing of the former T6 Carlingford Line would be provided temporarily to ensure access is maintained to the Rosehill Gardens Racecourse during construction. Permanent access arrangements will be considered as part of future planning applications (Stage 3 of the planning approval process).	No
Noise and vibration	Noise and vibration impacts are anticipated to change as a result of the proposed modification. The revised Rosehill dive structure location to the north-east would impact additional receivers. The Kay Street and Unwin Street realignment may also change operational traffic noise.	Yes Refer to Section 5.2.
Non-Aboriginal heritage	Non-Aboriginal heritage impacts are anticipated to change as a result of the proposed modification. Construction access to the revised Rosehill dive structure location requires removal of a locally significant heritage item (Rosehill Railway Station Footbridge). The Kay Street and Unwin Street realignment is within the curtilage of a locally significant heritage item, the RTA Depot, of which the impacts would be consistent with those assessed as part of the approved project.	Yes Refer to Section 5.3.

Environmental aspect	Comparison of proposed modification against the approved project	Further detailed assessment required?
Aboriginal heritage	The Aboriginal heritage impacts associated with the proposed modification would be consistent with those assessed for the approved project. The proposed modification is not located within an area of Aboriginal archaeological potential as identified in Technical Paper 4 of the Environmental Impact Statement for the approved project.	No
Property and land use	Property and land use impacts were previously assessed for the approved project. No further changes are anticipated to property and land use than those assessed for the approved project. The additional land that is required for the proposed modification would continue to be used for rail activities.	No
Landscape character and visual amenity	Landscape character and visual amenity impacts are anticipated to change as a result of the proposed modification. The Unwin Street and Kay Street realignment may alter visual impacts from the approved project.	Yes Refer to Section 5.4.
Business impacts	The business impacts associated with the proposed modification would be consistent with those assessed for the approved project. No additional businesses would be impacted by the proposed modification.	No
Social impacts	The social impacts associated with the proposed modification would be consistent with those assessed for the approved project. The proposed modification would not change the impacts assessed for the approved project regarding community assets, values and aspirations.	No
Groundwater and ground movement	The groundwater and ground movement for the proposed modification would be consistent with those assessed for the approved project. The revised location of Rosehill dive structure would not significantly change the groundwater in the area or the impacts to ground movement.	No
Soils and surface water quality	The soils and surface water quality for the proposed modification would be consistent with those assessed for the approved project.	No

Environmental aspect	Comparison of proposed modification against the approved project	Further detailed assessment required?
Contamination	Contamination impacts are anticipated to change as a result of the proposed modification. Changes to the revised dive structure location may expose additional contamination, however this is anticipated to be minimal.	Yes Refer to Section 5.5.
Hydrology and flooding	Hydrology and flooding impacts are anticipated to change as a result of the proposed modification. The Unwin Street and Kay Street realignment may alter the hydrology and flooding impacts from the approved project. These are anticipated to be minimal as the culverts, and associated benefits, for the approved project would be retained.	Yes Refer to Section 5.6.
Biodiversity	Biodiversity impacts are anticipated to change as a result of the proposed modification. Additional vegetation is proposed to be cleared in the additional area required for construction. Furthermore a threatened flora species was identified within the approved project area following project approval. These impacts are anticipated to be minimal as the vegetation is generally low quality exotic / native and the threatened flora species within the approved and proposed construction site represents a small proportion of the overall species population.	Yes Refer to Section 5.7.
Air quality	The air quality changes for the proposed modification would be consistent with those assessed for the approved project.	No
Spoil, waste management and resource use	The spoil, waste management and resource use for the proposed modification would be consistent with those assessed for the approved project. Less spoil may be generated as a result of the revised Kay Street and Unwin Street realignment.	No
Hazards	The potential hazards associated with the proposed modification would be consistent with those assessed for the approved project. Safety and security measures are subject to design development.	No
Sustainability and climate change	The potential climate change risks and greenhouse gas emissions associated with the proposed modification would be consistent with those for the approved project.	No

5.2 Noise and vibration

5.2.1 Overview

This section provides a summary of the potential changes to noise and vibration from the approved project as a result of the proposed modification (including revised mitigation measures). The detailed assessment is shown in Appendix C: Noise and vibration assessment.

The existing environment and methodology for assessment remains as for the approved project, detailed in Technical Paper 2 (Noise and vibration) of the Environmental Impact Statement. This includes the area being generally residential to the west and commercial / industrial to the east of the proposed modification.

The existing noise levels around the proposed modification are generally controlled by road traffic on the surrounding road network, particularly in areas adjacent to James Ruse Drive and the M4 Motorway where existing noise are dominated by continuous road traffic noise.

Assessment approach

This assessment approach used assesses the changes from the approved project as a result of the modification. This was used to identify both additional receivers and receivers with an increased impact through comparison of worst-case impacts from additional and changed construction at the Clyde stabling and maintenance facility construction site.

Representative scenarios have been developed to assess the potential impacts as a result of the modification and include:

- Changed construction – regarding the revised Rosehill dive structure relocated east and extending further north into the additional area required for construction
- Additional construction – regarding the removal of structures at the former Rosehill Railway Station (this scenario was not previously assessed for the approved project).

As part of design development and construction planning, other elements of the site have been revised (including removal of segment production facility, segment storage, parking and revised Rosehill services shaft location) and as such a direct comparison of the predicted impacts from the excavation of the proposed modification compared to the assessment of the approved project provided in the Environmental Impact Statement is not possible. However, with removal of the segment production facility noise activities at this location would be generally reduced from the approved project.

5.2.2 Impact assessment

The potential noise and vibration impacts from the proposed modification have been assessed for the revised Rosehill dive structure and the realignment of Kay Street and Unwin Street.

The noise impacts from the revised Rosehill dive structure are generally consistent with those predicted for the approved project, with exception of additional receivers to the north being affected from the proposed construction activities proposed further north-east, within the additional area required for construction. None of the additional receivers are expected to be highly noise affected from the construction proposed as part of the modification.

The noise impacts from the revised Kay Street and Unwin Street realignment are not expected to result in any additional construction or operational noise impacts to those predicted from the approved project. Further detail on this assessment is provided in the sections to follow.

Noise impacts

Rosehill dive structure

Changed construction

Impacts from the revised location and extent of the Rosehill dive structure are generally consistent with the impacts predicted for the approved project. No receivers are anticipated to be additionally impacted from excavation of the dive structure when compared with the worst-case impacts from all construction scenarios assessed for the approved project.

However, due to the works extending the construction site, additional receivers would experience a marginal increase in noise from excavation activities further north. This includes the relocation and extension of the Rosehill dive structure being closer to Rosehill Gardens Racecourse (see Figure 5-1).

Most works would be completed during the day with exception of the roadhead launch and support where assembly and launch (the peak noise activity) is expected to be no longer than two weeks. The most noise intensive work activity, excavation using rock breaker, would be no longer than 24 weeks.

Additional construction

The removal of the former Rosehill Railway Station involves the removal of structures and additional impacts to both new receivers and those identified as being affected by the approved project. The demolition of the station platforms, footbridge and station furniture at the former station would add construction activities in an area further north than was assessed for the approved project.

This work would be generally short term with a total duration of four to six weeks and be completed during daytime hours. Increased noise impacts are expected further north adjacent to the additional area required for construction on both sides of James Ruse Drive.

However, receivers with direct exposure to James Ruse Drive experience high existing road traffic noise levels during the daytime period. This existing noise would likely mask construction noise particularly during less noisy activities (see Figure 5-1).

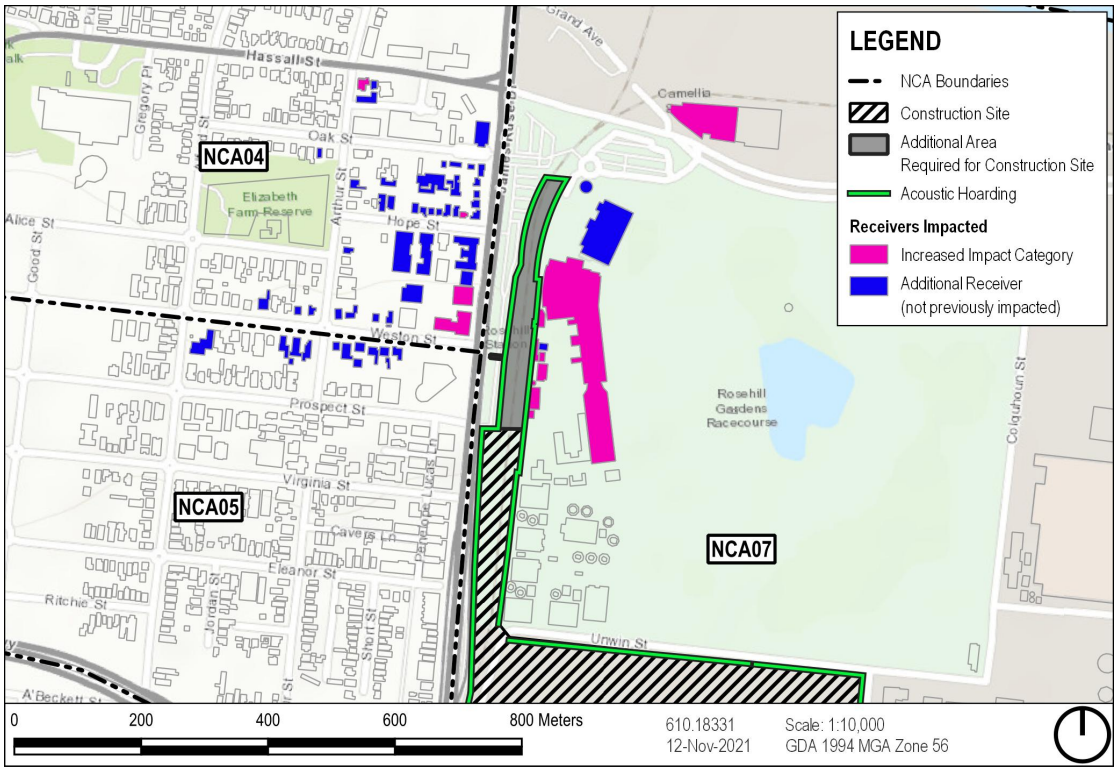

Figure 5-1 Receivers with increased or additional worst-case daytime airborne noise impacts from additional and changed construction

