5 Consultation

This chapter provides an outline of the consultation carried out for the proposed modification to the M4-M5 Link project (the project).

5.1 Introduction

Approval for the project was granted by the NSW Minister for Planning on the 17 April 2018 (application number SSI 7485). Since approval was granted for the project, a contractor has been appointed to construct Stage 1 of the approved project on behalf of the proponent, NSW Roads and Maritime Services (Roads and Maritime). Stage 1 comprises the construction of mainline tunnels between the M4 East Motorway at Haberfield and the New M5 Motorway at St Peters.

Construction design and planning has progressed since the assessment contained in the EIS and SPIR and a review of the concept design for the approved project has occurred. As a result, following ongoing construction design and planning, the proponent has further optimised the construction site arrangements assessed in the EIS and SPIR to reduce community impacts and to decrease the overall number of construction sites required for Stage 1 of the project.

The proponent proposes to:

- Remove the Darley Road civil and tunnel site (C4) from the project
- Proceed with Option A (as described in the EIS and SPIR) for the construction ancillary facilities proposed at Haberfield and Ashfield but with changes to some activities at a number of the construction ancillary facilities which arise from the removal of the Darley Road civil and tunnel site and the use of the Northcote Street site for tunnelling.

Chapter 4 (Proposed modification) of this report provides a detailed description of the proposed modification.

This chapter provides:

- An overview of the consultation tools used to engage with the community and stakeholders
- A summary of the consultation completed to date for the project and the modification
- An outline of the consultation and engagement activities that will occur in the future.

5.2 WestConnex communication and engagement, channels and tools

A range of permanent channels were established for the WestConnex program of works, to seek input from stakeholders and communities and to support engagement on an ongoing basis. **Table 5-1** details some of the key consultation channels and tools used for the WestConnex program of works.

In addition, community and key stakeholders have been encouraged to contact the proponent at any time to discuss the project via phone, email or post, or by visiting the local information centres.

Table 5-1 Consultation channels and tools

Activity/tool	Details	Timing
Community updates	Providing community updates regularly when project milestones occur. Community information has been and will continue to be tailored to meet the needs of the community and each stakeholder group.	Updates distributed when project milestones occur and when required

Activity/tool	Details	Timing
Community works notifications	Keeping the community and key stakeholder groups informed of construction works, traffic changes and potential impacts is a key priority. Notifications provided via doorknock and letterbox drops.	Minimum 5 days prior to work starting
Electronic and online information	Website contains up to date information on the project including approval documents and plans. All community information (notifications, leaflets, construction and traffic updates) will be uploaded on the WestConnex website www.westconnex.com.au .	Ongoing
Social media	Content and timely responses to enquiries and feedback received through social media channels including Facebook and Twitter.	Ongoing
Project enquiries through email	The following address - info@westconnex.com.au is used as central point of email contact for project enquiries and complaints. The email address is monitored 9.00am – 5.00pm Monday to Friday. Each component project of the WestConnex program of works has a dedicated email address to which enquiries and complaints can be directed.	Ongoing
Email subscription service	A project specific subscription service enabling interested parties to receive regular email updates on the entire program or specific projects. People can register for this service at information sessions, using the available contact points, or by signing up online. https://www.westconnex.com.au/contact-us	Ongoing
One-on-one stakeholder meetings	One-on-one meetings are used to inform, consult, facilitate feedback and identify and manage potential impacts and issues. If required, street meetings are held with local residents near the project to update them on activities in their area and address their concerns.	Ongoing
Doorknocking	Undertaken to advise local residents and businesses of project impacts and proposed mitigation measures. Calling cards ('*sorry we missed you*') are distributed to promote the project contact details and sources of electronic information.	Prior to work starting and ongoing during construction
Free-call 1800 Community information line	Toll-free information line 1800 660 248 which operates 24 hours, seven days a week with fielding initial community contact and directing the caller to the relevant team. The number is promoted on the project website, public information and notification materials and on the WestConnex M4-M5 Link Community Contact Card.	Ongoing
Postal address	The following address - (GPO Box 3905, Sydney NSW 2001) is used to receive written feedback regarding the Project.	Ongoing

Activity/tool	Details	Timing
M4-M5 Link Community Contact Card	The Project Community Contact Card includes the toll-free 1800 community information line, email and website details.	Ongoing
Translation and interpreting services	A translation and interpreting service is available to assist non-English speaking stakeholders.	Ongoing
Community contact database (Consultation Manager)	Record all stakeholder interactions, contact details, correspondences, type of event and a summary of issues raised and project responses/actions to resolve the matter.	Ongoing
WestConnex Acquisition Assistance Line	The WestConnex Acquisition Line is also available to provide information and support the community subject to property acquisition.	Ongoing

5.3 M4-M5 Link project consultation overview

Consultation with the community, State and local government agencies, utility service providers, special interest groups and relevant industry stakeholders has been undertaken at various stages of the project, including prior to and during the preparation of the EIS and during exhibition of the EIS. Consultation will also continue through construction and operation of the project as detailed in **section 5.5.**

An overview of the project consultation process is provided in **Figure 5-1.**

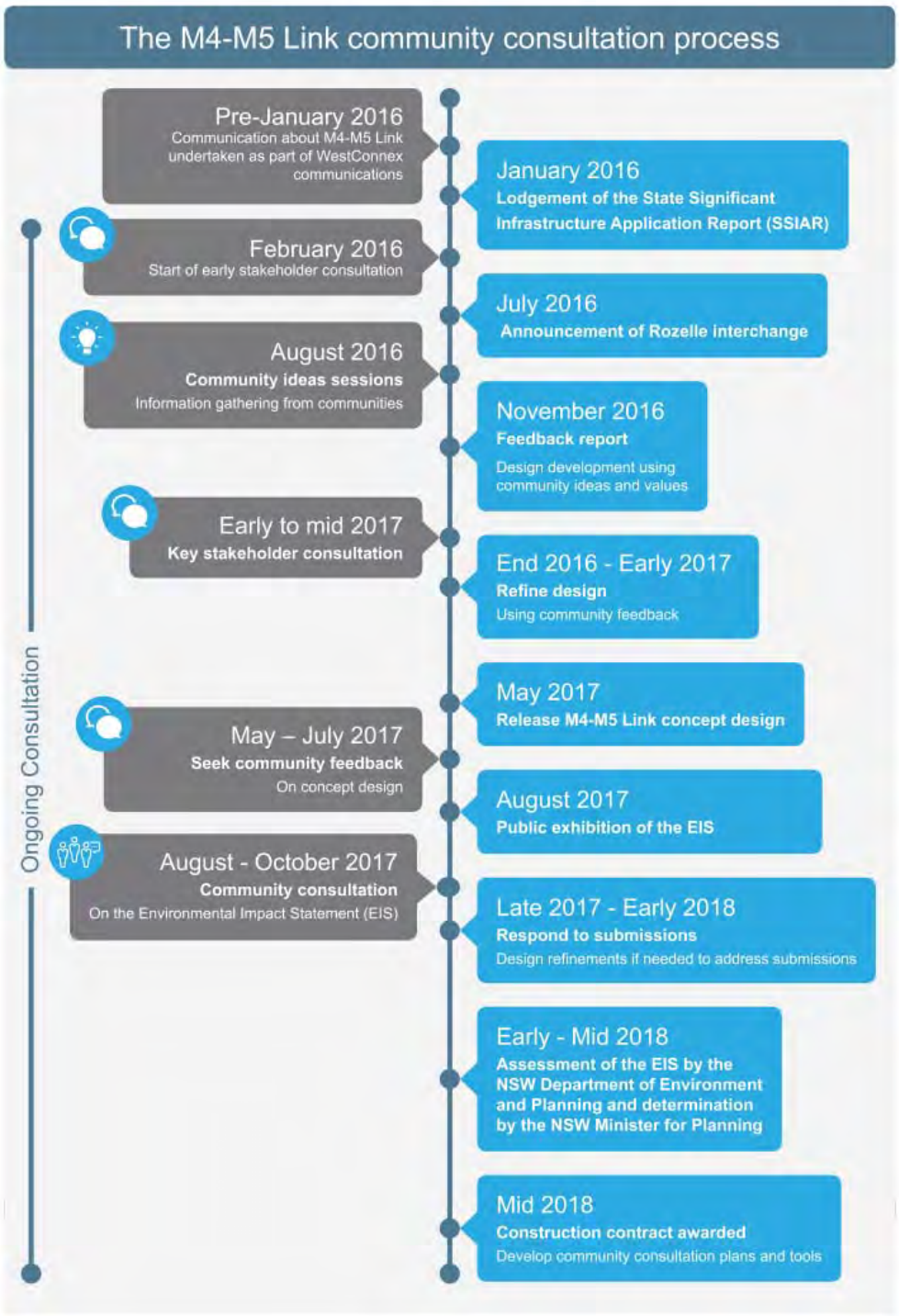

Figure 5-1 Overview of the project consultation process

5.3.1 Consultation during design and EIS preparation

Communication and consultation on the project has been carried out at a program level since 2012 and at a project level since the State Significant Infrastructure Assessment Report (SSIAR) was lodged in January 2016, with SSIAR addendums following in September 2016 and March 2017. A summary of consultation during design and EIS preparation is provided in **Table 5-2**.

Table 5-2 Summary of consultation during design and EIS preparation

Timing	Key consultation purpose or outcome
Mid 2012 to January 2016 – pre-State significant infrastructure application report (SSIAR) lodgement	• Development of the WestConnex Strategic Environmental Review • Broad program consultation • Consultation on other WestConnex projects undergoing assessment • Publication of the *WestConnex Updated Strategic Business Case* and updated Strategic Environmental Review
January 2016 to July 2016 – SSIAR lodgement	Key stakeholder consultation
July 2016 to November 2016 – ongoing design development	Consultation on early design to inform the design development
November 2016 to May 2017 – ongoing design development and changes	• Announcement of a significant design changes • Continued engagement with stakeholders and community members to seek feedback
May 2017 to August 2017 – NSW Government release of the M4-M5 Link Project Design Report	Early consultation on concept design prior to the EIS exhibition phase in response to feedback from community

5.3.2 Consultation during EIS exhibition

During the public exhibition of the EIS, a variety of consultation activities were undertaken including community information sessions, a series of briefings and meetings with key stakeholders, and distribution of a range of project information materials such as fact sheets. Consultation activities undertaken during the public exhibition included:

- Static display of the EIS: the EIS and supporting materials were made available to view and download on the NSW Department of Planning and Environment (DPE) website, the project website and in hardcopy form at 19 locations including local libraries and council offices
- Advertisements in local and metropolitan publications: newspaper advertisements were placed to announce the EIS public exhibition period and to promote the community information sessions for the project
- Community information sessions: five community information sessions were held during the EIS public exhibition period to provide opportunities for the community and stakeholders to discuss the EIS with technical specialists and members of the project team
- Meetings and briefings with stakeholders and the community: during the exhibition period, meetings and briefings were held to provide stakeholders with an overview of the EIS and discuss issues of interest
- Toll-free 1800 number and project email: the project phone number and email were available prior to and during the EIS exhibition period as channels for the community and stakeholders to find out more information and ask further questions
- Other consultation activities included:
  - Notification to email subscribers
  - Provision of a community guide to the EIS
  - Provision of project fact sheets and brochures

- Distribution of a community update to around 130,000 residences
- Website updates
- Social media updates.

5.3.3 Consultation during the preparation of the submissions and preferred infrastructure report

After the public exhibition of the EIS and during the preparation of the Submission and Preferred Infrastructure Report (SPIR), a series of briefings and meetings with key stakeholders was undertaken. This consultation included the following stakeholders:

- DPE
- Sydney Water
- NSW Environment Protection Authority
- Office of the NSW Chief Scientist and Engineer
- NSW Health (Sydney Local Health District)
- Department of Primary Industries – Water
- Port Authority of NSW
- Inner West Council
- City of Sydney.

5.3.4 Post approval consultation requirements

Approval for the construction and operation of the project was provided on 17 April 2018 by the NSW Minister for Planning (application number SSI 7485). Schedule 2, Part B of the conditions of approval provides conditions related to community information and reporting for the project. Community information and reporting requirements relate to:

- Community information, consultation and involvement, including:
  - Preparation of a Communication Strategy
  - The appointment of a Public Liaison Officer
  - The operation of the WestConnex Acquisition Assistance Line
- Complaints management, including:
  - Preparation of a Complaints Management System including a Complaints Register
  - Nomination of an independent Community Complaints Mediator
- The provision of electronic information, including the establishment of a website providing information in relation to the project.

Roads and Maritime is implementing the community information and reporting measures outlined above within the specified timeframes as required by the conditions of approval for the project.

5.4 Consultation during preparation of the modification

5.4.1 Consultation overview

A contractor for Stage 1 of the project was appointed in June 2018. Following their appointment, Roads and Maritime agreed to a number of potential changes to the project. These changes were first communicated to the community on 28 June 2018.

Since that time, Roads and Maritime has engaged and consulted with the community, councils, community representatives, government agencies, and other relevant stakeholders. **Section 5.4.2** below provides a summary of the various consultation tools used to communicate the proposed

modification to the community. It also provides a summary of the consultation completed with local, state and commonwealth government agencies, elected representatives and other stakeholders.