Kay Street and Unwin Street realignment

The revised Kay Street and Unwin Street realignment is not expected to have additional noise impacts from construction as the work proposed as part of the modification would have similar noise impacts to those for the approved project.

The revised Kay Street and Unwin Street alignment is not expected to significantly change noise levels at the closest residential receivers compared to the alignment from the approved project when operational. This is as the revised alignment is similar to that of the approved project however slightly to the east and further away from residential receivers. The assessment of the proposed modification anticipated impacts are unlikely to alter existing road traffic noise levels at the adjacent receivers due to the future road traffic noise levels in the area being controlled by the road traffic from James Ruse Drive, which is similar to the approved project.

Vibration impacts

Vibration impacts are predicted at the receivers nearest to the additional area required for construction where vibration intensive work is required to remove structures at the former Rosehill Station.

Cosmetic damage screening criteria are predicted to be exceeded at four commercial buildings at Rosehill Gardens racecourse. Human comfort criteria are also predicted to be exceeded at several of the nearest commercial buildings at the Rosehill Gardens Racecourse to the east of the site, meaning occupants of affected buildings may be able to perceive vibration impacts at times when vibration intensive equipment is in use nearby (Figure 5-2).

In reality, smaller equipment or alternative methodologies would likely be used as the work gets near to adjacent structures which would control the potential impacts. Impacts would also be reduced when work is more distant or further underground.

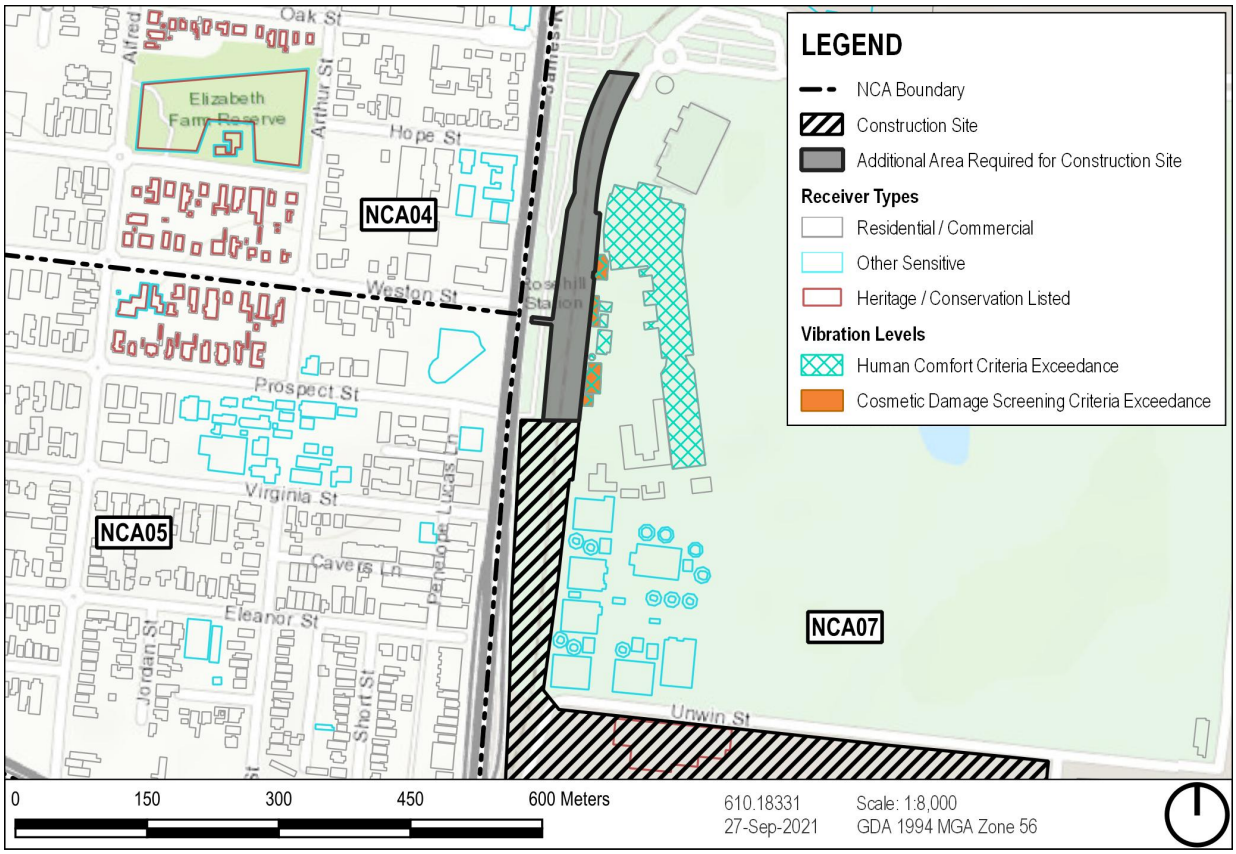

Figure 5-2 Vibration impacts as a result of the proposed modification (worse case)

5.2.3 Mitigation measures

The mitigation measures identified for the approved project would be applied to minimise impacts associated with the proposed modification. Additional mitigation measures are also proposed to further manage the potential noise and vibration impacts at the Rosehill Gardens Racecourse. These additional mitigation measures are shown in Table 5-2 in **bold**.

Table 5-2 Additional mitigation measures proposed (noise and vibration)

Reference	Impact / issue	Mitigation measure	Applicable location
Additional mitigation measures			
NV20	**Noise impacts to horses at the Rosehill Gardens Racecourse (consultation)**	**Undertake consultation with the Rosehill Gardens Racecourse and an equine veterinary expert to inform construction noise and vibration objectives for this sensitive receiver.** **Achievement of objectives are to be demonstrated in accordance with Noise and Vibration Construction Monitoring Program required by Conditions C15 and C16 and would include reference to equine behavioural responses where feasible.**	**CSMF**
NV21	**Noise impacts to horses at the Rosehill Gardens Racecourse (additional mitigation)**	**Consider the use of additional noise mitigation measures such as noise barriers where feasible and reasonable.**	**CSMF**

5.3 Non-Aboriginal heritage

5.3.1 Overview

This section provides a summary of the potential changes to non-Aboriginal heritage from the approved project as a result of the proposed modification (including revised mitigation measures). The detailed assessment is shown in Appendix D: Non-Aboriginal heritage assessment.

The existing environment and methodology for assessment remains as for the approved project, detailed in Technical Paper 3 (Non-Aboriginal heritage) of the Environmental Impact Statement. A site visit was completed in August 2021 to assist with this assessment.

Items identified in the Environmental Impact Statement have not been reassessed as part of this assessment. Additional items that have potential to be impacted as a result of the proposed modification are identified in Table 5-3 and shown in Figure 5-3 and Figure 5-4.

Table 5-3 Heritage items that may be affected a result of the proposed modification

Heritage item	Register listings	Address	Significance	Relationship to additional area required for the construction site
Rosehill Railway Station Footbridge	S170 (SHI no. 4801762)	James Ruse Drive, Rosehill	Local	Within the additional construction site area
Former Rosehill Railway Station	Potential heritage item	James Ruse Drive, Rosehill	Local	Within the additional construction site area

Figure 5-3 Rosehill Railway Station Footbridge

Figure 5-4 Former Rosehill Railway Station

5.3.2 Impact assessment

Built heritage impact assessment

The built heritage impact assessment identified one listed and one potential heritage item that would be affected as a result of the proposed modification. Both items are proposed to be demolished and hence directly affected as the area is required for construction of the Rosehill dive structure and associated works. Both items were being considered for removal as part of future planning applications, however were brought forward to allow construction of the revised Rosehill dive structure.

The former Rosehill Railway Station, Rosehill Railway Station Footbridge and associated T6 Carlingford rail line were decommissioned as a part of Parramatta Light Rail Stage 1. Hence, the railway station and rail line are no longer operational and the footbridge is no longer required to cross an operating rail line. The railway station and footbridge will continue to be redundant without operation of the T6 Carlingford rail line. The heritage significance of these two items would also be reduced if they are removed from their rail context.

A summary of impacts to heritage items as result of the proposed modification is provided in Table 5-4.

Table 5-4 Summary of impacts to heritage items as result of the proposed modification

Heritage item	Construction site	Significance	Description of potential impacts
Rosehill Railway Station Footbridge	Within the additional construction site area	Local	Direct impact: Major Overall impact: Major
Former Rosehill Railway Station	Within the additional construction site area	Local (potential heritage item)	Direct impact: Major Overall impact: Major

Archaeological heritage impact assessment

Significant archaeological remains have not been predicted to be located within the additional construction area required for the proposed modification. As such, demolition, clearing and excavation works resulting in ground disturbance are unlikely to disturb archaeological remains. The proposed works within the additional area required for construction would not result in impacts to significant non-Aboriginal archaeological remains or ‘relics’ as defined under the *Heritage Act 1977* (NSW).

Cumulative impact assessment

The proposed modification would impact non-Aboriginal local heritage items in the Clyde area that would result in a loss to the collective railway heritage of NSW and the changed setting moves further away from the historic land use of the site. In summary, the proposed modification would result in moderate cumulative impacts to the heritage items in the local area and of NSW compared to the approved project that had nil potential cumulative impacts.

The surrounding area to Clyde stabling and maintenance facility is undergoing moderate development however these developments are not expected to result in any further impacts to heritage listed items or archaeological resources.

5.3.3 Mitigation measures

The mitigation measures identified for the approved project would be applied to minimise impacts associated with the proposed modification. Changed and additional mitigation measures are proposed as a result of the modification are shown in **bold** text and are provided in Table 5-5.

Table 5-5 Changed and additional mitigation measures proposed as a result of the proposed modification (non-Aboriginal heritage)

Reference	Impact / issue	Mitigation measure	Applicable location
Changed mitigation measures			
NAH1	Archival recording	Archival recording and reporting of the following heritage **and unlisted potential 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) **• Rosehill Railway Station Footbridge (SHI no. 4801762)** **• Rosehill Railway Station (unlisted potential heritage item)**.	PMS, CSMF, SOPMS, TBS**, CSMF**
Additional mitigation measures			
NAH11	**Removal / Salvage**	**Prior to commencement of demolition of heritage elements at Rosehill Railway Station and Rosehill Railway Footbridge, significant heritage fabric would be identified for salvage and reuse opportunities for salvaged fabric considered.**	**CSMF**

5.4 Landscape character and visual amenity

5.4.1 Overview

This section provides a summary of the potential changes to landscape and visual amenity from the approved project as a result of the proposed modification (including revised mitigation measures). The detailed assessment is shown in Appendix E: Landscape and visual amenity assessment.

The existing environment and methodology for assessment remains as for the approved project, detailed in Technical Paper 5 (Landscape and visual) of the Environmental Impact Statement. A site visit was completed in August 2021 to assist with this assessment.

The landscape and views identified for the approved project and that are relevant to the proposed modification have been reassessed as part of this assessment.

5.4.2 Impact assessment

Changes to landscape impact

Rosehill dive structure

The revised location of the Rosehill dive structure would require additional area to extend the construction site north into the former T6 Carlingford Line and hence its landscape character was not assessed as part of the approved project. This area was decommissioned, closed and used as a construction site for the Parramatta Light Rail Stage 1 project.

The revised location of the Rosehill dive structure would have a moderate adverse landscape impact during construction on the former T6 Carlingford Line and Rosehill Railway Station due to the removal of the vegetation along the embankments, reducing the shade cover and amenity (see Table 5-6 for a summary of landscape character impacts).

Kay Street and Unwin Street realignment

The realignment of Unwin Street and Kay Street via an at-grade road and road bridge, instead of a road underpass as per the approved project would continue to change the landform across the construction site, however the vegetation removal and scale of earthworks would be consistent with the approved project. Overall, the construction site would have minor adverse landscape impacts for the site and streetscapes of Unwin Street, Kay Street and Shirley Street which is consistent with the approved project (see Table 5-6 for a summary of landscape character impacts).

All other landscape impacts would remain unchanged from the approved project.

Table 5-6 Summary of landscape character impacts relevant to the proposed modification

Modification change	Location	Landscape impact	
		Approved project	Proposed modification
Rosehill dive structure	The former T6 Carlingford Line and Rosehill Railway Station	N/A	Moderate adverse
Kay Street and Unwin Street realignment	The site and streetscapes including Unwin, Kay and Shirley Streets	Minor adverse	Minor adverse

Changes to visual amenity

Rosehill dive structure

The revised location of the Rosehill dive structure would include additional visual impacts further north compared to the approved project. This would be from the construction site extending further north-east and associated facilities and vegetation removal with establishing this site. However, much of these works would be seen in the existing context of the street and associated car parks (see Figure 5-5 and Figure 5-6)

Only one view was assessed as a negligible visual impact from the Rosehill dive structure for the approved project from the Rosehill Gardens Racecourse. For the proposed modification, all views were assessed as having negligible to moderate adverse visual impacts (see Table 5-7 for a summary of day-time visual impacts).

Most night-time visual impacts from the revised Rosehill dive structure would be contained within the landscape cutting and distant from any sensitive receivers. Therefore there would be no changes to the negligible visual impacts at night time from the revised Rosehill dive structure (see Table 5-8 for a summary of night-time visual impacts).

Figure 5-5 View south from James Ruse Drive footbridge (existing view)

Figure 5-6 View north from Rosehill Gardens Racecourse **car park (existing view)**

Kay Street and Unwin Street realignment

The realignment of Unwin Street and Kay Street via an at-grade road and road bridge would be larger in scale and visually more prominent than proposed for the approved project. While the road bridge would be more noticeable, it would be viewed in context of the approved construction site which may be visible from James Ruse Drive (see Figure 5-7) and Unwin Street and Shirley Street (see to Figure 5-8)

This is no change to the visual impact levels, that range from minor adverse to moderate adverse, from the proposed modification to the approved project (refer to Table 5-7 for a summary of day-time visual impacts).

There would be no changes to negligible visual impacts at night time from the realignment of Unwin Street and Kay Street from the approved project (see Table 5-8 for a summary of night-time visual impacts).

Figure 5-7 View south-east along James Ruse Drive (existing view)

Figure 5-8 View south-west to the corner of Unwin and Shirley Streets (existing view)

Table 5-7 Summary of day-time visual impact

Modification change	Location	Day-time visual impact level	
		Approved project	Proposed modification
Rosehill dive structure	Viewpoint 6: View south from the James Ruse Drive footbridge	N/A	Minor adverse
	Viewpoint 7: View north from the car parking areas of the Rosehill Gardens Racecourse	N/A	Moderate adverse
	Viewpoint 8: View north along the boundary with the Rosehill Gardens Racecourse	N/A	Moderate adverse
	Views from Rosehill Gardens Racecourse	Negligible	Negligible
	Views from James Ruse Drive	N/A	Minor adverse
	Views from the residential buildings and hotels to the west of James Ruse Drive	N/A	Negligible
Kay Street and Unwin Street realignment	Viewpoint 1: View south-east along James Ruse Drive	Moderate adverse	Moderate adverse
	Viewpoint 3: View south-west to the corner of Unwin and Shirley streets	Minor adverse	Minor adverse
	Viewpoint 5: View north-east from M4 Western Motorway onramp	Moderate adverse	Moderate adverse

Table 5-8 Summary of night-time visual impact

Modification change	Location	Night-time visual impact level	
		Approved project	Proposed modification
Rosehill dive structure	Night-time visual impact, Clyde stabling and maintenance facility construction site	Negligible	Negligible
Kay Street and Unwin Street realignment	Night-time visual impact, Clyde stabling and maintenance facility construction site	Negligible	Negligible

5.4.3 Mitigation measures

The mitigation measures identified for the approved project would be applied to minimise impacts associated with the proposed modification. Changed and additional mitigation measures are proposed as a result of the modification are shown in **bold** text and are provided in Table 5-9.

Table 5-9 Changed and additional mitigation measures proposed as a result of the proposed modification (Landscape and visual)

Reference	Impact / issue	Mitigation measure	Applicable location
Changed from approved project			
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**, CSMF**
Additional mitigation measures			
LV15	**Visual impacts**	**Investigate the opportunity for early installation of screening vegetation along the eastern boundary of the former rail corridor alongside the Rosehill Gardens Racecourse and west of the Kay Street and Unwin Street road bridge where feasible.**	**CSMF**
LV16		**Provide vegetation that assists in the screening and visual softening of the road, bridge and other permanent engineered structures where feasible.**	**CSMF**

5.5 Contamination

5.5.1 Overview

This section provides a summary of the potential changes to contamination impacts from the approved project as a result of the proposed modification. The detailed assessment is shown in Appendix F: Contamination assessment.

The existing environment and methodology for assessment remains as for the approved project, detailed in Technical Paper 8 (Contamination) of the Environmental Impact Statement. A site visit was completed in August 2021 to assist with this assessment.