5.4.2 Summary of key consultation activities and consultation tools

The following section details the key consultation activities and tools used to consult on the proposed modification to date. **Table 5-3** provides a summary of the community notifications that were provided. **Table 5-4** provides a summary of the community engagement that has occurred and the relevant feedback received.

Table 5-3 Community notification summary for the modification to date

Activity/Tool	Timing	Details
Media releases issued to Sydney metro news organisations	28 June 2018	Sydney Morning Herald and Inner West Courier were sent a media release detailing the proposed modification. https://www.westconnex.com.au/news-media/delivery-improvements-reduce-impact-m4-m5-link-construction
M4-M5 Link Community Update Brochure	Across a seven day period from 28 June 2018	This brochure was letterbox dropped to 60,000 households across the M4-M5 Link corridor. Information included the proposed removal of the Darley Road site, the proposed change in use of the Northcote Street site and the proposed use of the Parramatta Road West and East sites generally in accordance with condition of approval C19.
M4-M5 Link Community Update Brochure	Live from 28 June 2018	Uploaded to the WestConnex website. https://www.westconnex.com.au/sites/default/files/M4-M5%20Link_Community%20Update_June%202018_FA_Digital.pdf Information included the proposed removal of the Darley Road site, the proposed change in use of the Northcote Street site and the proposed use of the Parramatta Road West and East civil sites generally in accordance with condition of approval C19.
M4-M5 Link Community Update Email	29 June 2018	Email sent to 4,571 registered stakeholders on the WestConnex database. Information included the proposed removal of the Darley Road site, the proposed change in use of the Northcote Street site and the proposed use of the Parramatta Road West and East civil sites generally in accordance with condition of approval C19.

Table 5-4 Community engagement summary for the modification to date

Activity/Tool	Timing	Details	Feedback and comments	Response
WestConnex Community Reference Group - Southern	12 June 2018	Attended by City of Sydney (CoS) Council, Inner West Council (IWC) and DPE. General update on the status of the M4-M5 Link project provided.	• No specific feedback relating to the modification	n/a
WestConnex Community Reference Group - Western	19 June 2018	Attended by IWC and DPE. A general update on the M4-M5 Link provided including the announcement of a preferred contractor.	• No specific feedback relating to the modification	n/a
Door Knock	29 June 2018	Over 400 stakeholders in the Ashfield, Haberfield and Leichhardt area who could potentially be impacted by the proposed changes to the project were doorknocked. Community engagement teams from Roads and Maritime and SMC engaged with stakeholders informing them of the proposed change in use of the construction sites that would be required for the project, including the removal of Darley Road tunnel site. Properties along the following streets were doorknocked: • Parramatta Road • Northcote Street • Darley Road • Alt Street • Bland Street • Walker Street • Wattle Street • Wolseley Street • Ash Lane	• The information was well received by the majority of stakeholders especially stakeholders around Darley Road who were satisfied the Darley Road construction site would not be required • Some stakeholders around Northcote Street welcomed the decision to keep the Northcote construction zone for the M4-M5 Link mainline tunnel construction as it means the road remains closed to traffic from Parramatta Road. • The main issues raised during the doorknock included: – Query regarding whether the community would have an opportunity to comment on the proposed changes – Concern regarding the spoil haulage route for the Northcote Street civil and tunnel site – Concerns about construction workers at the Northcote Street site parking on residential streets and worker behaviour during out of hours periods – Concerns regarding the impact of vibration on property – General concerns regarding tunnelling – Query regarding the traffic movements in and out of the Parramatta Road site	Concerns regarding potential impacts associated with the proposed modification have been assessed as part of this modification report in **Chapter 6** (Environmental assessment)

Activity/Tool	Timing	Details	Feedback and comments	Response
WestConnex Community Reference Group - Central	29 June 2018	Attended by IWC, DPE and the contractor. General update on the project provided including the announcement of preferred contractor.	• No specific feedback relating to the modification	n/a
Extraordinary WestConnex Community Reference Group	12 July 2018	Attended by IWC and DPE. Provided update on the M4-M5 Link project, including: • Removal of Darley Road as a construction site • The use of the Northcote Street site as a civil and tunnel site • The use of the Parramatta Road West and East sites as civil sites (they will not be used for tunnelling) • The temporary overpass between the Parramatta Road West and East (Muirs) civil sites • A modification to the SSI Application under the NSW *Environmental Planning and Assessment Act 1979* is required and will include an assessment of the proposed changes.	• No specific feedback relating to the modification	n/a
Door Knock	7 - 8 September 2018	Around 200 stakeholders along the Northcote Street proposed haulage routes were doorknocked. Community engagement teams from Roads and Maritime engaged with stakeholders along both Route A and B.	• The feedback on using these routes for M4-M5 Link concerned construction traffic impacts, particularly existing intersections where congestion is already heavy. • Feedback was generally considered neutral	

5.4.3 Consultation with local, state and commonwealth government agencies elected representatives and other industry and stakeholder consultation

Table 5-5 provides a summary of the consultation activities undertaken with local, state and Commonwealth Government agencies, elected representatives and other stakeholders prior to the modification going on public display. In addition to these meetings, regular phone and email correspondence has taken place with these stakeholders.

Table 5-5 Stakeholder engagement summary for the modification to date

Meeting/Briefing	Timing	Details
Briefing for Anthony Albanese Member of Parliament (MP)	13 June 2018	Provided overview of the M4-M5 Link project announcement, including the required construction sites. Indicated that the contractor would commence preparing their plans for DPE approval in line with the conditions of approval.
Briefing for Ron Hoenig MP	26 June 2018	
Briefing for Inner West Councillors	28 June 2018	
Briefing for Inner West Council staff	3 July 2018	
Briefing for City of Sydney Councillors and Council staff	4 July 2018	Provided overview of the M4-M5 Link project announcement, including the required construction sites, new contractor and the upcoming modification exhibition.
Briefing for Tanya Plibersek MP	5 July 2018	

Meeting/Briefing	Timing	Details
NSW Environment Protection Authority (EPA)	6 August 2018	A presentation was provided to the NSW EPA giving an update on the proposed modification. At the meeting: • NSW EPA was generally supportive of the decision to remove the Darley Road construction site and the proposed use at the Parramatta Road West site • NSW EPA questioned the potential noise impacts associated with the use of Northcote Street site for tunnelling and the proposed 24/7 operation of the Parramatta Road West and East sites • NSW EPA raised concerns about the extended duration of construction noise impacts in the Haberfield/Ashfield area as a result of both the M4 East and M4-M5 Link construction works. EPA questioned whether the 'construction fatigue' condition of approval E88 would be impacted by the proposed modification • NSW EPA requested that the modification detail the acoustic treatments that have already been implemented or are proposed in the vicinity of the Northcote Street tunnel site, the Wattle St ramps, the G-loop and the Parramatta Rd West and East sites. EPA stressed the importance of bringing forward proposed noise treatments to the commencement of construction (as per condition of approval E90) • NSW EPA expressed a preference for use of the G-loop as a spoil haulage route from the Northcote Street site particularly if spoil is to be removed 24 hours a day, seven days per week. • NSW EPA suggested that Roads and Maritime undertake proactive consultation with the local community prior to and during the public exhibition period • NSW EPA suggested that Roads and Maritime use the existing community forums such as the WestConnex Community Reference Group to discuss the detail of the proposed modification and receive preliminary feedback.

Meeting/Briefing	Timing	Details
Sydney Water	10 August 2018	A presentation was provided to Sydney Water giving an update on the proposed modification. At the meeting: • Sydney Water stressed the importance of protecting their existing assets during the construction phase and ensuring that options are available for haulage routes should an emergency arise • In relation to the proposed water treatment plant (WTP) at St Peters, Sydney Water noted that proposed discharges into the existing or proposed (New M5) stormwater network would need to demonstrate that the infrastructure has adequate capacity • Sydney Water noted that, if proposed, a new stormwater connection to Alexandra Canal would require a Sydney Water construction licence and an EPA approval given the potential to disturb contaminated sediments in the canal. They also noted that a new stormwater outlet would require a heritage assessment as the canal is a state listed heritage item • Sydney Water noted they would be comfortable with the contractor seeking a Trade Waste Agreement for WTP discharges • Sydney Water noted that they had recently met with the contractor regarding the project and provided feedback on a number of their draft management plans. Roads and Maritime indicated that a further update to Sydney Water would be provided regarding the relevant environmental assessment findings for the modification in September 2018.

Meeting/Briefing	Timing	Details
Inner West Council and City of Sydney Council	30 August 2018	A presentation was provided to IWC and CoS giving an update on the proposed modification. At the meeting: • IWC was interested in the provision of off-street car parking in the Haberfield/Ashfield area for construction workers • IWC queried the number of heavy vehicle movements from the Northcote Street civil and tunnel site and Parramatta Road West and Parramatta Road East civil sites and the time of day these movements would occur • IWC suggested that Roads and Maritime should consult with Canada Bay Council regarding the Ramsay Street haulage route given the route is located partly within its Local Government Area (LGA) boundary • CoS queried the drainage design for the operational water treatment plant at St Peters • IWC queried the expected discharge quality from the operational water treatment plant at St Peters • IWC asked for clarification regarding the responsibility of Roads and Maritime, Sydney Motorway Corporation and the contractor for consultation regarding the modification • IWC questioned whether the modification would impact proposed legacy land at Haberfield and Ashfield including at Reg Coady Reserve following the completion of the M4 East project • IWC questioned whether the G-loop would be available for general commuter traffic to use and, if not, how this would be regulated (signage, line marking and cameras) • IWC questioned how groundwater inflows to the tunnels would be managed • IWC noted that pedestrians crossing Ramsay Street in locations where there are no traffic lights (eg in the vicinity of Northcote Street and Wolseley Street) may be impacted by proposed heavy vehicle movements • IWC questioned whether bus stops on Parramatta Road would be relocated and the impact this would have on pedestrian safety • IWC was concerned about the extended duration of tunnelling at the Northcote Street site and the impact this would have on adjacent residential properties (eg potential noise, dust, traffic and car parking impacts) • IWC noted that they had previously received complaints about the impact of the M4 East G-loop on the safety of school children crossing Dobroyd Parade to get to Timbrell Park • IWC questioned whether the contractor was considering the use of larger spoil haulage vehicles (under the Roads and Maritime's voluntary Safety, Productivity & Environment Construction Transport Scheme (SPECTS)) to improve tunnelling efficiencies and noted that use of these larger vehicles on local roads would require Notice to travel on local council roads • IWC noted that they had no major issues with the proposed modification as it would result in several improvements including the removal of the Darley Road construction site.

There have been a number of other meetings with key State government agencies and local council stakeholders and the contractor to discuss post-approval management plans required by conditions of the project approval.

5.5 Future consultation for the modification

Consultation would take place before, during and after public display of the proposed modification. Consultation for the proposed modification would be generally consistent with the consultation process undertaken for the EIS. The following is an outline of the future consultation that will be undertaken for the proposed modification.

5.5.1 Consultation before public display of modification

During preparation of the modification, various consultation activities occurred up to lodgement of the modification. Consultation activities that are planned to occur just prior to lodgement will include further consultation with residents door knocked regarding the proposed haulage routes for the Northcote Street civil and tunnel site, further communications with key stakeholders in the lead up to the display of the modification and responding to queries related to any potential concerns and issues.

The outcomes of this consultation will be discussed in the Response to Submissions report for the modification.

5.5.2 Consultation during exhibition of modification

The environmental assessment for the modification will be exhibited for 14 days from 12 September 2018. The consultation activities planned during the exhibition period will provide community and stakeholders with an opportunity to find out detailed information about the proposed modification. The community and other stakeholders will also be able to provide feedback on the modification to DPE as submissions.

Consultation activities that will occur during the exhibition of the modification include:

- Provision of a ‘‘Community Guide to the M4-M5 Link modification’ factsheet to residents, businesses and other stakeholders that could be potentially impacted by the proposed modification. This factsheet will be distributed just after exhibition of the modification. It will outline how to make a submission and will focus on the potential impacts related to the modification. It will be issued to residents, businesses and other stakeholders located close to the Northcote Street civil and tunnel site and proposed haulage routes, the Parramatta Road West and Parramatta Road East civil sites and the Campbell Road motorway operations complex at St Peters where the relocated WTP is proposed
- Doorknocking potentially impacted residents, businesses and other stakeholders to explain the proposed modification and gather any feedback
- Sending direct emails to registered stakeholders, including residents, landowners, stakeholders, businesses and community groups
- Providing webpage updates about the modification. These updates will be published on www.westconnex.com.au and will include information on how to make a submission.

All feedback will be collated and presented in the Response to Submissions Report for the modification.

5.5.3 Consultation during and following DPE assessment

Following exhibition of the modification Roads and Maritime will review the submissions received and respond to the issues raised in a Response to Submissions Report for the modification. This report will be provided to DPE and will be assessed prior to a determination being made. If during exhibition or during the response to submissions process further changes to the proposed modification are identified, these changes would also be described and assessed.

During DPE’s assessment of the modification and up to and following determination, Roads and Maritime, SMC and the contractor will continue to consult with the community and relevant

stakeholders in line with the existing and modified (if approved) conditions of approval, the Communications Strategy and established communication and complaints processes.