A review of NSW Environment Protection Authority Contaminated Sites and Environmental Protection Licences Registers and additional site investigations conducted by Sydney Metro identified:

- No new sites listed on NSW EPA registers relevant to the proposed modification
- The results from recent site investigations conducted by Sydney Metro are generally consistent with the information summarised in Technical Paper 8 – Contamination of the Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD (Sydney Metro, 2020). This includes:
    - Soil investigations identified asbestos, heavy metals and benzo(a)pyrene in shallow soil (to two metres depth) above National Environmental Protection Measure (Assessment of Site Contamination) 2013 (ASC NEPM) guideline levels for protection of human health and/or ecosystems in a commercial land use setting, in samples collected adjacent to the northern end of the dive portal extension area (Golder-Douglas Partners, 2020a)
    - Concentrations of heavy metals and nutrients have been reported in shallow and deeper groundwater samples collected adjacent to the northern end of the dive portal extension area above guidelines for protection of ecosystems. Concentrations of analytes were not reported in groundwater in the vicinity of the proposed modification above ASC NEPM guidelines for protection of human health relevant for construction workers or for analytes that may represent a vapour risk (Golder-Douglas Partners, 2020b). Per- and poly-fluoroalkyl substances (PFAS) were detected in shallow groundwater below guideline values for protection of ecosystems and human health. Paired deeper groundwater wells did not report detectable concentrations of PFAS
- Photos from the site inspection did not identify any additional sources of potential contamination. Soil earthworks (importation of soil) in the northern portion of the dive portal extension area were evident, associated with construction of the Paramatta Light Rail.

The areas of environmental interest and receptors for the proposed modification are considered to be consistent with those outlined in Technical Paper 8 (Contamination) of the Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD (Sydney Metro, 2020).

5.5.2 Impact assessment

The proposed modification would extend the Clyde stabling and maintenance facility construction site further north to accommodate the revised location of the Rosehill dive structure. The areas of environmental interest and receptors for the proposed modification are consistent with those assessed in Technical Paper 8 (Contamination) of the Environmental Impact Statement.

No significant changes to the potential impacts to human health or the environment to those shown in Technical Paper 8 (Contamination) of the Environmental Impact Statement have been identified as a result of the proposed modification given:

- The areas of environmental interest identified in the Environmental Impact Statement remain relevant for the proposed modification
- Construction activities for the modification would be generally consistent with the types of activities for the approved project
- The revised dive structure relocation is not considered to change the potential exposure pathways for contamination to reach human health or environmental receptors
- The proposed changes to the revised dive structure as well as Kay Street and Unwin Street realignment are not considered to materially change the previous impact assessment given these reflect minor changes to the location. However, the proposed modification would reduce the need to expose potentially contaminated soil.

Overall, the potential contamination impacts of the proposed modification would be consistent with those detailed in the Technical Paper 8 (Contamination) of the Environmental Impact Statement.

5.5.3 Mitigation measures

The mitigation measures identified for the approved project would be applied to minimise impacts associated with the proposed modification.

The proposed modification would not require any change or addition to the mitigation measures provided for the approved project.

5.6 Hydrology and flooding

5.6.1 Overview

This section provides a summary of the potential changes to hydrology and flooding from the approved project as a result of the proposed modification. The detailed assessment is shown in Appendix G: Hydrology and flooding assessment.

The existing environment and methodology for assessment remains as for the approved project, detailed in Technical Paper 9 (Hydrology and flooding) of the Environmental Impact Statement. Changes to hydrology and flooding from the approved project as a result of the modification would be assessed in flood modelling and comply with the approved project conditions of approval.

5.6.2 Impact assessment

Rosehill dive structure

The revised Rosehill dive structure would not be flood affected, and only affected by shallow, minor overland flow and drainage runoff. The revised dive structure would have similar exposure to flooding and runoff to the approved project. This is similar to the approved project and hence no further impacts are expected.

Kay Street and Unwin Street realignment

Kay Street and Unwin Street realignment may have changes to potential flooding due to the underpass changing to a road bridge to cross over the future Metro rail tracks. The following design refinements would be included that would have the potential to change flooding:

- Removal of road dive structures and associated flood-proofing retaining walls surrounding the dives
- Introduction of bridge approach embankments on the floodplain (particularly north of A'Becketts Creek)
- Minor change in road alignment and embankment area.

The modification still proposes for A'Becketts Creek and Duck Creek to generally flow through culverts and open channels as per the approved project and hence to receive the flood impacts benefits of this design. The potential flooding and hydrology changes, from the approved project, for the proposed modification would include:

- Generally negligible changes in the potential flooding impacts to properties which were previously identified in the approved project, for areas upstream of the Clyde stabling and maintenance facility construction site
- Minor increases in flood levels (up to 0.01 metres) in the Probable Maximum Flood event downstream of the Clyde stabling and maintenance facility construction site when compared to the approved project. Some areas would experience an increase in flood levels compared to the existing environment, while other areas would experience a reduction in flood levels compared to the existing environment. This is a similar to the assessment of Probable Maximum Flood impact for the approved project
- No changes expected to the identified potential flow velocity and scour impacts compared to the impacts identified for the approved project
- Nil or negligible changes to number of properties impacted by flooding, when compared to the approved project
- Nil or no consequential changes to potential impacts to floodplain risk management plans, emergency management arrangements or cumulative flooding impacts.

Potential changes from the approved project to the proposed modification for flood hazard – one percent AEP are provided in Figure 5-9 and Figure 5-10. Negligible changes are expected as a result of the proposed modification.

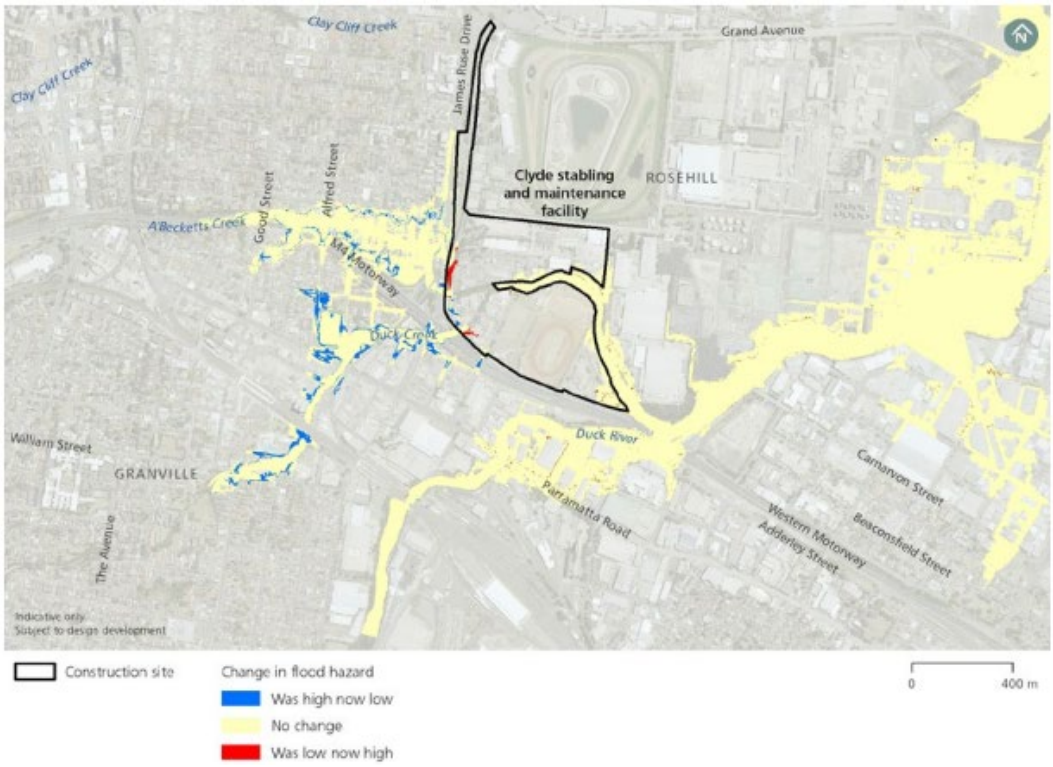

Figure 5-9 Potential change in flood hazard – one per cent AEP event for the approved project compared to existing environment

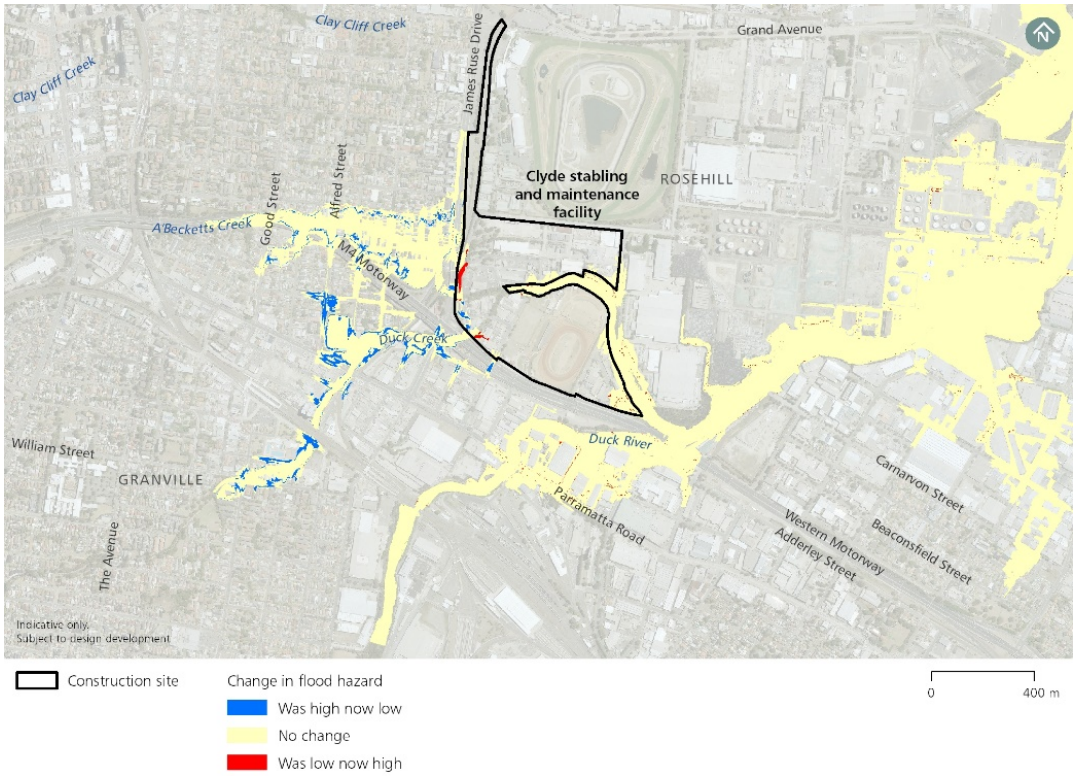

Figure 5-10 Potential change in flood hazard – one per cent AEP event for the proposed modification compared to existing environment

Potential changes from the approved project to the proposed modification for flood hazard – probably maximum flood event are provided in Figure 5-11 and Figure 5-12. Negligible changes are expected with the proposed modification.

Figure 5-11 Potential change in flood hazard – probable maximum flood event for the approved project compared to existing environment

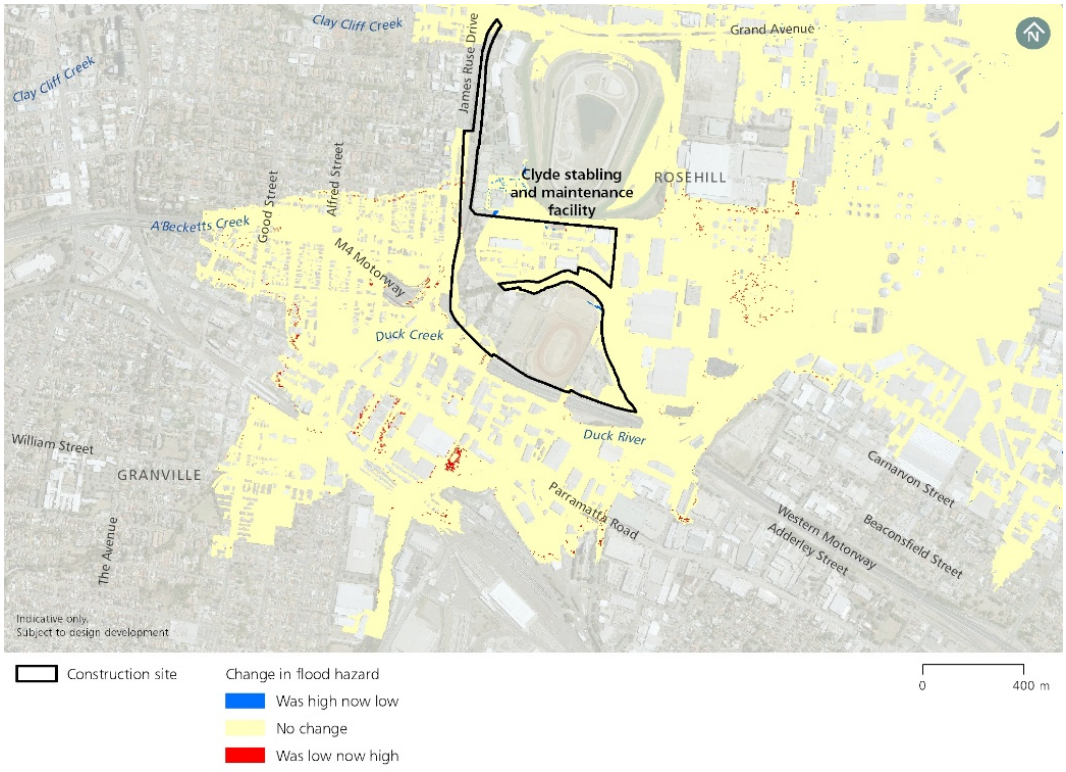

Figure 5-12 Potential change in flood hazard – probable maximum flood event for the proposed modification compared to existing environment

Potential changes from the approved project to the proposed modification – for change in flood levels at once per cent AEP are provided in Figure 5-13 and Figure 5-14. Negligible changes are expected with the proposed modification.

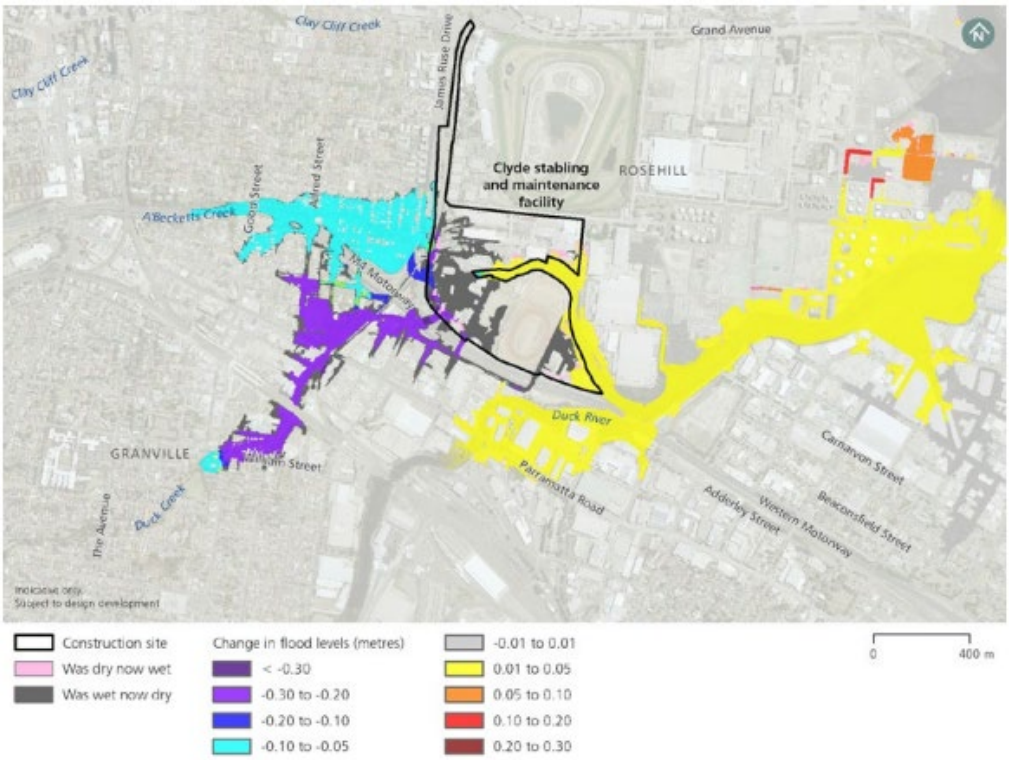

Figure 5-13 Potential change in flood levels – one per cent AEP event for the approved project compared to existing environment