Communication and consultation with stakeholders and the community during construction would focus on providing updates on construction activities and program, responding to enquiries and concerns in a timely manner and minimising potential impacts where possible. Further detail of consultation with stakeholders and the community during construction is provided in section 7.6.2 of the EIS.

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6 Environmental Assessment

6.1 Introduction

This chapter provides an environmental assessment of the proposed modification to Stage 1 of the M4-M5 Link project (the project). The assessment identifies potential issues and provides a comparison with the impacts assessed in the Environmental Impact Statement (EIS) and the Submissions and Preferred Infrastructure Report (SPIR) for the approved project. The assessment has been prepared to address the environmental assessment requirements for the modification as described in **Appendix A** (Environmental assessment requirements).

6.2 Environmental scoping

A scoping assessment has been completed for the proposed modification. The scoping assessment identifies the likely potential environmental impacts associated with the proposed modification.

The scoping assessment has been carried out at the following locations:

- Northcote Street civil and tunnel site, including the proposed construction access tunnel and spoil haulage routes (see **section 6.2.1**)
- Parramatta Road West and Parramatta Road East civil sites (see **section 6.2.2**)
- Removal of the Darley Road civil and tunnel site from the project (see **section 6.2.3**)
- Relocation of the operational water treatment plant to St Peters (see **section 6.2.4**).

A scoping assessment at these locations has been developed to identify potential environmental impacts associated with the proposed modification.

As described in **Chapter 4** (Proposed modification), the proposed modification relates primarily to the use of construction sites for Stage 1 of the project, with the exception of the relocation of the operational water treatment plant to St Peters. Therefore, potential impacts associated with the operation of Stage 1 of the project generally would not change.

A number of issues for the proposed modification would be generally consistent with the EIS and do not require further assessment. Issues that do not require further assessment include:

- Traffic and transport (operation)
- Air quality (operation)
- Human health (construction and operation)
- Social and economic (operation)
- Contamination (construction and operation)
- Groundwater (operation)
- Biodiversity (construction and operation)
- Non-Aboriginal heritage (operation)
- Aboriginal heritage (construction and operation)
- Hazard and risk (construction and operation)
- Greenhouse gas (construction and operation).

These issues would be managed in accordance with the existing environmental management measures as summarised in Part E of the SPIR and relevant conditions of approval for the project. Impacts to human health during construction are considered as part of the assessment of potential air quality and noise and vibration assessments for the proposed modification.

6.2.1 Northcote Street civil and tunnel site

As described in **Chapter 5** (Proposed modification), the Northcote Street site is proposed to be used as a civil and tunnel site. Potential environmental impacts associated with this change of use that require assessment are identified in **Table 6-1**.

Table 6-1 Scoping assessment for the Northcote Street civil and tunnel site

Issue	Potential environmental impacts	Where addressed
Traffic and transport	Potential impact to car parking in the wider Haberfield/ Ashfield precinct	**Section 6.3.1** and **section 6.3.7**
	Potential traffic impact to the road network from construction workforce shuttle bus movements	
	Potential traffic impacts associated with heavy vehicle and light vehicle movements to and from the civil and tunnel site	
	Potential impacts to intersection and mid-block performance along proposed spoil haulage routes	
	Other potential traffic and transport impacts including access, on-street parking, pedestrians and cyclists, public transport and traffic crashes	
	Potential traffic impacts associated with reconfiguration works required for the dedicated temporary construction vehicle turning lane (the G-loop)	
Air quality	Potential air quality including dust impacts associated with the use of the site for tunnelling and associated activities during the construction period	**Section 6.3.2** and **section 6.3.7**
	Potential air quality impacts associated with reconfiguration works required to facilitate use of the G-loop	
Noise and vibration (amenity and structural)	Potential noise and vibration impacts including sleep disturbance associated with the use of the site for tunnelling and associated activities during the construction period	**Section 6.3.2** and **section 6.3.7**
	Potential traffic noise impacts including sleep disturbance for sensitive receivers fronting the proposed spoil haulage routes	
	Potential noise and vibration impacts associated with the construction of the construction access tunnel	
	Potential ground borne noise and vibration impacts associated with construction of the proposed construction access tunnel	
	Potential noise impacts associated with reconfiguration works required to facilitate use of the G-loop	
Visual amenity	Potential visual impacts associated with the proposed construction infrastructure at site (e.g. retention of the existing M4 East acoustic shed, site offices and workshop) when viewed from nearby sensitive receptors and public vantage points including traffic along this section of Parramatta Road	**Section 6.3.6** and **section 6.3.7**
	Potential visual amenity impacts associated with reconfiguration works and use of the G-loop	
Land use and property	Proposed construction of the access tunnel resulting in potential settlement impacts to properties and infrastructure located above the tunnel alignment	**Section 6.3.5**
	Changes to utility connections required to provide power for construction tunnelling activities at the site	
	Potential impacts from the continued use of the G-loop and ongoing occupation of part of Reg Coady Reserve during construction	
Non-Aboriginal heritage	Proposed construction of the access tunnel resulting in potential settlement impacts on properties within the Haberfield Conservation Area	**Section 6.3.9**

Issue	Potential environmental impacts	Where addressed
Groundwater	Potential groundwater impacts associated with construction of the temporary access tunnel	**Section 6.3.8**
Surface water, flooding and drainage	Potential flooding and drainage impacts associated with proposed use of the site, including potential impacts on the construction access tunnel.	**Section 6.3.4**

6.2.2 Parramatta Road West and Parramatta Road East civil sites

As described in **Chapter 4** (Proposed modification), the Parramatta Road West and East civil sites are located on the western and eastern sides of Parramatta Road between around Alt Street and Bland Street at Ashfield and Haberfield.

The Parramatta Road West and East civil sites would be used in accordance with condition of approval C19 and other conditions of the project approval. The sites would be used for parking and other works that do not exceed the 'noise affected' Noise Management Levels as identified in the Interim Construction Noise Guideline (ICNG).

The sites would be used for site offices, light and heavy vehicle car parking, shuttle bus services, workshop and storage of equipment, materials and construction machinery. Both sites would operate 24 hours a day, 7 days a week in accordance with the conditions of the project approval.

The sites would be used to support civil and tunnelling construction activities at other project construction sites, primarily within the Haberfield and Ashfield area. No tunnelling, tunnel spoil stockpiling and handling or tunnel spoil haulage would occur at these sites.

Potential environmental impacts associated with the proposed use of these sites that require assessment are identified in **Table 6-2**.

Table 6-2 Scoping assessment for Parramatta Road West and East civil sites

Issue	Potential environmental impacts	Where addressed
Transport and traffic	Potential impacts to car parking in the wider Haberfield/ Ashfield precinct	**Section 6.4.1**
	Potential impact to the local traffic network	
	Potential safety impacts associated with the temporary overhead pedestrian walkway to pedestrians and traffic (including public transport and over-height vehicles) using Parramatta Road	
	Potential traffic impacts associated with construction of the temporary overhead pedestrian walkway including any impacts to traffic using this section of Parramatta Road	
Air quality	Potential air quality including dust impacts associated with the use of the sites	**Section 6.3.2**
Noise and vibration (amenity and structural)	Potential noise and vibration impacts associated with construction of the temporary overhead pedestrian walkway	**Section 6.3.3**
	Potential noise and vibration impacts (amenity) associated with use of the sites	
	Potential noise impacts associated with the on-going use of the temporary overhead pedestrian walkway during the construction period (for construction workforce use only)	
Visual Amenity	Potential visual impacts associated with the proposed use of the two sites	**Section 6.4.6**
	Potential visual impacts (including lighting impacts) associated with the temporary overhead pedestrian walkway when viewed from nearby sensitive receptors and public vantage points including traffic along this section of Parramatta Road	

Issue	Potential environmental impacts	Where addressed
Heritage	Potential impact of the temporary overhead pedestrian walkway on the visual setting of the adjacent Haberfield Heritage Conservation Area	**Section 6.4.8**
Surface water, flooding and drainage	Potential surface water, flooding and drainage impacts associated with the proposed use of the two sites	**Section 6.4.4**
Social and economic	Potential social and economic impacts associated with the proposed use of the two sites and the temporary pedestrian walkway connection.	**Section 6.4.7**
Land use	Potential land use impacts associated with the proposed use of the two sites and the temporary pedestrian walkway.	**Section 6.4.5**

6.2.3 Removal of the Darley Road civil and tunnel site from the project

As described in **Chapter 4** (Proposed modification), construction activities would not be carried out at the Darley Road civil and tunnel site for the proposed modification. The construction activities proposed for Darley Road civil and tunnel site as described in the EIS and SPIR would be accommodated at other project construction sites.

The approved project involved the removal and transportation of around 550,300 cubic metres of tunnel spoil from the Darley Road civil and tunnel site as described in Section 23.3.2 of the EIS. Given that the length of the mainline tunnel would not change for the proposed modification, this spoil volume would be required to be removed from other approved tunnelling sites.

The overall intensity (rate) of spoil removal at approved tunnelling sites is not expected to change, however the additional spoil to be removed would require the extension of the tunnelling component of the overall construction program by around six months. As a result the overall construction program for the mainline tunnels would continue through until around the end of Q1 2023.

The duration of the potential environmental impacts associated with tunnelling activities would therefore increase for the proposed modification. However, the rate of spoil removal and associated haulage vehicle movements (daily and peak hour) are expected to remain generally similar to the EIS.

The removal of Darley Road would result in groundwater ingress during construction being directed to construction water treatment plants located at other tunnelling sites. As a result, the rate of discharge at the Pyrmont Bridge Road civil and tunnel site and Northcote Street civil and tunnel site is expected to increase.

Potential environmental impacts associated with the removal of the Darley Road civil and tunnel site from the project that require assessment are identified in **Table 6-3**.

Table 6-3 Scoping assessment for removal of the Darley Road civil and tunnel site from the project

Issue	Potential environmental impacts	Where addressed
Traffic and transport	Extended duration of potential traffic impacts at other tunnelling sites	**Section 6.5.1**
Air quality	Extended duration of potential air quality impacts at other tunnelling sites	**Section 6.5.2**
Noise and vibration	Extended duration of potential noise and vibration impacts at other tunnelling sites	**Section 6.5.3**
Social and economic	Potential social and economic impacts on the local community including residents, local businesses and community facilities as a result of the extended tunnelling duration	**Section 6.5.4**

Issue	Potential environmental impacts	Where addressed
Visual	Potential visual impacts associated with additional utility infrastructure such as pumps required for other construction water treatment plants to compensate for the removal for the construction water treatment plant at Darley Road	**Section 6.5.5**
Surface water, flooding and drainage	Potential impacts on the receiving environment (waterways) arising from any changes in discharge volumes, rates and water quality at other construction water treatment plants to compensate for the removal for the construction water treatment plant at Darley Road	**Section 6.5.6** and **section 6.6.4**
Resource use and waste	The distribution of spoil volumes at tunnelling sites would change as a result of the removal of Darley Road	**Section 6.5.6**

6.2.4 Relocation of operational water treatment plant to St Peters

As described in **Chapter 4** (Proposed modification), the Darley Road operational water treatment plant would be relocated to the Campbell Road motorway operations complex at the St Peters interchange. Potential environmental impacts associated with this change that require assessment are identified in **Table 6-4**.

The construction footprint of the project at St Peters interchange would not be increased to allow for the construction of the operational water treatment plant. The operational footprint for the project would need to be increased to accommodate the operational water treatment plant.

Table 6-4 Scoping assessment for the relocation of the operational water treatment plant to St Peters

Issue	Potential environmental impacts	Where addressed
Transport and traffic	Potential traffic impacts associated with construction of the water treatment plant	**Section 6.6.1**
Construction air quality	Potential air quality (dust) impacts associated with construction of the water treatment plant	**Section 6.6.2**
Construction noise and vibration (amenity and structural)	Potential noise impacts associated with construction of the water treatment plant	**Section 6.6.3**
	Potential operational noise impacts associated with the operation of the water treatment plant	**Section 6.6.3**
Visual amenity	Potential visual impacts associated with the water treatment plant when viewed from nearby sensitive receptors and public vantage points, including from the proposed open space area to the east of the site	**Section 6.6.6**
Land use and property	Potential impact of the water treatment plant on proposed land uses including the New M5 St Peters interchange and associated landscape areas and the proposed open space area to the east of the site	**Section 6.6.5**
Surface water, flooding and drainage	Potential impacts from the increased discharge flows from the water treatment plant into Alexandra Canal including scour potential and potential to disturb contaminated sediments within the canal	**Section 6.6.4**
	Potential impact of discharge from the water treatment plant on the existing stormwater network and receiving environment (waterways)	
	Potential flooding and drainage impacts during construction and operation	
Non-Aboriginal heritage	Potential impact of the required works on the significance of listed heritage items (e.g. Alexandra Canal)	**Section 6.6.8**

6.3 Northcote Street civil and tunnel site

The following is an assessment of the issues relevant to Northcote Street civil and tunnel site as identified in **Table 6-1**.

6.3.1 Traffic and transport

Assessment methodology

An assessment of potential construction traffic impacts associated with the proposed modification was carried out and is included in **Appendix B** (Traffic and transport report). This section summarises the construction traffic assessment associated with the Northcote Street civil and tunnel site and taking into account changed construction traffic volumes at the Parramatta Road West and Parramatta Road East civil sites.

The traffic impacts of the proposed modification were assessed using existing traffic models previously used to assess construction impacts for the M4 East and M4-M5 Link projects. The assessments were undertaken on the surrounding road network during the AM and PM peak hours in the forecast peak construction year (2021). The impact of shuttle buses from the Parramatta Road civil sites was included in this assessment.

The construction impact assessment was undertaken at locations where construction traffic is forecast to pass through the network in significant volumes. The intersections assessed were grouped into two clusters as identified in **Table 6-5** and shown in **Figure 6-1**.

Table 6-5 List of intersections assessed for the proposed modification

Cluster 1 (Haberfield and Ashfield)	Cluster 2 (Five Dock)
Parramatta Road/Harris Road	Ramsay Road/Fairlight Street
Parramatta Road/Croydon Road/Arlington Street	Great North Road/Queens Road/Fairlight Street
Parramatta Road/Great North Road	Great North Road/Ramsay Road/First Avenue
Parramatta Road/Frederick Street/Wattle Street	Queens Road/Harris Street
Parramatta Road/Bland Street	Great North Road/Lyons Road
Wattle Street/Ramsay Street	
Dobroyd Parade/Waratah Street	
Dobroyd Parade/Timbrel Drive/Mortley Avenue	

Cluster 2 was not assessed in the M4-M5 Link EIS or SPIR, and therefore a comparison is made to the 'without construction' scenario only.

The Cluster 1 model was previously used in the assessment of the construction impacts for the M4-M5 Link EIS and the Cluster 2 model was previously used in the assessment of the construction impacts for the M4 East EIS. The existing models included background traffic forecasts for construction year 2021 (the 'without construction' scenario).

Construction traffic as a result of the proposed modification was then added to the 2021 background traffic, based on the proposed construction methodology, covering vehicle types, volumes and construction traffic routes to and from the various construction ancillary facilities (the 'with construction' proposed modification scenario).

As the proposed modifications relate to the Stage 1 construction sites at Haberfield and Ashfield, and the removal of the Darley Road site from the project, there is negligible change in construction impact forecast on the road network east of these sites along City West Link, and so the roads and intersections assessed in Leichhardt North, Lilyfield and Rozelle in the M4-M5 Link EIS have not been reassessed.

LEGEND

Existing features

- Waterway
- Railway
- Light rail
- Suburb boundary
- Arterial road
- Subarterial road
- Local road

Model boundary

- Cluster area
- Modelled intersection

Figure 6-1 Traffic model coverage

The assessment provides a comparison of impacts for the proposed modification and impacts described in the SPIR (the 'with construction' SPIR scenario). The traffic and transport assessment in Appendix A (Traffic and transport impact assessment) of the SPIR amended the assessment in the EIS, taking into consideration changes to preferred infrastructure.

The SPIR considered two construction site options (Option A and Option B). Option A has been included for comparison in this assessment because it is the most comparable to the proposed modification. The assessment also considers the traffic impacts outlined in the SPIR for the M4 East project.

Levels of service

Level of service (LoS) is a measure to describe the operational conditions and efficiency of a road or intersection. The definition of LoS generally outlines the operating conditions in terms of speed and travel time, freedom to manoeuvre, traffic interruptions, comfort and convenience, and road safety. It is a qualitative measure describing operational conditions within a roadway or intersection, as perceived by motorists and/or passengers.

There are six levels of service; LoS A to LoS F. LoS A represents the best operating conditions and LoS F the poorest operating conditions. When the level of service of a road or intersection falls below LoS D, investigations are generally carried out to identify suitable remediation. However, constraints in built up urban areas mean that LoS E and LoS F are regularly experienced by motorists on the Sydney road network during traffic peak periods.

Roadway level of service

Mid-block volume/capacity (v/c) ratios provide an indication of the saturation level of a segment of road, based on the theoretical design capacity of the road. Volume/capacity ratios can be used to provide a corresponding level of service for road operation, as detailed in *Guide to Traffic Management – Part 3 Traffic Studies and Analysis* (Austroads, 2013).

The level of service for freeways or motorways is calculated from the vehicle density, which is the traffic volume divided by the average passenger vehicle speed. Density is measured in passenger car units (PCU[1]) per kilometre per lane (PCU/km/ln).

The roadway LoS criteria are provided in **Appendix B** (Traffic and transport report).

Updated analysis of roadway LoS has been provided at relevant locations impacted by the proposed modification compared to the SPIR.

Intersection level of service

Average delay is often used to assess the operational performance of intersections, with level of service used as an index. An assessment of performance of the intersection is undertaken to determine the average delay times experienced by traffic at the intersection. The intersection is then characterised into its corresponding level of service 'band' based on these delay times.

The intersection LoS criteria are provided in **Appendix B** (Traffic and transport report).

The intersection performance results for the road network under the 2021 'without construction' and 'with construction' forecast volumes are summarised for each relevant location for the AM and PM peak hours. This allows for comparison with the level of impact reported in the SPIR.

Intersection modelling was undertaken using passenger car units (PCU) to quantify traffic volumes. This accounts for the amount of road space used by different vehicle types.

Traffic generation and spoil haulage routes

The assessment considered the changes to construction traffic volumes for the proposed modification compared to the SPIR. Proposed changes to construction traffic volumes are summarised in **Table 6-6**.

Table 6-6 Proposed changes to construction traffic volumes

Site	Light vehicle movements (per hour, AM peak – EIS	Light vehicle movements (per hour, AM peak – modification	Light vehicle movements (per hour, PM peak – EIS	Light vehicle movements (per hour, PM peak – modification
Northcote Street civil and tunnel site	50	7	150	7
Parramatta Road East civil site	10	18	10	31
Parramatta Road West civil site	50	12	150	20
Site	**Heavy vehicle movements (per hour, AM and PM peak) – EIS**		**Heavy vehicle movements (per hour, AM and PM peak) – modification**	
Northcote Street civil and tunnel site	5		8	
Parramatta Road East civil site	3		1	
Parramatta Road West civil site	7		7	

No changes in the indicative construction volumes from the other construction sites are proposed, subject to ongoing detailed construction planning.

The nominated routes for exiting spoil haulage vehicles from Northcote Street civil and tunnel site are described in **Chapter 4** (Proposed modification).There are two nominated routes (Route A and Route B) which are shown in **Figure 6-2**.

For the G-loop route (Route B) two scenarios have been assessed

- Trucks exiting the G-Loop and entering the M4 East westbound entry ramp (Route B – M4 East ramps)
- Trucks exiting the G-Loop and using the westbound Wattle Street surface lanes and the Parramatta Road/Wattle Street intersection (Route B – Wattle Street).

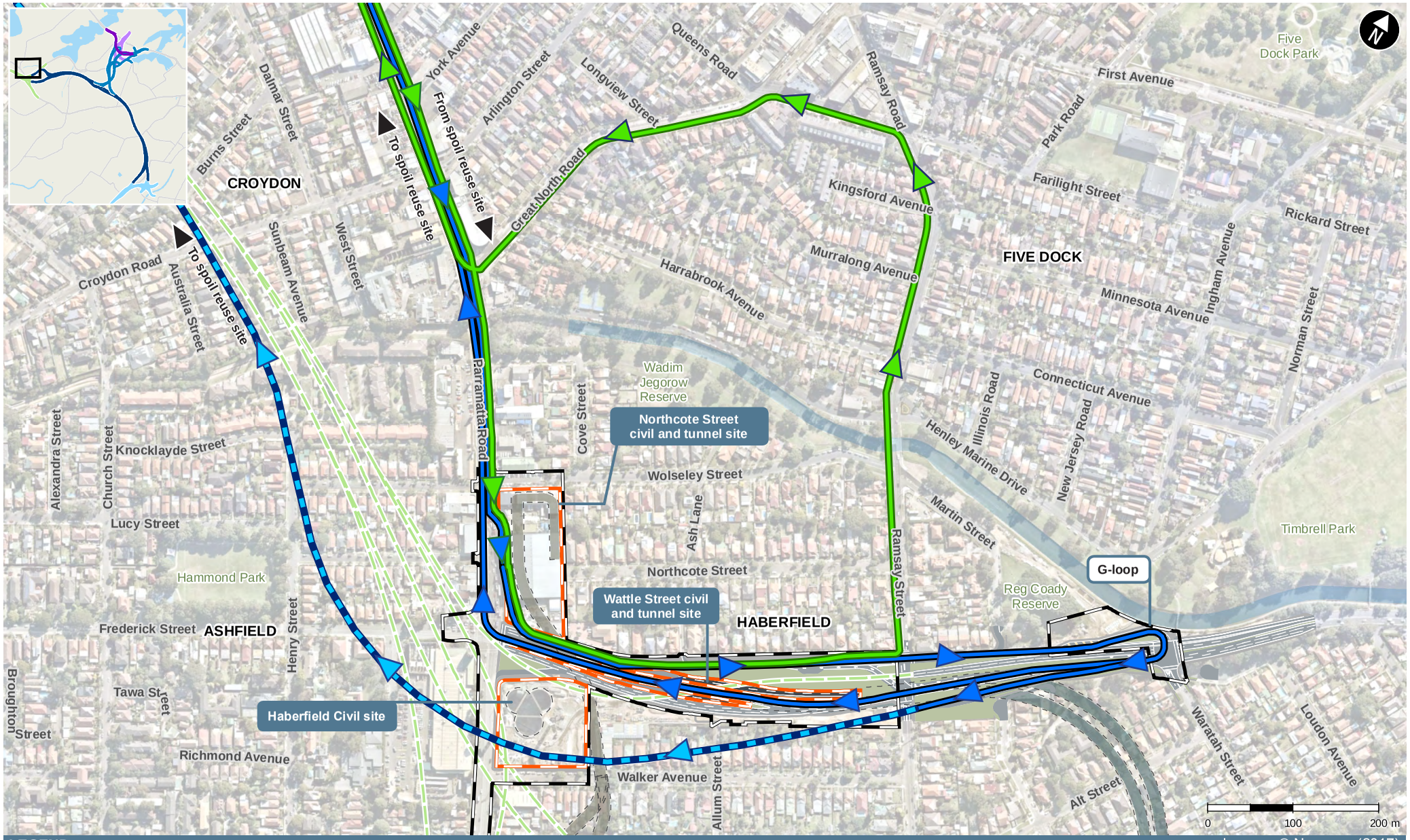


Figure 6-2 Northcote Street civil and tunnel site – proposed spoil haulage routes

Assessment of potential impacts

Roadway level of service – Haberfield and Ashfield

The results for Haberfield and Ashfield identified limited change in terms of volume over capacity (V/C) compared to the assessment in Appendix A (Traffic and transport impact assessment) of the SPIR and indicate that the relevant mid-blocks would remain within their theoretical capacity. The small change in V/C indicates a small change in forecast volume on these links and therefore a limited impact. The results are considered for the Route A haulage route. The Route B haulage route has a minimal impact on the mid-block operational performance.

A comparison of the AM and PM peak hour mid-block operational performance for the SPIR and the modification is provided in **Table 6-7** and **Table 6-8**.

Table 6-7 2021 AM peak hour mid-block operational performance summary[1]

Location and direction		Mid-block capacity	With construction (M4-M5 Link SPIR Option A)			With construction (Modification)		
			Flow	V/C[2]	LoS	Flow	V/C[2]	LoS
Parramatta Road, north of Wattle Street – Haberfield	SB	3,300	1,890	0.57	C	1,910	0.58	C
	NB	3,300	1,340	0.41	C	1,350	0.41	C
Wattle Street, east of Parramatta Road – Haberfield	EB	2,000	780	0.39	B	770	0.38	B
	WB	2,000	890	0.45	C	880	0.44	C
M4 East ramps at Wattle Street[3]	EB	2,200	1,310	0.60	D	1,250	0.57	C
	WB	4,500	1,340	0.30	B	1,310	0.29	B

Notes:

1. Traffic volume rounded to nearest 10
2. Volume over capacity ratio
3. Freeway LoS is evaluated in PCU, eastbound (EB) capacity treated as urban road with interrupted flow due to downstream traffic signals.

Table 6-8 2021 PM peak hour mid-block operational performance summary[1]

Location and direction		Mid-block capacity	With construction (M4-M5 Link SPIR Option A)			With construction (Modification)		
			Flow	V/C[2]	LoS	Flow	V/C[2]	LoS
Parramatta Road, north of Wattle Street – Haberfield	SB	3,300	2,260	0.68	D	2,120	0.64	D
	NB	3,300	1,380	0.42	C	1,380	0.42	C
Wattle Street, east of Parramatta Road – Haberfield	EB	2,000	1,270	0.64	D	1,130	0.57	C
	WB	2,000	800	0.40	C	760	0.38	B
M4 East ramps at Wattle Street[3]	EB	2,200	1,010	0.46	C	970	0.44	C
	WB	4,500	1,290	0.29	B	1,240	0.28	B

Notes:

1. Traffic volume rounded to nearest 10
2. Volume over capacity ratio.
3. Freeway LoS is evaluated in PCU, eastbound (EB) capacity treated as urban road with interrupted flow due to downstream traffic signals.

Intersection level of service – Haberfield and Ashfield (Route A)

A comparison of the AM and PM peak hour intersection operational performance for the SPIR and the modification Route A is provided in **Table 6-9** and **Table 6-10**.