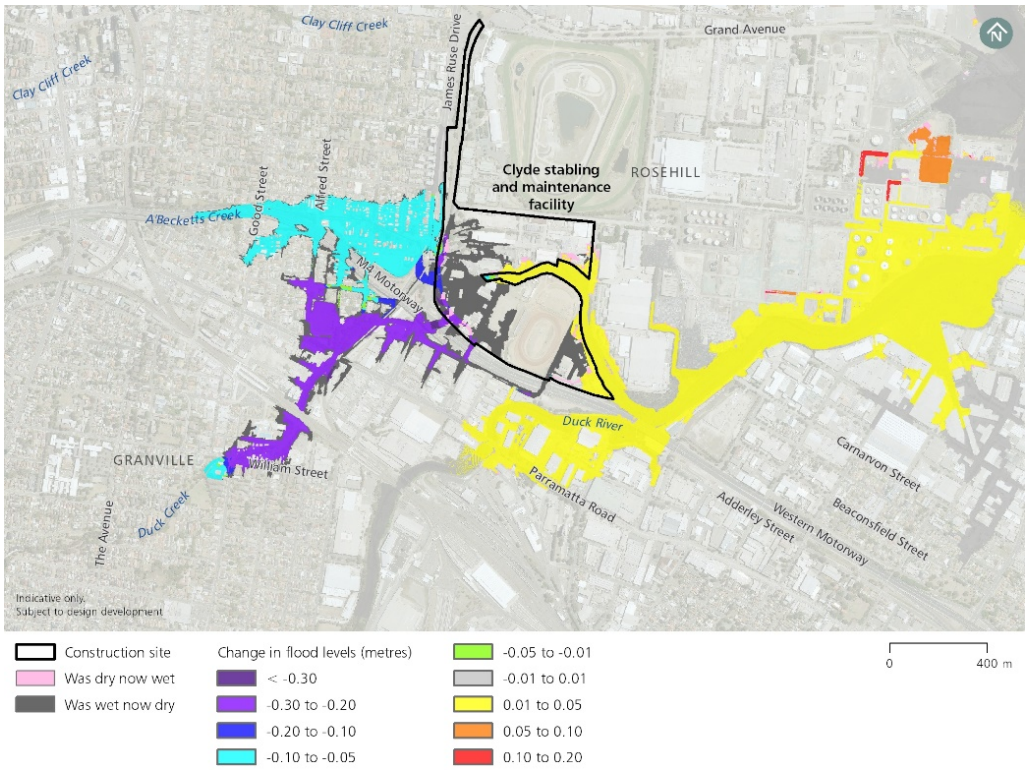

Figure 5-14 Potential change in flood levels – one per cent AEP event for the proposed modification compared to existing environment

5.6.3 Mitigation measures

The mitigation measures identified for the approved project would be applied to minimise impacts associated with the proposed modification.

The proposed modification would not require any change or addition to the hydrology and flooding environmental mitigation measures provided for the approved project.

5.7 Biodiversity

5.7.1 Overview

This section provides a summary of the potential changes to biodiversity from the approved project as a result of the proposed modification. The detailed assessment is shown in Appendix H: Biodiversity Development Assessment Report.

The existing environment and methodology for assessment remains as for the approved project, detailed in Technical Paper 10 (Biodiversity) of the Environmental Impact Statement. Existing environment for the additional area required for construction of the proposed modification is described below.

Furthermore, Downy Wattle, a listed threatened species, was identified south of the former Rosehill Railway Station within the approved project area following approval of the project. This biodiversity assessment considers both the additional area required for construction of the proposed modification and the area which the Downy Wattle from the approved project area is located on is referred to collectively as the “subject land”.

Site visits were completed in August and October 2021 to assist with this assessment.

Existing vegetation

The area on which the subject land is located supports:

- 0.54 hectares of native vegetation with high levels of disturbance, including:
    - 0.53 hectares within the additional area required for construction
    - 0.01 hectares within the approved project area
- 0.67 hectares of Urban Native/Exotic vegetation located within the additional area required for construction (does not occur within the subject land coinciding with the approved project area).

Additional vegetation in the approved project area that is not within the subject land includes:

- 0.05 hectares of native vegetation
- 0.36 hectares of Urban Native/Exotic vegetation

The additional vegetation located in the approved project area and not within the subject land is not considered further as part of this assessment.

Potential for threatened species

There is limited habitat for threatened fauna as the subject land is located within a highly urbanised area that does not have large expanses of intact native vegetation with high biodiversity value. Southern Myotis was assumed present during the assessment for the approved project (Sydney Metro, 2020a), however the subject land for the proposed modification lacks hollow-bearing trees and there are no waterways within 200 metres of the subject land. Therefore, Southern Myotis and other fauna species are not considered to be located on or use habitat within the subject land.

As habitat within the subject land is degraded due to the high degree of management, clearing and degradation and the vegetation is heavily weed infested it provides limited opportunity for

threatened flora species. However, Downy Wattle does occur in two locations within the subject land. An area within the former T6 Carlingford Line rail corridor to the south of the former Rosehill Railway Station, within the approved project area, containing about 25 individual stems and two further individuals located within the planted native vegetation west of the former Rosehill Railway Station.

5.7.2 Impact assessment

Vegetation impacts

The proposed modification requires additional clearing of vegetation to the approved project. Most of this vegetation is low condition native vegetation or urban native / exotic plant community types (see Figure 5-15). The native vegetation proposed for clearing is Plant Community Type 849 and includes:

- Removal of 0.14 hectares of habitat for Downy Wattle
- Removal of 0.54 hectares of sub-optimal foraging habitat for Grey-headed Flying-fox and Swift Parrot.

A summary of impacts to vegetation for the approved project and for the proposed modification is provided in Table 5-10.

Table 5-10 Summary of impacts to vegetation

Zone	Plant Community Type	Threatened ecological community	Area	Vegetation Integrity score
Approved project				
849_Poor	*Grey Box – Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion*	No	0.03	11.4
920_Poor	*Mangrove Forests in estuaries of the Sydney Basin Bioregion and South East Corner Bioregion*	No	0.15	34.6
Proposed modification				
-	Urban Native/Exotic	No	0.67	-
849_Low	*Grey Box – Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion*	No	0.54	14.2

Threatened species

The proposed modification requires the removal of 0.14 hectares of Downy Wattle, including 0.13 hectares within the additional area required for construction and 0.01 hectares within the approved project area (see Figure 5-16), however this is not likely to result in a significant impact to species or communities listed under the *Environment Protection and Biodiversity Conservation Act 1999*.

The Downy Wattle located within the subject land are highly isolated within urban development away from the remainder of the population. Additionally, the habitat within the subject land consists of largely unviable urban native/exotic planted vegetation and the soil profile within the location of the species has also undergone historic disturbance from construction of the former rail infrastructure, with limited recruitment observed.

The removal of about 27 stems from a population of at least 4,655 within a 15 kilometre radius of the subject land, would result in the loss of 0.6 per cent of the overall population and is not likely to constitute a significant impact to the species population.

The native vegetation within the subject land is not likely to be utilised by Swift Parrot or Grey-headed Flying-fox as there are other higher quality resources for these species nearby.

Biodiversity impacts requiring offset

The offset requirements for the proposed modification were calculated using the Biodiversity Assessment Method Calculator. Offsets required for the approved project and the proposed modification presented in Table 5-11 for ecosystems and in Table 5-12 for species.

Table 5-11 Offsets required (ecosystem credits)

Vegetation zone	Area (hectares)	Impact	Vegetation Integrity score	Offset required	Threatened ecological community	Hollow bearing tree	Credit requirement
Approved project							
920_Poor	0.15	Clearance	34.6	Yes, 10:1 ratio, 1.5 hectares required	No	No	3
Proposed modification							
849_Low	0.44	Clearance	14.2	No	No	No	0
Total	**0.59**	**-**	**-**	**-**	**-**	**-**	**3**

Table 5-12 Offsets required (species credits)

Vegetation zone	Species	Habitat condition (vegetation integrity score) loss	Area (hectares)	Biodiversity risk weighting	Credit requirement
Approved project					
920_Poor	Southern Myotis	11.4	0.15	2	3
Proposed modification					
849_Low	Downy Wattle	14.2	0.14	2	1
Total	**-**	**-**	**0.28**	**-**	**4**

5.7.3 Mitigation measures

The mitigation measures identified for the approved project would be applied to minimise impacts associated with the proposed modification.

The proposed modification would not require any change or addition to the mitigation measures provided for the approved project.

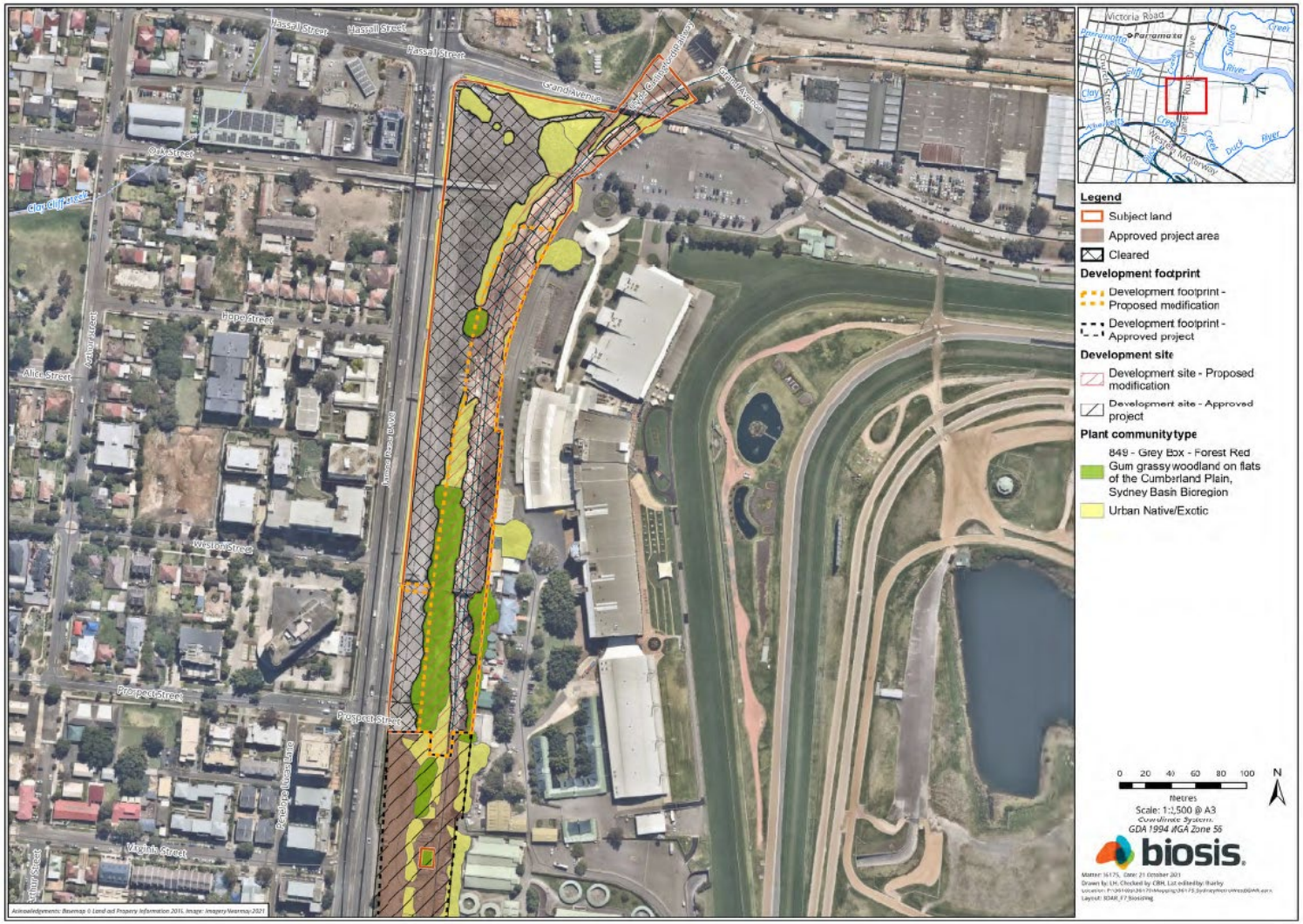

Figure 5-15 Vegetation (Plant Community Types) potentially affected as a result of the proposed modification

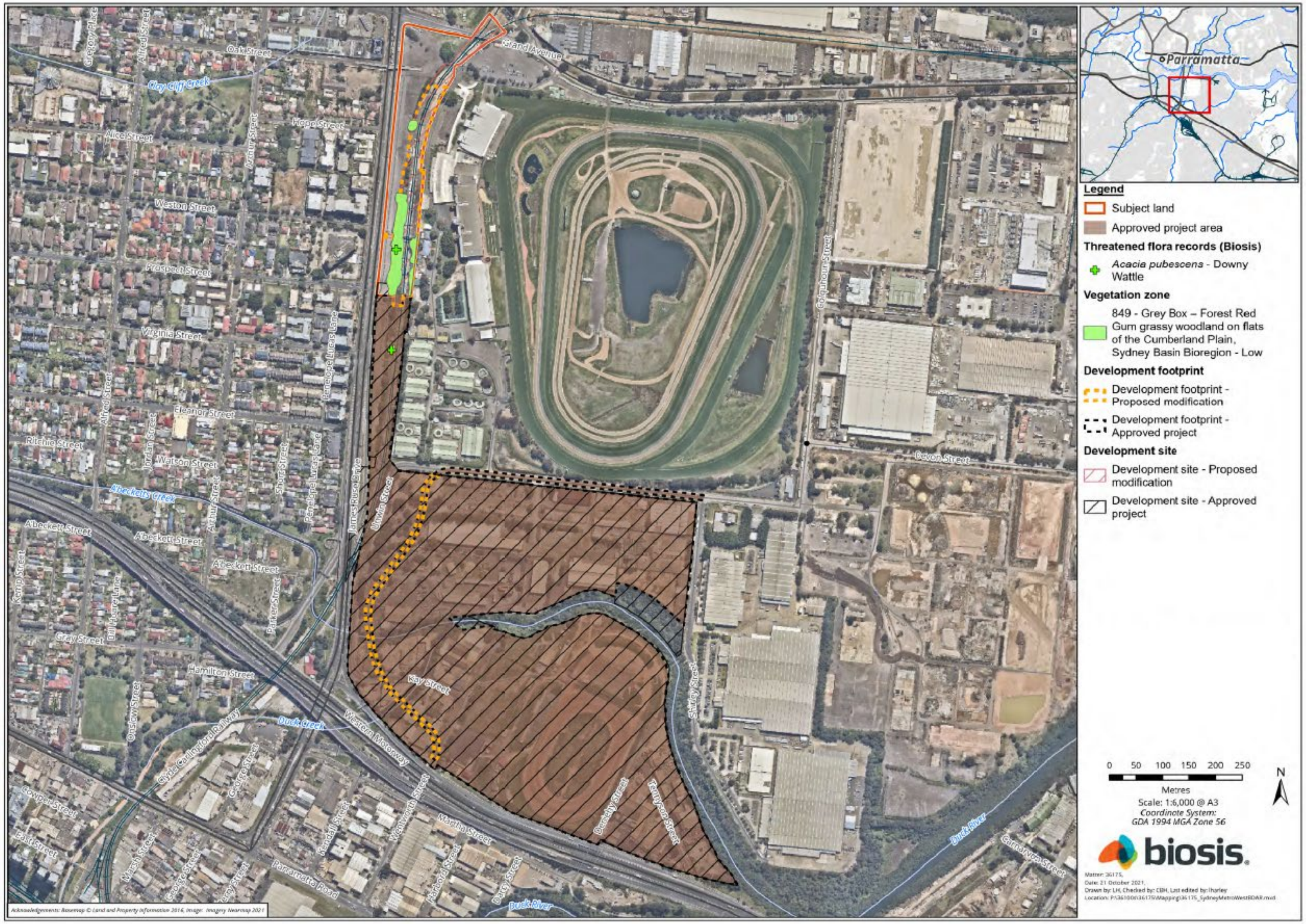

Figure 5-16 Vegetation (Plant Community Types) and Downy Wattle potentially affected as a result of the proposed modification

6 Environmental mitigation measures

This section provides an approach to environmental mitigation and management and a consolidated listed of the revised environmental mitigation measures as a result of the proposed modification.

6.1 Approach to environmental mitigation and management

The approach to environmental management is consistent with the approach detailed 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 major civil construction work between Westmead to The Bays (Stage 1 of the planning approval process). 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.

6.2 Revised environmental mitigation measures

The revised environmental mitigation measures for the proposed modification have been consolidated and are presented in Table 6-1. Mitigation measures provided in Table 6-1 supersedes the revised mitigation measures presented in Submissions Report for the approved project. Changed and additional mitigation measures shown in **bold** text.

A consolidated list of all the revised mitigation measures (including for proposed modification) are provided in Appendix A.

Table 6-1 Changed and additional mitigation measures proposed as a result of the proposed modification (consolidated list)

Reference	Impact / issue	Mitigation measure	Applicable location
Noise and vibration			
NV20	Noise impacts to horses at the Rosehill Racecourse Stables (consultation)	Undertake consultation with the Rosehill Gardens Racecourse and an equine veterinary expert to inform construction noise and vibration objectives for this sensitive receiver. Achievement of objectives are to be demonstrated in accordance with Noise and Vibration Construction Monitoring Program required by Conditions C15 and C16 and would include reference to equine behavioural responses where feasible.	CSMF
NV21	Noise impacts to horses at the Rosehill Racecourse Stables (additional mitigation)	Consider the use of additional noise mitigation measures such as noise barriers where feasible and reasonable.	CSMF

Reference	Impact / issue	Mitigation measure	Applicable location
Non-Aboriginal heritage			
NAH1	Archival recording	Archival recording and reporting of the following heritage **and unlisted potential 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) • **Rosehill Railway Station Footbridge (SHI no. 4801762)** • **Rosehill Railway Station (unlisted potential heritage item)**.	PMS, CSMF, SOPMS, TBS**, CSMF**
NAH11	**Removal / Salvage**	**Prior to commencement of demolition of heritage elements at Rosehill Railway Station and Rosehill Railway Footbridge, significant heritage fabric would be identified for salvage and reuse opportunities for salvaged fabric considered.**	**CSMF**

Reference	Impact / issue	Mitigation measure	Applicable location
Landscape character and visual amenity			
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, **CSMF**
LV15	**Visual impacts**	**Investigate the opportunity for early installation of screening vegetation along the eastern boundary of the former rail corridor alongside the Rosehill Gardens Racecourse and west of the Kay Street and Unwin Street road bridge where feasible.**	**CSMF**
LV16	**Visual impacts**	**Provide vegetation that assists in the screening and visual softening of the road, bridge and other permanent engineered structures where feasible.**	**CSMF**

7 Recommended revised conditions of approval

This section outlines the conditions of approval relevant to the project that are recommended to be amended as a result of the proposed modification.

7.1 Approach to conditions of approval

A review of the conditions of approval for the project was undertaken to identify the conditions that would require either amendment or deletion as part of the proposed modification.