Table 6-9 2021 AM peak hour intersection operational performance summary[1] (Route A)

Cluster	Intersection	With construction (M4-M5 Link SPIR Option A)		With construction (Modification – Northcote Street site egress via Five Dock)	
		Volume (PCU)	LoS	Volume (PCU)	LoS
1	Parramatta Rd | Harris Rd	2,650	C	2,690	C
	Parramatta Rd | Croydon Rd | Arlington St	3,370	C	3,420	C
	Parramatta Rd | Great North Rd	3,940	C	3,960	C
	Parramatta Rd | Frederick St | Wattle St	4,960	D	4,990	D
	Parramatta Rd | Bland St	2,870	F	2,930	F
	Wattle St | Ramsay St	3,280	C	3,310	C
	Dobroyd Parade | Waratah St	3,710	B	3,720	B
	Dobroyd Parade | Timbrell Dr | Mortley Ave	5,780	F	5,780	F

Notes:

1. Traffic volume rounded to nearest 10.

Table 6-10 2021 PM peak hour intersection operational performance summary[1] (Route A)

Cluster	Intersection	With construction (M4-M5 Link SPIR Option A)		With construction (Modification – Northcote Street site egress via Five Dock)	
		Volume (PCU)	LoS	Volume (PCU)	LoS
1	Parramatta Rd | Harris Rd	3,240	C	3,220	C
	Parramatta Rd | Croydon Rd | Arlington St	3,710	E	3,760	F
	Parramatta Rd | Great North Rd	3,920	F	3,980	F
	Parramatta Rd | Frederick St | Wattle St	5,200	E	5,070	E
	Parramatta Rd | Bland St	2,530	B	2,570	B
	Wattle St | Ramsay St	3,330	E	3,170	D
	Dobroyd Parade | Waratah St	3,280	B	3,270	B
	Dobroyd Parade | Timbrell Dr | Mortley Ave	5,800	F	5,760	F

Notes:

1. Traffic volume rounded to nearest 10.

Compared to the scenario considered in the SPIR, there is a relatively small change in the volume of construction traffic on parts of the network due to the proposed modification, rising by a maximum of about 60 PCU in the PM peak at the Parramatta Road/Great North Road intersection. This increase in PCUs does not change the level of service (LoS) at this intersection and there is limited change elsewhere on the network.

The change in intersection performance relative to the M4-M5 Link SPIR assessment is limited, with a change in the LoS at two intersections during the PM peak hour:

- Wattle Street/Ramsay Street intersection – improvement from LoS E to LoS D
- Parramatta Road/Croydon Road/Arlington Street intersection – deterioration from LoS E to LoS F. This intersection is at capacity even in the ‘’without construction’ scenario – it is close to LoS E – so even a small change in demand has a large impact on intersection delay. The capacity constraint is caused by exit blocking from downstream intersections, so upgrades at this intersection would not alleviate the forecast delay.

This analysis shows that there is a relatively minor difference in volumes on the modelled road network between the ‘with construction’ SPIR scenario and ‘with construction’ proposed modification scenario.

Intersection level of service – Haberfield and Ashfield (Route B – M4 East tunnels)

A comparison of the AM and PM peak hour intersection operational performance for the SPIR and the modification for Route B (M4 East tunnels) is provided in **Table 6-11** and **Table 6-12**. This scenario involves spoil vehicles exiting the G-Loop and entering the M4 East westbound entry ramp.

Table 6-11 2021 AM peak hour intersection operational performance summary[1] (Route B)

Cluster	Intersection	With construction (M4-M5 Link SPIR Option A)		With construction (Modification – Northcote Street site egress via G-Loop)	
		Volume (PCU)	LoS	Volume (PCU)	LoS
1	Parramatta Rd | Harris Rd	2,650	C	2,680	C
	Parramatta Rd | Croydon Rd | Arlington St	3,370	C	3,400	C
	Parramatta Rd | Great North Rd	3,940	C	3,940	C
	Parramatta Rd | Frederick St | Wattle St	4,960	D	4,990	D
	Parramatta Rd | Bland St	2,870	F	2,930	F
	Wattle St | Ramsay St	3,280	C	3,310	C
	Dobroyd Parade | Waratah St	3,710	B	3,730	C
	Dobroyd Parade | Timbrell Dr | Mortley Ave	5,780	F	5,780	F

Notes:

1. Traffic volume rounded to nearest 10.

Table 6-12 2021 PM peak hour intersection operational performance summary[1] (Route B)

Cluster	Intersection	With construction (M4-M5 Link SPIR Option A)		With construction (Modification – Northcote Street site egress via G-Loop)	
		Volume (PCU)	LoS	Volume (PCU)	LoS
1	Parramatta Rd | Harris Rd	3,240	C	3,200	C
	Parramatta Rd | Croydon Rd | Arlington St	3,710	E	3,740	F
	Parramatta Rd | Great North Rd	3,920	F	3,960	F
	Parramatta Rd | Frederick St | Wattle St	5,200	E	5,070	E
	Parramatta Rd | Bland St	2,530	B	2,570	B
	Wattle St | Ramsay St	3,330	E	3,170	D
	Dobroyd Parade | Waratah St	3,280	B	3,290	B
	Dobroyd Parade | Timbrell Dr | Mortley Ave	5,800	F	5,760	F

Notes:

1. Traffic volume rounded to nearest 10.

Similar to the potential impact forecast in the section above for Route A, the change in intersection performance relative to the SPIR assessment for Route B is limited with a change in the LoS forecast at the following intersections:

- Dobroyd Parade/Waratah Street intersection – deterioration from LoS B to LoS C during the AM peak hour. This is mainly due to the additional signal phase for the northern leg (G-Loop exit), which reduces the capacity on the other approaches
- Wattle Street/Ramsay Street intersection – improvement from LoS E to LoS D during the PM peak hour with the forecast reduction in construction vehicles compared to the SPIR
- Parramatta Road/Croydon Road/Arlington Street intersection – deterioration from LoS E to LoS F during the PM peak hour.

The analysis shows there is a relatively minor difference in volumes on the modelled road network between the 'with construction' SPIR scenario and 'with construction' proposed modification scenario.

Compared to the Route A haulage route, the maximum queue length on the eastbound lanes from the M4 East exit ramp is forecast to increase from about 115 metres to 180 metres during the AM peak hour. This is some distance from the M4 East tunnel portal, located at Ramsay Street, which is about 280 metres from the intersection. The use of the G-Loop route (Route B) is therefore not expected to result in queuing back on to the M4 East exit ramps during the AM peak.

Intersection level of service – Haberfield and Ashfield (Route B – Wattle Street)

A comparison of the AM and PM peak hour intersection operational performance for the SPIR and the modification for Route B (Wattle Street) is provided in **Table 6-13** and **Table 6-14**. This scenario involves spoil vehicles exiting the G-Loop and using the surface westbound Wattle Street lanes and the Parramatta Road/Wattle Street intersection.

Table 6-13 2021 AM peak hour intersection operational performance summary[1]

Cluster	Intersection	Without construction		With construction (M4-M5 Link SPIR Option A)		With construction (Modification – Northcote Street site egress via G-Loop and Parramatta Road)	
		Volume (PCU)	LoS	Volume (PCU)	LoS	Volume (PCU)	LoS
1	Parramatta Rd | Harris Rd	2,550	B	2,650	C	2,700	C
	Parramatta Rd | Croydon Rd | Arlington St	3,280	B	3,370	C	3,420	C
	Parramatta Rd | Great North Rd	3,810	C	3,940	C	3,960	C
	Parramatta Rd | Frederick St | Wattle St	4,880	D	4,960	D	5,010	D
	Parramatta Rd | Bland St	2,870	F	2,870	F	2,930	F
	Wattle St | Ramsay St	3,260	C	3,280	C	3,330	C
	Dobroyd Parade | Waratah St	3,470	B	3,710	B	3,730	C
	Dobroyd Parade | Timbrell Dr | Mortley Ave	5,530	F	5,780	F	5,780	F

Notes:

1. Traffic volume rounded to nearest 10.

Table 6-14 2021 PM peak hour intersection operational performance summary[1]

Cluster	Intersection	Without construction		With construction (M4-M5 Link SPIR Option A)		With construction (Modification – Northcote Street site egress via G-Loop and Parramatta Road)	
		Volume (PCU)	LoS	Volume (PCU)	LoS	Volume (PCU)	LoS
1	Parramatta Rd | Harris Rd	3,040	B	3,240	C	3,220	C
	Parramatta Rd | Croydon Rd | Arlington St	3,610	D	3,710	E	3,760	F
	Parramatta Rd | Great North Rd	3,820	F	3,920	F	3,980	F
	Parramatta Rd | Frederick St | Wattle St	4,950	E	5,200	E	5,090	E
	Parramatta Rd | Bland St	2,500	B	2,530	B	2,570	B
	Wattle St | Ramsay St	3,080	D	3,330	E	3,190	D
	Dobroyd Parade | Waratah St	2,960	B	3,280	B	3,290	B
	Dobroyd Parade | Timbrell Dr | Mortley Ave	5,450	F	5,800	F	5,760	F

Notes:

1. Traffic volume rounded to nearest 10.

The use of this route adds an additional 20 PCU to the intersections west of the Dobroyd Parade/ Waratah Street intersection compared to Route B (M4 East tunnels). However, this does not impact the forecast level of service of the modelled intersections compared to the route using Route B (M4 East tunnels). Therefore, the impacts relative to the M4-M5 Link SPIR assessment are consistent with those described above for M4 East route option.

Roadway level of service – Five Dock

The AM and PM peak hour mid-block operational performance for the modification at Five Dock is provided in **Table 6-15** and **Table 6-16**. These roadways were not assessed by the M4-M5 Link EIS or SPIR therefore the comparison is made to a 'without construction' scenario.

Table 6-15 2021 AM peak hour mid-block operational performance summary[1]

Location and direction		Mid-block capacity	Without construction			With construction (Modification)		
			Flow	V/C[2]	LoS	Flow	V/C	LoS
Ramsay Rd, south of Fairlight St	NB	1800	690	0.38	B	710	0.39	B
	SB	1800	770	0.43	C	770	0.43	C
Fairlight St, west of Ramsay Rd	EB	1800	790	0.44	C	790	0.44	C
	WB	1800	700	0.39	B	720	0.40	C
Great North Rd, south of Fairlight St	NB	900	540	0.60	D	540	0.60	D
	SB	900	550	0.61	D	570	0.63	D

Notes:

1. Traffic volume rounded to nearest 10.
2. Volume over capacity ratio.

Table 6-16 2021 PM peak hour mid-block operational performance summary[1]

Location and direction		Mid-block capacity	Without construction			With construction (Modification)		
			Flow	V/C[2]	LoS	Flow	V/C	LoS
Ramsay Rd, south of Fairlight St	NB	1800	800	0.44	C	820	0.46	C
	SB	1800	690	0.38	B	690	0.38	B
Fairlight St, west of Ramsay Rd	EB	1800	630	0.35	B	630	0.35	B
	WB	1800	690	0.38	B	710	0.39	B
Great North Rd, south of Fairlight St	NB	900	350	0.39	B	350	0.39	B
	SB	900	510	0.57	C	530	0.59	D

Notes:

1. Traffic volume rounded to nearest 10.
2. Volume over capacity ratio.

The results in the Five Dock model identified limited impact in terms of volume over capacity and indicate that the relevant mid-blocks will remain within their theoretical capacity. The small change in V/C indicates a small change in forecast volume on these links and therefore a limited impact. A change in the LoS forecast at the following locations:

- Westbound on Fairlight Street, west of Ramsay Road – deterioration from LoS B to LoS C during the AM peak hour
- Northbound on Great North Road, south of Fairlight Street – deterioration from LoS C to LoS D during the PM peak hour.

Intersection level of service – Five Dock

The AM and PM peak hour intersection operational performance for the proposed modification at Five Dock is provided in **Table 6-17** and **Table 6-18**. These intersections were not assessed by the M4-M5 Link EIS or SPIR therefore the comparison is made to a 'without construction' scenario.

Table 6-17 2021 AM peak hour intersection operational performance summary[1]

Cluster	Intersection	Without construction		With construction (Modification)	
		Volume (PCU)	LoS	Volume (PCU)	LoS
2	Ramsay Rd | Fairlight St	2,070	D	2,090	D
	Great North Rd | Queens Rd | Fairlight St	2,840	E	2,860	E
	Great North Rd | Ramsay Rd | First Ave	1,880	F	1,880	F
	Queens Rd | Harris St	2,460	C	2,460	C
	Great North Rd | Lyons Rd	3,530	F	3,530	F

Notes:

1. Traffic volume rounded to nearest 10.

Table 6-18 2021 PM peak hour intersection operational performance summary[1]

Cluster	Intersection	Without construction		With construction (Modification)	
		Volume (PCU)	LoS	Volume (PCU)	LoS
2	Ramsay Rd | Fairlight St	1,950	C	1,970	C
	Great North Rd | Queens Rd | Fairlight St	2,410	B	2,440	B
	Great North Rd | Ramsay Rd | First Ave	1,780	F	1,780	F
	Queens Rd | Harris St	2,300	C	2,300	C
	Great North Rd | Lyons Rd	3,650	F	3,650	F

Notes:

1. Traffic volume rounded to nearest 10.

There is a relatively small change in traffic volume on parts of the network under the 'with construction' (modification) scenario when compared to the 'without construction' scenario, rising by a maximum of about 30 PCU in each peak hour. This increase in PCUs is not forecast to change the level of service at the modelled intersections compared to the 'without construction' scenario. The proposed modification is not forecast to have any material impact on the performance of the modelled road network in the Five Dock area.

Swept path analysis

An assessment of the intersections along the two proposed spoil haulage routes for the Northcote Street civil and tunnel site was carried out to identify intersections that needed further analysis of proposed turning movements. The assessment focused in particular on the Wattle Street/Ramsay Street intersection and the G-loop/Dobroyd Parade/Waratah Street intersection. The swept path analysis indicated that proposed turning movements could be made safely by a truck and dog vehicle at both intersections.

Temporary road network changes, closures and diversions

No changes are proposed to the temporary road network changes, closures or diversions described in the M4-M5 Link SPIR.

Minor changes would be required to the proposed intersection design at the G-loop, Dobroyd Parade and Waratah Street intersection (after completion of the M4 East project) to allow Route B to be used, including:

- Adjustments to the kerb and channel, including protection of new drainage infrastructure, along the north side of Dobroyd Parade at the entry and exit to the G-loop
- A short section of the median designed to separate the eastbound traffic on Dobroyd Parade from the eastbound traffic using the M4 East tunnel exit ramp would be removed to allow heavy vehicles to exit the G-loop and turn right onto Dobroyd Parade westbound
- A section of the pedestrian path along the north side of Dobroyd Parade would be realigned around the perimeter of the G-loop to avoid potential conflict between heavy vehicles and pedestrians
- Upgrade the traffic light phasing at this intersection to accommodate the G-loop traffic
- Signage and line marking associated with the above.

These works would be carried out under a Road Occupancy Licence and in consultation with Transport for NSW's Transport Management Centre (TMC). Works would likely be carried out outside of the peak traffic periods, with establishment and decommissioning works carried out in accordance with the conditions of approval for the project, including the Traffic and Transport CEMP.

Impacts to car parking

A preliminary assessment of parking provision, based on approximate peak workforce estimates, anticipate that the total parking provision within the Haberfield and Ashfield construction sites would be able to meet the forecast parking demand, as shown in **Table 6-19**.

To assist in minimising impacts from the construction workforce using on-street parking, the use of public transport would be encouraged (where feasible). The sites, situated along Parramatta Road, would be serviced by numerous bus routes. However, workers starting or ending shifts very early or very late would be more likely to use private vehicles.

Table 6-19 Parking demand and provision at Haberfield and Ashfield construction ancillary facilities

Location	Approximate day shift peak construction workforce	Estimate of parking demand (0.7 spaces per staff)	Approximate proposed parking numbers	Surplus or deficit
Haberfield and Ashfield construction ancillary facilities	260	182	200	+18

A Construction Parking and Access Strategy would be developed in accordance with condition E54 of the project approval to identify actions that would be implemented by the contractor to avoid or minimise the use of on-street parking in the vicinity of construction sites by the construction workforce. The car parking strategy would consider forecast parking demand, review of existing parking supply, alternative parking arrangements and communication and engagement. Processes for monitoring, reporting and corrective actions would also be part of the strategy.

No changes are proposed to the on-street parking impacts identified in the M4-M5 Link EIS and SPIR as part of this modification. Potential impacts on on-street parking would be confirmed during detailed construction planning and detailed design and managed in accordance with the Construction Traffic, Transport and Access Management Sub-Plan.

Impacts to pedestrians and cyclists

Key elements of the Northcote Street civil and tunnel site would be consistent with the layout used for the M4 East project, including the vehicle entry and exit locations and the arrangements around the G-Loop. The traffic control measures in place to manage impacts on pedestrian and cyclists during construction of the M4 East project would generally be retained or reinstated for the M4-M5 Link Stage 1 construction at the Northcote Street civil and tunnel site. These would be further detailed in the Construction Traffic, Transport and Access Management Sub-Plan.

Safe pedestrian and cyclist access would be maintained through the provision of a shared path around the northern perimeter of the G-loop during construction in accordance with condition E57 of the project approval.

Impacts to public transport

With the small changes in peak hour construction volumes compared to the SPIR, there is likely to be a small impact on buses commensurate with the impact on general traffic.

No changes to bus stops are proposed at the Northcote Street civil and tunnel site.

Impacts to traffic crashes

The change in construction traffic volumes is low when compared to existing traffic volumes on key arterial roads connecting to the construction ancillary facility locations and is not expected to substantially impact road safety.

There is still a risk with construction traffic interacting with general traffic, with elevated risk when construction-related vehicles are entering and leaving construction sites. Any foreseen impacts on road safety for all users during construction would be mitigated as much as possible through the provision of tailored construction traffic management plans and other measures detailed in the M4-M5 Link SPIR and in the Construction Traffic, Transport and Access Management Sub-Plan.

Cumulative impacts

With regard to the cumulative scenario assessment, cumulative traffic volumes included in the M4-M5 Link SPIR (in addition to the construction traffic volumes being generated by the project) were the proposed Western Harbour Tunnel construction site at Rozelle and the Multi-User Facility and Concrete Batching Plant planned at Glebe Island.

Based on forecast traffic distribution, traffic from these facilities is likely to have minimal impact on the Haberfield, Ashfield and Five Dock road network. Some traffic would access the M4 East Wattle Street ramps, which is forecast to have a minor impact on the Dobroyd Parade/Waratah Street and Dobroyd Parade/Timbrell Drive intersections, but with no change in level of service.

Management measures and conditions of approval

The impacts assessed indicate the proposed modification would result in minimal change to the traffic and transport impacts previously assessed in the M4-M5 Link EIS and SPIR. Impacts would therefore continue to be managed through the construction management measures contained in the conditions of approval for the project, specifically those in the Construction Traffic, Transport and Access Management Sub-Plan and the Construction Parking and Access Strategy.

Safe pedestrian and cyclist access would be maintained during construction in accordance with condition E57 of the conditions of approval and road safety audits would be carried during detailed design to assess the safety performance of new or modified road and pedestrian and cyclist infrastructure (including around construction ancillary facilities).

6.3.2 Air quality

Assessment methodology

Potential changes to air quality impacts for the proposed modification relate primarily to changes to dust-generating activities during construction. A construction air quality assessment was carried out to assess these impacts and is provided in **Appendix D** (Air quality report).

The assessment methodology considers three separate potential dust impacts:

- Annoyance due to dust soiling
- The risk of health effects due to an increase in exposure to particulate emissions (PM_{10})
- Harm to ecological receptors.

Particulate emissions from construction activities which mechanically disturb the surface are predominantly made up of the coarse fraction (PM_{10}), rather than the finer $PM_{2.5}$ particles. $PM_{2.5}$ is not a significant component of construction activities and is therefore not assessed.

The construction air quality assessment involved the application of a semi-quantitative risk-based approach following the guidance developed by the UK Institute of Air Quality Management (IAQM, 2014), and adapted to conditions representative of the proposed modification. The assessment of potential air quality impacts during construction involved the following main steps:

- A screening assessment to identify the need for further assessment of air quality impacts at a particular location
- The identification of the construction activities that would be likely to occur in relation to the project and that may result in air quality impacts (ie activities occurring within the construction ancillary facilities)
- A risk assessment for the different activities with the potential to result in air quality impacts: demolition, earthworks, construction and vehicle track-out. Risks were assessed in relation to the size of the project, the volume of traffic on unsealed roads, and the locations of sensitive receivers
- The identification of project-specific management/mitigation measures to minimise the risk of any potential impacts
- The determination of the overall significance of risk of dust impacts considering the application of appropriate dust mitigation measures.

The methodology is consistent with the methodology applied for the assessment of potential air quality impacts during construction in Appendix I (Technical Working Paper: Air quality) of the EIS

Given the proximity of the Northcote Street civil and tunnel site and the Parramatta Road West and Parramatta Road East civil sites, the construction sites have shared receptors that may experience potential dust impacts from a combination of the three sites. The assessment therefore considers the overall change to potential air quality impacts in the Haberfield and Ashfield area, as it is difficult to attribute specific impacts to a specific construction site.

The study area for the assessment is a 350 metre area around the construction footprint of the Northcote Street civil and tunnel site and the Parramatta Road West and Parramatta Road East civil sites.

The screening assessment identified the need for further assessment of potential construction air quality impacts to human receptors in Haberfield and Ashfield. The screening assessment identified that there are no ecological receptors to consider within the study area.

Existing environment

The assessment of construction air quality impacts associated with the proposed modification has assumed that the existing environment conditions are consistent with those set out in Appendix I (Technical Working Paper: Air quality) of the EIS.

The most significant sources of particulate matter (PM) emissions in the Sydney area are the domestic-commercial sector and industry. The contribution to PM from the domestic sector in Sydney is due largely to wood burning for heating in winter. Emissions from natural sources, such as bushfires, dust storms and salt spray, also contribute to PM concentrations. PM levels are affected by:

- The annual variability in the weather
- Natural events such as bushfires and dust storms, as well as hazard reduction burns

- The location and intensity of local emission sources, such as wood heaters, transport and industry.

Assessment of potential impacts

Construction activities with the potential to impact air quality

The following construction activities were identified that may result in air quality impacts:

- Demolition: Demolition is any activity that involves the removal of existing structures. This may also be referred to as de-construction, specifically when a building is to be removed a small part at a time
- Earthworks: This covers the processes of soil stripping, ground levelling, excavation and landscaping. Earthworks would primarily involve excavating material, haulage, tipping and stockpiling
- Construction: Construction is any activity that involves the provision of new structures, modification or refurbishment
- Track-out: This involves the transport of dust and dirt by heavy vehicles from the construction/demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network.

The anticipated potential for dust emissions based on the activities outlined above is identified in accordance with the site categories provided in the IAQM, 2014 guidance in **Table 6-20**, along with a comparison to the assessment in the EIS.

Table 6-20 Anticipated scale of dust emissions for construction activities

Activity	Site category[1]	Potential for dust emissions[1](modification)	Potential for dust emissions[1](EIS)
Demolition	Building volume greater than 50,000 cubic metres, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities greater 20 metres above ground level.	Large	Large
Earthworks	Site area 2,500-10,000 square metres, moderately dusty soil type (e.g. silt), five to 10 heavy earth moving vehicles active at any one time, formation of bunds four to eight metres in height, total material moved 20,000-100,000 tonnes.	Medium	Medium
Construction	Building volume 25,000-100,000 cubic metres, potentially dusty construction material (e.g. concrete), piling, on site concrete batching.	Medium	Medium
Track-out	Greater than a combined 50 heavy vehicle movements (outward) in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length greater than 100 metres.	Large	Large

Notes:

1. As described in IAQM, 2014 guidance

Risk assessment

The assessment identified the risk of dust soiling and human health impacts for each construction activity. The assessments takes into account the sensitivity of an area based on the sensitivity of receptors, the proximity of receptors to construction activities and background PM concentrations. The results of the risk assessment are summarised in **Table 6-21** and a comparison of the risk assessment in the EIS is provided in **Table 6-22**.

Table 6-21 Risk of dust impacts for construction activities

Activity	Potential for dust emissions	Sensitivity of area		Risk of dust impacts	
		Dust soiling	Human health	Dust soiling	Human health
Demolition	Large	High	Medium	High	High
Earthworks	Medium	High	Medium	Medium	Medium
Construction	Medium	High	Medium	Medium	Medium
Track-out	Large	High	Medium	High	Medium

Table 6-22 Comparison of the risk of dust impacts with the EIS

Activity	Risk of dust soiling impacts		Risk of human health impacts	
	Modification	EIS	Modification	EIS
Demolition	High	High	High	Medium
Earthworks	Medium	High	Medium	Medium
Construction	Medium	High	Medium	Medium
Track-out	High	High	Medium	Medium

Given the proximity of the sites, it is anticipated that there would be a minor overall change for the proposed modification to the potential risk of dust impacts to nearby receptors compared to the EIS.

The proposed modification would involve carrying out some construction activities at the Northcote Street civil and tunnel site that were proposed in the EIS to be carried out at the Parramatta Road West civil and tunnel site, including earthworks associated with tunnelling activities. Much of the site preparation work at the Northcote Street civil and tunnel site would have already been carried out as part of the M4 East construction including the acoustic shed and initial stage of the construction access tunnel. This would reduce the potential impacts from earthworks and construction activities for the proposed modification. Demolition works would still occur at the Parramatta Road West and East civil sites as well as the construction of a temporary overhead pedestrian walkway between the two sites.

Overall significance of risk

As described in the section below, the environmental managements summarised in Part E of the SPIR are considered to be sufficient to manage the potential air quality impacts associated with the construction of the project.

Given the application of these measures, construction dust is unlikely to represent a serious ongoing problem. Any impacts would be relatively short in duration, and may only arise during dry weather with the wind blowing towards a receptor, at a time when dust is being generated and mitigation measures are not being fully effective. The potential air quality impacts associated with proposed modification would therefore be ‘not significant’, which is consistent with the assessment in the EIS.

Management measures and conditions of approval

Based on the assessment of potential air quality impacts associated with the proposed modification, no further environmental management measures are deemed necessary beyond those summarised in Part E of the SPIR.