7.2 Recommended revised conditions of approval

Table 7-1 presents the proposed changes to conditions of approval for the approved project. These changes are required to Schedule 2 (conditions of approval) with the proposed changes shown in **bold underline** text.

Table 7-1 Proposed changes to the approved projects conditions of approval as a result of the proposed modification

No	Condition of approval description	Reason
A1	The Proponent must carry out Stage 1 of the CSSI in accordance with the conditions of this approval and generally in accordance with the: (a) *Sydney Metro West – Westmead to The Bays and Sydney CBD Environmental Impact Statement* dated 15 April 2020; (b) *Sydney Metro West – Westmead to The Bays and Sydney CBD Submissions Report* dated 20 November 2020; and (c) *Sydney Metro West – Westmead to The Bays and Sydney CBD Amendment Report* dated 20 November 2020.; and (d) *Sydney Metro West – Westmead to The Bays and Sydney CBD Modification Request Letter* dated 21 June 2021 **(e) *Sydney Metro West – Clyde stabling and maintenance facility Modification Report dated November 2021.***	Condition updated to include reference to this Modification Report.

<table>
<tr><th>No</th><th>Condition of approval description</th><th>Reason</th></tr>
<tr><td>D4</td><td>Before any vegetation clearing or tree removal that must be offset, <u>the relevant credits</u> specified in Table 3 below must be purchased and retired. The retirement of credits must be carried out in accordance with the offset rules of the BC Act.

Table 3 Biodiversity Credits to be Retired
<table>
<tr><th>Credit Type</th><th>Number of Credits</th></tr>
<tr><td>Ecosystem Credits</td><td></td></tr>
<tr><td>Mangrove Forests in estuaries of the Sydney Basin Bioregion and South East Corner Bioregion (Plant Community Type 920) - Poor</td><td>3</td></tr>
<tr><td>Species Credits for Threatened Species</td><td></td></tr>
<tr><td>Myotis macropus / Southern Myotis (Fauna)</td><td>1</td></tr>
<tr><td><u>Acacia pubescens / Downy Wattle (Flora)</u></td><td><u>1</u></td></tr>
</table></td><td>Table 3 updated to include the offset of removal of “Acacia pubescens / Downy Wattle (Flora)” as part of the proposed modification.</td></tr>
</table>

8 Justification and conclusion

This section provides a justification for the proposed modification and concludes the Modification Report.

8.1 Justification

The proposed modification responds to Sydney Metro considering alternative construction methodologies, improvement of program delivery and having better outcomes for the community through project development.

The Clyde stabling and maintenance facility construction site is required to support major civil construction work between Westmead and The Bays. The establishment of the area as a construction site, construction of the dive structure and realignment of Kay Street and Unwin Street would support future works as part of the Sydney Metro West project.

The dive structure would facilitate a connection from the underground main tunnel alignment to the surface at the Clyde stabling and maintenance facility. The revised Rosehill dive structure as part of the proposed modification would avoid the requirement for major works associated with diversion of a Sydney Water sewer and the related impacts to the community.

The realignment of Kay Street and Unwin Street is required to allow for the future metro rail to connect to the Clyde stabling and maintenance facility. The change from a road underpass to a road bridge over the future metro tracks would reduce the need to disturb potentially contaminated soils and provides a number of benefits including improved access, safety, potential damage to the structure and better value for money.

The economic, environmental and social impacts and the principles of ecologically sustainable development have been considered, and continue to be part of project development, and no changes to this consideration has been identified as a result of the proposed modification.

The proposed modification is consistent with applicable NSW strategic planning and policy, and strategic transport infrastructure policy, and is also consistent with the project objectives and project benefits identified in the Environmental Impact Statement.

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 modification, there has been no change to the overall strategic merit of Sydney Metro West.

8.2 Conclusion

The proposed modification has resulted from the proposing improvements to construction, program delivery and outcomes for the community. It would result in changed impacts to noise and vibration, non-Aboriginal heritage, landscape and visual, hydrology and flooding and biodiversity impacts. However, these impacts would be outweighed by the additional benefits that the proposed modification would provide.

While the project-specific mitigation measures identified for the approved project are generally sufficient to address the potential impacts of the proposed modification, additional and changes to mitigation measures are proposed.

These additional and changed mitigation measures reflect the need to manage the potential impacts associated with the proposed modification, including the noise expected to be experienced at the Rosehill Gardens Racecourse stables, the heritage impacts from the removal of the former Rosehill Railway Station and associated Rosehill Railway Station Footbridge and the visual impacts from the Clyde stabling and maintenance facility construction site.

The relevant conditions of approval for the approved project would continue to apply to the proposed modification with condition A1 updated to include reference to this Modification Report and a new species credit identified for inclusion in condition D4 to recognise the potential impacts from vegetation clearing on site.

9 References

Golder & Douglas Partners, 2020a, Factual Contamination Assessment Report, 00013/11180 Sydney Metro West Geotechnical Investigation, 1791865-002-R-CAR-Rev0, 6 May 2020

Golder & Douglas Partners, 2020b, Groundwater Monitoring Report – Stage 2 Locations, 00013/11180 Sydney Metro West Geotechnical Investigation, 1791865-002-R-CAR-Rev0, 7 October 2020

Greater Sydney Commission, 2018, *Greater Sydney Region Plan: A Metropolis of Three Cities – connecting people.*

Infrastructure NSW, 2018, *Building Momentum State Infrastructure Strategy 2018-2038*

National Environment Protection Council (NEPC) (1999) National Environment Protection (Assessment of Site Contamination) Measure 1999 (as revised 2013) (ASC NEPM).

NSW Environment Protection Authority Contaminated Sites Register and Record of Notices.

Sydney Metro, 2020a, *Sydney Metro West Westmead to The Bays and Sydney CBD – Environmental Impact Statement,* April 2020

Sydney Metro, 2020b, *The Sydney Metro West Westmead to The Bays and Sydney CBD - Amendment Report (Concept and Stage 1)*. Sydney Metro

Sydney Metro, 2020c, *The Sydney Metro West Westmead to The Bays and Sydney CBD - Submissions Report (Concept and Stage 1)*. Sydney Metro.

Transport for NSW, 2018, *Future Transport 2056,* Transport for NSW.

Transport for NSW, 2020, *Construction Noise and Vibration Strategy,* Transport for NSW.

10 Glossary

	Definitions
Additional area required for construction	Additional area required for construction for the proposed modification
Amendment Report	Sydney Metro West Westmead to The Bays and Sydney CBD – Amendment Report Concept and Stage 1 (Sydney Metro, 2020c)
Approved project	Concept and major civil construction work for Sydney Metro West between Westmead and The Bays (Stage 1 of the planning approval process for Sydney Metro West).
AEP	Annual exceedance probability
BAM	Biodiversity Assessment Method
BDAR	Biodiversity Development Assessment Report
CBD	Central business district
Construction site	Approved Clyde stabling and maintenance facility indicative construction site
dB	Decibels
Development footprint	The area of land that is directly impacted by the proposed modification and approved project
Development site	The broader area in which the subject land is located
DPI	Department of Primary Industries
DPIE	Department of Planning, Industry and Environment
Ecosystem credit species	A measurement of the value of threatened ecological communities and threatened species habitat for species that can be reliably predicted to occur with a plant community type. Ecosystem credits measure the loss in biodiversity values at a development.
Environmental Impact Statement	The Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD (Sydney Metro, 2020a)
EP&A Act	NSW Environmental Planning and Assessment Act 1979
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
Hollow bearing tree (or HBT) BAM	An attribute of a credit class as defined in the BAM
ICNG	Interim Construction Noise Guideline
LEP	Local Environmental Plan
MNES	Matters of National Environmental Significance protected by a provision of Part 3 of the EPBC Act
NCA	Noise catchment area
NML	Noise management level
OOH	Out-of-hours
PCT	Plant Community Type
PMF	Probable maximum flood
Proposed modification	Major civil construction work between Westmead and The Bays including a revised location of the Rosehill dive structure and the realignment of Kay Street and Unwin Street.

	Definitions
Project staging	Sydney Metro West is being assessed as a staged infrastructure application under section 5.20 of the EP&A Act. The approved Concept and major civil construction work for Sydney Metro West between Westmead and The Bays (Stage 1 of the planning approval process for Sydney Metro West), application number SSI-10038, were approved on 11 March 2021.
SEPP	State Environmental Planning Policy
SHR	State Heritage Register
SREP	Sydney Regional Environmental Plan
Species credit species	A class of biodiversity credits created or required for the impact on threatened species that cannot be reliably predicted to use an area of land based on habitat surrogates.
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
Subject land	The areas within or the combined areas of the development site, and any indirect and prescribed impacts, to which the BAM has been applied.
Submissions Report	The Sydney Metro West Westmead to The Bays and Sydney CBD Submissions Report (Concept and Stage 1) (Sydney Metro, 2020b)
The Concept	Sydney Metro West – the construction and operation of a metro rail line, around 24 kilometres long, between Westmead and Sydney CBD
TEC	Threatened Ecological Community
Vegetation integrity score	The process to generate the vegetation condition score under the BAM