The proposed modification would not require the modification of the conditions of approval for the project related to air quality impacts for construction activities at Haberfield and Ashfield.

6.3.3 Noise and vibration

Assessment methodology

An assessment of the potential noise and vibration impacts associated with the proposed modification was carried out and is included in **Appendix C** (Noise and vibration report). This section summarises the assessment for potential noise and vibration impacts associated with the use of Northcote Street civil and tunnel site, including the construction of the access tunnel and proposed spoil haulage routes.

The approach taken in assessing potential noise and vibration impacts from the proposed modification matches the approach taken in the EIS for the approved project. This approach involves:

- Identifying and classifying the sensitive receivers
- Characterising the existing noise environment based on attended and unattended noise measurements at nearby receiver locations
- Determining noise and vibration management levels in accordance with relevant guidelines
- Modelling to quantify the potential construction noise and vibration impacts from the construction activities for the proposed modification
- Identifying the potential changes to the impacts from the approved project and assessing the significant of potential impacts identified
- Preparing and documenting any changes to the mitigation measures identified for the approved project that would be implemented during construction.

Roads and Maritime *Construction Noise and Vibration Guideline*, August 2016 (CNVG) outlines Roads and Maritime's approach to assessing and mitigating construction noise. This guideline and other relevant guidelines have been used to assess potential noise and vibration impacts.

The Noise Catchment Areas (NCAs) described in the EIS at Haberfield and Ashfield have been used for this assessment. The NCAs are described in **Table 6-23** and shown in **Figure 6-3**.

Table 6-23 Noise catchment areas and surrounding land uses

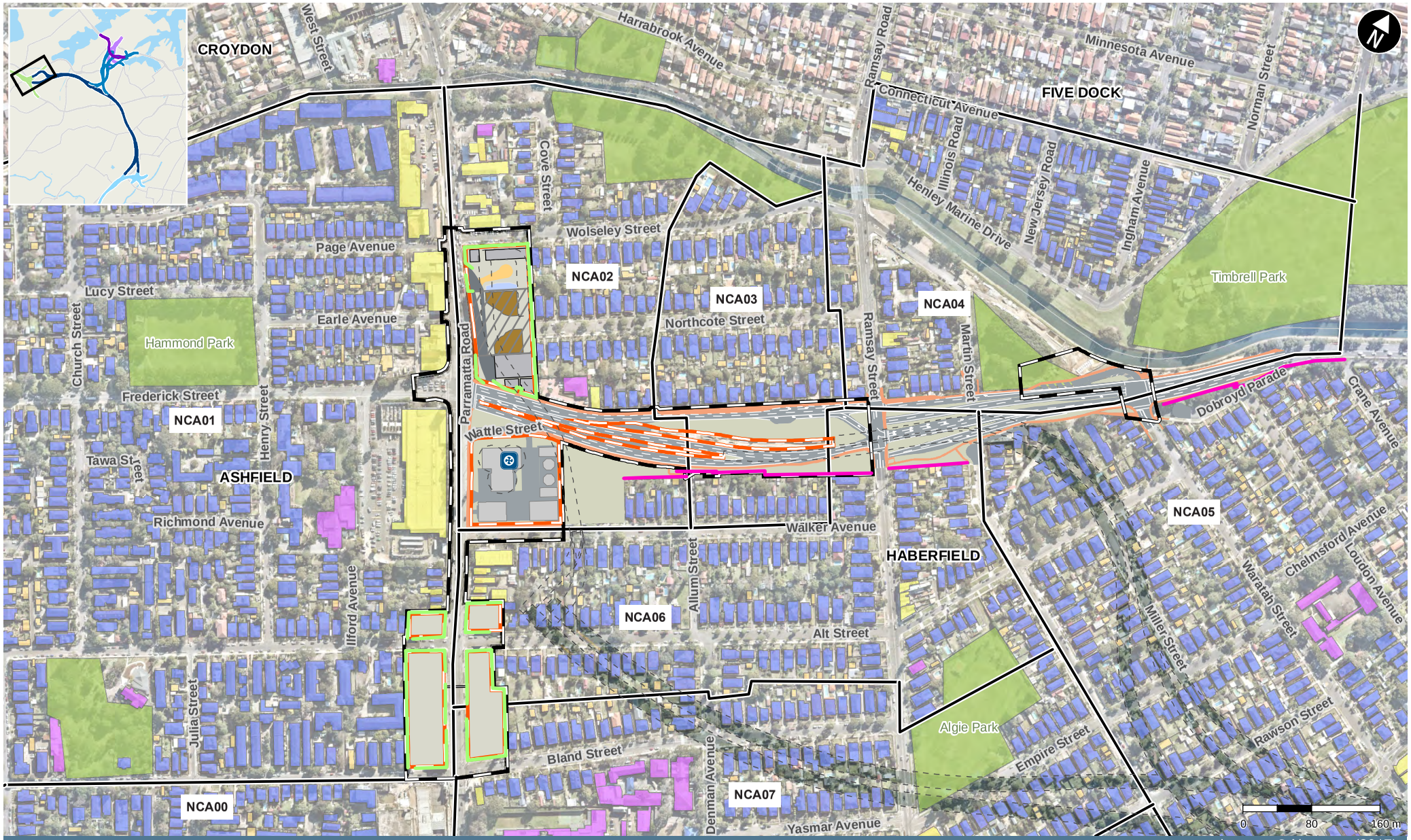
NCA description		
Name	**Minimum distance (metres)[1]**	**Description**
Haberfield and Ashfield		
NCA00	40	West of Parramatta Road between Bland Street and Orpington Street. Land use consists of residential receivers.
NCA01	<5	West of Parramatta Road between Iron Cove Creek and Bland Street. Land use comprises of a mix of residential receivers, special use facilities, active and passive recreation areas and commercial receivers fronting Parramatta Road.
NCA02	<5	East of Parramatta Road between Henley Marine Drive and Walker Avenue. Land use comprises of a mix of residential and commercial receivers, a place of worship and a childcare centre.
NCA03	20	Catchment adjoins either side of Wattle Street between Ash Lane and Ramsay Street. Land use consists of residential receivers.
NCA04	30	Catchment area adjoins Ramsay Street and the northern side of Wattle Street. Land use consists of residential receivers, isolated commercial receivers and a passive recreational area.
NCA05	n/a[2]	South of Dobroyd Parade between Hawthorne Parade and Martin Street. Land use consists of residential receivers with isolated commercial receivers and educational facilities.

NCA description		
Name	**Minimum distance (metres)[1]**	**Description**
NCA06	<5	East of Parramatta Road between Walker Avenue and Alt Street residences. Land use consists of residential and commercial receivers and an educational facility on Ramsay Street
NCA07	<5	East of Parramatta Road between Dalhousie Street and Bland Street residences. Land use comprises of a mix of residential and commercial facilities, other sensitives and active and passive recreation areas.

Notes:

1. Approximate minimum horizontal offset distance from the nearest receiver building facade (receiver of any type) to the nearest point that construction works are occurring
2. No surface works are proposed in this NCA. Receivers in this catchment would therefore only be potentially affected by impacts from tunnelling works during construction

The assessment of potential sleep disturbance impacts is consistent with the approach described in the EIS which included a night-time disturbance 'screening criterion' noise goal of RBL +15 dBA. The term 'sleep criterion' indicates a noise level that is intended as a guide to identify the likelihood of sleep disturbances.



M4-M5 Link

Boundaries
- Project footprint
- Ancillary facility
- NCA boundary

Surface construction
- Access road
- Acoustic shed
- Laydown and storage area
- Building
- Stockpile
- Site hoarding
- Noise wall

Underground construction
- Mainline tunnel
- Temporary access tunnel

Project facilities
- Ventilation facility

Receivers
- Residential
- Commercial
- Outdoor area
- Other receivers

Figure 6-3 NCA boundary map around Haberfield and Ashfield

Existing environment

The existing noise environment was described in Appendix J (Technical working paper: Noise and Vibration) of the M4-M5 Link EIS. **Table 6-24** provides the Residential Noise Management Levels (NMLs) applicable to the Haberfield and Ashfield area.

Table 6-24 Residential NMLs for the project

Representative monitoring location	Rating Background Level (RBL) dBA ICNG defined time periods1		
	Daytime period RBL	Evening period RBL	Night period RBL
1A Wattle St, Haberfield	58	58	52
141 Alt St, Haberfield	46	46	43
119 Alt St, Ashfield	46	46	38
35 Wattle St, Haberfield	58	55	44
259 Ramsay St, Haberfield	56	53	43
99 Charles St, Lilyfield	51	49	42

Assessment of potential impacts

Activities proposed at the Northcote Street civil and tunnel site have been considered in five noise scenarios (NS) to assess potential impacts. For each scenario the use of equipment has been identified, including numbers being used on site and the potential sound power level (dBA). **Table 6-25** details the sound power levels for construction equipment.

Table 6-25 Sound power levels for construction equipment

Noise scenario name	Scenario ID	Equipment (realistic worst case)	Worst case items in same location	Sound power level (dBA)		
				L_{WA}		L_{WAmax}
				Item	Activity[2]	Activity[2]
Site establishment – Northcote Street civil and tunnel site	NS-01	Flatbed truck	1	100	106	112
		Franna crane	1	99		
		Mobile crane	1	101		
		Semi-trailer	2	106		
		Hand tools	1	96		
Tunnelling works – Northcote Street civil and tunnel site	NS-02	Front end loader	2	112	117	119
		Underground trucks	2	113		
		Surface Haulage Trucks	4	110		
		Water treatment plant[1]	1	87		
		Ventilation fans[1]	1	89		
Tunnelling support activities – Northcote Street civil and tunnel site	NS-03	Concrete truck / agitator	2	106	106	112
		Hand tools	1	96		
		Franna crane	1	99		
		Bus	1	98		
		Forklift	1	101		
		Concrete pump	1	106		
Site decommissioning – Northcote Street civil and tunnel site	NS-04	Excavator	1	104	112	123
		Mobile crane	1	101		
		Semi trailer	1	106		
		Elevated working platform	1	97		
		Truck	1	97		
		Concrete saw	1	115		

Noise scenario name	Scenario ID	Equipment (realistic worst case)	Worst case items in same location	Sound power level (dBA)		
				L_{WA}		L_{WAmax}
				Item	Activity[2]	Activity[2]
Site establishment and decommissioning G-loop	NS-05	Concrete truck / agitator	1	103	112	123
		Mobile crane	1	101		
		Semi-trailer	1	106		
		Elevated working platform	1	97		
		Truck	1	97		
		Concrete saw	1	115		

Notes:

1. Equipment sound power levels are referenced from the M4-East Northcote Street tunnel site Construction Noise and Vibration Impact Statement (CNVIS) and are indicative only. Sound power levels of the finalised equipment may differ and are subject to detailed design
2. Activity sound power levels account for the amount of time an item of plant is anticipated to operate within each 15 minute period

For the purpose of the assessment, the existing M4 East tunnelling site arrangement at Northcote Street civil and tunnel site (with minor modifications) is used. The assessment prior to the consideration of additional mitigation takes account of the existing site hoardings and acoustic shed.

Predicted noise levels have been modelled for each NS in relation to the relevant NCAs. As a result of this modelling the predicted NML exceedances are summarised in **Table 6-26**.

Table 6-26 Overview of NML exceedances

Scenario ID	Activity	Weeks[1]	Activity duration compared to overall project program[2]	Number of receivers															
				Total	Highly noise affected[4]	NML exceedance receiver count[3]													
						Daytime			Daytime (out of hours)			Evening			Night-time			Sleep disturbance		
						1-10 dBA	11-20 dBA	>20 dBA	1-10 dBA	11-20 dBA	>20 dBA	1-10 dBA	11-20 dBA	>20 dBA	1-10 dBA	11-20 dBA	>20 dBA	1-10 dBA	11-20 dBA	>20 dBA
NS-01	Site establishment	24	25%	1747	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NS-02	Tunnelling	116	100%	1747	-	-	-	-	1	-	-	1	-	-	41	-	-	162	8	-
NS-03	Tunnelling support activities	116	100%	1747	-	-	-	-	2	-	-	2	-	-	71	1	-	35	-	
NS-04	Site decommissioning	52	25%	1747	-	5	-	-	-	-	-	-	-	-	-	-	-			
NS-05	G-loop establishment and decommissioning	10	6%	1747	-	6	-	-	31	-	-	43	2	-	196	22	-	225	31	-

Notes

1. Approximate overall duration of the activity in all areas of the site. The duration of these impacts is less than the overall duration, and depends on the rate of progress in the works areas
2. Approximate percentage (to nearest 13 per cent) of activity duration within overall proposal program. Where percentage is less than 13 per cent, 13 per cent is shown for illustrative purposes
3. Based on worst case noise works area (closest to receivers)
4. Based on ICNG definition (ie predicted LAeq(15minute) noise at residential receiver is 75 dBA or greater)

The NML exceedances summarised in **Table 6-26** above are described in more detail below.

Site establishment (NS-01) and decommissioning (NS-04)

During site establishment activities no exceedance of daytime NMLs are predicted. Construction activities would primarily be undertaken within the existing acoustic shed and upper parts of the existing construction access tunnel. No major surface earthworks required during site establishment.

Minor exceedances, of up to 10 dBA at five sensitive receivers are predicted during decommissioning (NS-04) during standard construction hours within NCA01 and NCA02. The exceedances are predicted to be related to the use of excavators and concrete saws.

Tunnelling activities (NS-02)

During tunnelling activities, exceedances of the night time airborne NMLs are predicted at residential receivers located to the west of the site (NCA01), with a maximum exceedance of 10 dBA predicted for up to three receivers). These exceedances are anticipated to be associated with opening in both the site hoarding and the acoustic shed to allow truck access and egress from the site.

Tunnelling support activities (NS-03)

For tunnelling support activities, NML exceedances of up to 15 dBA during night periods are predicted in NCA01 and NCA02. The worst case impacts may result in up to 15 dBA exceedance of NMLs during the night time period, at one receiver within NCA01. The majority of the receivers in this area would experience minor noise impacts. The exceedances are anticipated to be associated with the use of concrete pumps associated with concrete deliveries.

Construction of the G-loop (NS-05)

Some of the reconfiguration works to reinstate the G-loop may be carried out outside of standard construction hours to avoid impacts on the road network during busier periods. Moderate NML exceedances of up to 20 dBA are predicted for a scenario where a concrete saw is operating. Noise impacts are generally limited to receivers that are situated near to the G-loop within NCA04, NCA05 and NCA06. Out of hours works (OOHWs) are expected to be limited in duration as the extent of the reconfiguration works is minor. When the concrete saw is not operating it is estimated that the NML exceedances would generally reduce by up to 4 dBA.

Sleep disturbance

The sleep disturbance screening criterion is likely to be exceeded when night works associated with tunnelling (NS-02), tunnelling support activities (NS-03) and the construction of the G-loop (NS-05) are occurring adjacent to residential receivers.

The *Road Noise Policy* (RNP) provides the following guidance in relation to potential sleep disturbance awakening events:

- Maximum internal noise levels below 50-55 dBA are unlikely to awaken people from sleep
- One or two noise events per night, with maximum internal noise levels of 65-70 dBA, are not likely to affect health and wellbeing significantly.

The assessment has provided the potential maximum noise impacts for sleep disturbance, however it is noted that the ICNG only requires the project to consider maximum noise levels where construction works are planned to extend over more than two consecutive nights.

The project Construction Noise and Vibration Management Sub-Plan (CNVMP) will set parameters around how works outside standard daytime construction hours will be carried out, including timing and frequency, and the mitigation measures that will be implemented based on predicted impacts identified through location and activity specific assessments.

Consecutive construction impacts

It is recognised that mitigation measures aimed at short term works may be less effective where longer term impacts are apparent. Longer term impacts require additional consideration of reasonable and feasible management measures to minimise impacts on the community.

When evaluating the extent of noise impacts within the Haberfield area, it is noted that it would likely be subject to potential construction impacts from works associated with other infrastructure projects, including the approved M4 East project, currently under construction.

The impacts previously discussed considered the activity that would be carried out at Northcote Street civil and tunnel site in isolation, whereas the potential impacts from the identified consecutive projects are likely to be perceived to be longer for receivers near this site. The majority of highly noise intrusive works are anticipated to be associated with the M4 East project use of this site. The M4-M5 Link project use of this site is predicted to result in impacts (of a lesser degree) for similar receivers in the area.

The CNVMP to be prepared for the project will consider the longer term impacts and provide consideration of reasonable and feasible management measures to minimise impacts on the community. The measures will be consistent with the measures set out in the M4-M5 Link EIS, SPIR and the conditions of approval for the project, including condition E88.

Construction road traffic noise assessment

Traffic noise impacts have been assessed for the proposed spoil haulage routes identified for Northcote Street civil and tunnel site. The routes are described in **Chapter 4** (Proposed modification).

Table 6-27 presents the assessment of predicted increase in noise impacts along the modelled roads. The results of the construction road traffic noise assessment show that construction traffic is below the assessment criterion (2dB) which reflects only marginal forecast change in noise levels at receivers along the proposed routes. The predicted change in noise levels is less than 2dB along road during the daytime and night-time period.

Table 6-27 Construction road traffic noise assessment

Site	Vehicle type	Road	Predicted traffic noise increase (dBA)[1]	
			Daytime	Night-time
Northcote Street civil and tunnel site	Light & heavy	Parramatta Rd	<0.5	<0.5
		Wattle St	<0.5	<0.5
		Ramsay St / Rd	<0.5	1.6
		Fairlight St	<0.5	1.7
		Great North Rd	<0.5	1.5

When Route A (Ramsay Street) is in use, Ramsay Street and Great North Road are predicted to experience the greatest change in noise levels, with increase of 1.6 dB and 1.5 dB respectively forecast during the night-time period. Whilst the predicted increase is below 2 dB criterion, both of these road have relatively low volumes of heavy vehicles during night time periods. Individual pass-by maximum noise levels of project related spoil haulage trucks are therefore likely to be higher than traffic noise levels without construction during the night-time period.

When Route B (G-loop) is in use, construction traffic is unlikely to result in a noticeable increase in LAeq noise levels at receivers along Wattle Street/ Dobroyd Parade. Noise levels are predicted to increase by less than 0.5 dB during the daytime and night time periods.

Individual pass-by maximum noise levels of project related spoil haulage trucks are therefore likely to be higher than traffic noise levels without construction during the night-time period. The project should consider the potential impact from maximum noise levels that heavy vehicles may have on surrounding receivers along Ramsay Street, Fairlight Street and Great North Road when considering the routes for construction traffic during the night time period.

The G-loop is considered a construction site road for use by construction traffic only and as such noise emissions associated with its use would be assessed against construction noise management levels (NMLs). An assessment of the use of the G-loop was conducted a part of the WestConnex M4 East CNVIS for the Northcote Tunnel Support site (as it was named in the M4 East EIS).

The M4 East project assessed a maximum of 20 heavy vehicles egressing from the Northcote Street site per hour. It is forecast that eight vehicles per hour would egress from the site as a result of this modification. As such, impacts associated with the proposed use of the G-loop would be consistent with or less than the impacts for the M4 East project. As such no further assessment of noise impacts for the G-loop is required.

Ground-borne noise assessment

The construction of the access tunnel from Northcote Street civil and tunnel site to the mainline tunnel alignment has the potential to result in ground-borne noise impacts to nearby sensitive receivers. The ground-borne noise assessment is based on the worst case predicted internal ground-borne noise level when the tunnelling works are at their closest point below each sensitive receiver.

Table 6-28 summaries the maximum ground-borne noise levels associated with the construction of the access tunnel using road-headers and rock-breakers. It is assumed that tunnelling works will occur 24 hours a day, seven days a week.

Table 6-28 Worst case predicted ground-borne noise levels during tunnelling - Northcote Street construction access tunnel

NCA	Worst case ground-borne noise level at a residential receiver (dBA $L_{Aeq(15minute)}$)	Number of residential receivers where criteria are exceeded	Number of other sensitive receivers where criteria are exceeded	Number of commercial receivers where criteria are exceeded
Road-header tunnelling works				
NCA01	27	-	-	-
NCA02	33	-	-	-
NCA03	21	-	-	-
NCA06	32	-	-	-
NCA07	22	-	-	-
Rock-breaker tunnelling works				
NCA01	37	1	-	-
NCA02	49	8	1	-
NCA03	23	-	-	-
NCA06	47	28	-	-
NCA07	26	-	-	-

During road header tunnelling works, the worst case ground-borne noise levels are predicted to be compliant with the more stringent 35 dBA LAeq (15minute) night-time criterion at all sensitive receivers which are potentially affected by ground-borne noise from road-header tunnelling works.

During rock-breaker tunnelling works, the worst case ground-borne noise levels are predicted to exceed the 35 dBA LAeq (15 minute) night-time criterion at up to 38 sensitive receivers in NCA01, NCA02, and NCA06. Ground-borne noise levels are predicted to exceed the night-time ground-borne noise levels by up to 14 dB during rock-breaking tunnelling works.

Ground-borne noise predictions are based on the nearest sensitive receivers above or adjacent to the proposed tunnel alignment. The ground-borne noise impacts would reduce for sensitive receivers offset horizontally from the access tunnel due to the increase slant distance. In addition, it is expected that a combination of road-headers and rock-breakers would be used during construction. The exceedances under the rock-breaker tunnelling works scenario are therefore conservative and impacts would be expected to be less than those predicted.

Cumulative noise impacts

Concurrent noise impacts can occur where more than one works activity occurs at the same time and in the same location such that an individual receiver is potentially impacted by noise from more than one element of works. A scenario where construction equipment operates concurrently has been modelled for the Northcote Street civil and tunnel site and for the Parramatta Road pedestrian walkway.

Cumulative noise impacts associated with the operation of multiple construction ancillary facilities in proximity to each other such as the Northcote Street and Wattle Street civil and tunnel sites or the Parramatta Road West and East civil sites are considered unlikely to occur given the following:

- The noise impacts at each site would be localised to receivers in close proximity to each construction site
- The separation distances and noise attenuation between the sites
- The location of the sites adjacent to heavily trafficked major roads such as Wattle Street and Parramatta Road which dominate the ambient noise environment
- The conditions of approval for the project which require each construction ancillary facility to operate within applicable noise management levels particularly during the more sensitive out of hours periods.

As per all construction works associated with the M4-M5 Link project, the construction ancillary facilities around Haberfield and Ashfield will operate in accordance with the project conditions of approval.

Management measures and conditions of approval

Based on the assessment of potential noise and vibration impacts associated with the proposed modification, no further environmental management measures are deemed necessary beyond those summarised in Part E of the SPIR.

The proposed modification would not require the modification of the conditions of approval for noise and vibration at the Northcote Street civil and tunnel site.

6.3.4 Surface water, flooding and drainage

Assessment methodology

An assessment of flooding and drainage impacts during construction for the Northcote Street civil and tunnel site is provided in **Appendix E** (Surface water and flooding report) and included:

- An assessment of flooding conditions and potential impacts based on a review of the relevant sections of the M4-M5 Link EIS, M4 East EIS and the M4 East detailed design
- An assessment of whether surface water can be adequately managed by the environmental management measures stipulated within the M4-M5 Link EIS and SPIR.

Existing environment

The assessment of potential surface water and flooding impacts associated with the proposed modification has assumed that the existing environment conditions at each of the assessed locations are consistent with those set out in Appendix Q (Technical Working Paper: Surface water and flooding) of the EIS.

The Northcote Street civil and tunnel site is located within the Dobroyd Canal catchment. Construction discharges would ultimately drain to Dobroyd Canal.

Assessment of potential impacts

Flooding

Given the Northcote Street civil and tunnel site is located outside the Probable Maximum Flood (PMF) extent for mainstream flooding and overland flow, no flood impacts on adjacent properties are anticipated and the entrance to the tunnel dive would be suitably located outside the PMF flood extent.

The G-loop at Reg Coady Reserve is affected by flooding during a 100 year ARI event. The G-loop was assessed during the M4 East EIS to potentially cause localised increases of up to 200 millimetres in the depth of inundation in Dobroyd Parade at Martin Street. Increases in the range of 10 to 20 millimetres were also assessed to extend into the Sydney Water pump station on the corner of Dobroyd Parade and Martin Street. The M4 East EIS identified that impacts could be mitigated by the provision of local bunding to direct overland flow along the G-loop road and around the Sydney Water pump station.

The temporary flood mitigation measures and temporary drainage associated with the existing G-loop for the M4 East would be reinstated in generally the same form after reconfiguration works for the modification. At the end of construction the G-loop would be decommissioned and adjoining roads would be reinstated in accordance with the M4 East detailed design. As such, no permanent impact to existing flooding conditions is likely to occur.

Temporary impacts during construction would be considered during detailed design and construction planning phases in accordance with the mitigation measures set out in the EIS, SPIR and conditions of approval including the preparation of a Flood Mitigation Strategy (as described in the EIS) which would include details and procedures to manage the risk of adverse flood impacts on surrounding properties.

Localised drainage

All construction works would have the potential to impact local overland flow paths and existing minor drainage paths. Disruption of existing flow mechanisms, both of constructed drainage systems or those of overland flow paths, could occur as a consequence of the various construction activities and facilities. Existing drainage systems at the site have been established by the M4 East project.

These are typical impacts faced on most construction projects and can be addressed by adopting industry standard mitigation measures. Consideration of these impacts would be included during future detailed design and construction planning phases.

Water quality and geomorphology

Construction wastewater (including groundwater ingress, rainfall runoff in tunnel portals and ventilation shafts, heat and dust suppression water and wash down runoff) discharges from the Northcote civil and tunnel site would be approximately 1,100 kilolitres per day (refer to **section 6.3.10** for further information). Intermittent surface water (surface water runoff from roof/paved surfaces) discharges would also occur. Given the minor discharge volumes occurring in the context of the overall catchment and concrete channel receiving environment of Dobroyd Canal, the potential for scour and erosion to occur is considered to be negligible.

With the proposed environmental management measures as described in Part E of the SPIR in place, impacts on water quality are considered to be negligible.

Management measures and conditions of approval

Based on the assessment of potential surface water, flooding and drainage impacts associated with the proposed modification, no further environmental management measures are deemed necessary beyond those summarised in Part E of the SPIR.

The proposed modification would not require the modification of the conditions of approval for the project related to surface water, flooding and drainage impacts at the Northcote Street civil and tunnel site.