WestConnex M4-M5 Link

Mainline Tunnel

Modification report

Appendix D

Air quality report

WESTCONNEX M4-M5 LINK

Mainline Tunnel – Modification report

Appendix D Air quality report

SEPTEMBER 2018

This document cover is to be replaced with a Roads and Maritime Services approved document cover. Refer to Roads and Maritime Services Visual Identity Manual.

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Roads and Maritime Services

WestConnex M4-M5 Link

Mainline Tunnel – Modification report

Appendix D Air quality report

September 2018

Prepared for

Roads and Maritime Services

Prepared by

ERM Australia Pacific Pty Ltd

Contents

Executive summary

Construction design and planning for the M4-M5 Link between the M4 East Motorway at Haberfield and the New M5 Motorway at St Peters has progressed since the assessment in the M4-M5 Link Environmental Impact Statement (EIS) and the Submissions and Preferred Infrastructure Report (SPIR). A review of the concept design for the approved project has also occurred and, as a result, the proponent has further optimised the construction site arrangements assessed in the EIS and SPIR.

Proposed modifications

The proposed modification relates to Stage 1 of the approved project. The following points provide an overview of the proposed modification:

- The Northcote Street civil site (C3a) would become a civil and tunnel site. This would result in 24 hours, seven days a week tunnelling works being carried out from this location within an existing acoustic shed. The Northcote Street site is being used for tunnelling as part of the M4 East project. A construction access tunnel is to be provided from the Northcote Street site that utilises part of the existing access tunnel for the M4 East project. Proposed spoil haulage routes to and from this site are identified in this traffic and transport assessment. Relevant conditions of the project approval would apply to the use of this site for tunnelling and civil works to ensure potential impacts are managed consistently with the project approval
- The Parramatta Road West and Parramatta Road East civil sites (C1b and C3b) would be used as civil sites in accordance with condition of approval C19 and other conditions of the project approval. 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. No tunnelling, tunnel spoil handling or tunnel spoil stockpiling and haulage would occur at these sites
- A temporary pedestrian walkway would be constructed above Parramatta Road to connect the Parramatta Road East and Parramatta Road West civil sites. The pedestrian walkway would only be available for use by project staff during the construction phase of the project and would not be available for public use. The pedestrian walkway would be demobilised upon completion of the construction phase of the project
- Removal of the Darley Road civil and tunnel site (C4) from the project. No construction activities or permanent operational infrastructure would be provided at this location. The EIS provided for construction spoil to be removed from the Darley Road site. This spoil would now be removed from other tunnelling sites
- The relocation of the operational water treatment plant from the Darley Road motorway operations complex (as described in the EIS) to the Campbell Road motorway operations complex at the St Peters interchange.

Air quality impacts

The purpose of this construction air quality assessment is to support the environmental assessment for the modification by assessing and reporting potential construction impacts in relation to air quality. Management and mitigation measures have also been considered and recommended for implementation where appropriate.

The assessment determined that without mitigation measures the risk of dust impacts due to construction activities was ‘medium’ to ‘high’. If the identified mitigation measures are included in the relevant air quality management plans, construction dust is unlikely to represent a serious ongoing problem. Any effects would be temporary and relatively short in duration in the context of the total duration of the project, and their likely scale would not normally be considered sufficient to change the conclusion that with mitigation the effects would be ‘not significant’.

No additional management or mitigation measures beyond those set out in the EIS and SPIR, or conditions of approval for the project are required as a result of the proposed modification.

1 Introduction

Approval for the construction and operation of the M4-M5 Link project was granted on 17 April 2018 by the NSW Minister for Planning (application number SSI 7485).

Construction design and planning has progressed since the assessment contained in the Environmental Impact Statement (EIS) and the Submissions and Preferred Infrastructure Report (SPIR) and a review of the concept design for the approved project has occurred. As a result, 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 main changes include the removal of the Darley Road civil and tunnel site for the project and changes to some of the construction ancillary facilities as summarised in **Table 1-1** and described in **section 1.2** below.

Table 1-1 Change to construction ancillary facilities at Haberfield, Ashfield and Leichhardt

EIS and SPIR	Proposed modification
Wattle Street civil and tunnel site (C1a)	No change
Haberfield civil site (C2a/C2b)[1]	No change
Northcote Street civil site (C3a)	Northcote Street civil and tunnel site Includes tunnelling, spoil handling and spoil haulage from this site
Parramatta Road West civil and tunnel site (C1b)	Parramatta Road West civil site[2] Inclusion of a temporary pedestrian walkway above Parramatta Road to link to the Parramatta Road East civil site.
Parramatta Road East civil site (C3b)	Parramatta Road East civil site[2] Inclusion of a temporary pedestrian walkway above Parramatta Road to link to the Parramatta Road West civil site.
Darley Road civil and tunnel site (C4)	Removal of site

Notes

1: The use and footprint of this site was amended in sections B11.6.8 and C6.1.3 of the SPIR to be as per the arrangement for the Haberfield civil site (C2b).

2: Condition C19 allowed use of the site for parking and other works that do not exceed the 'noise affected' Noise Management Levels as identified in the ICNG.

Not all of the changes proposed can be accommodated within the existing project approval. As such it is necessary to seek a modification to the project approval in accordance with Section 5.25 of the EP&A Act.

1.1 Overview of M4-M5 Link project

The infrastructure approval provides for the construction and operation of the WestConnex M4-M5 Link project.

The EIS describes construction and operation of the M4-M5 Link in two stages:

Stage 1[1], as described in the EIS included:

- Construction of the mainline tunnels between the M4 East Motorway at Haberfield and the New M5 Motorway at St Peters, stub tunnels to the Rozelle interchange (at the Inner West subsurface interchange) and ancillary infrastructure at the Darley Road motorway operations complex (MOC1) and Campbell Road motorway operations complex (MOC5)
- These works are anticipated to commence in 2018 with the mainline tunnel opening to traffic in 2022.

Stage 2[2] as described in the EIS, included:

- Construction of the Rozelle interchange and Iron Cove Link including connection to the stub tunnels at the Inner West subsurface interchange, connection to the surface road network at Lilyfield and Rozelle, and construction of tunnels, ramps and associated infrastructure as part of the Rozelle interchange to provide connections to the proposed future Western Harbour Tunnel and Beaches Link project. Ancillary infrastructure will be provided at Rozelle West motorway operations complex (MOC2), Rozelle East motorway operations complex (MOC3) and Iron Cove Link motorway operations complex (MOC4)
- Stage 2 works are expected to commence in 2019 with these components of the project opening to traffic in 2023.

The M4-M5 Link project is part of the WestConnex program of works that, together with the proposed future Sydney Gateway, would facilitate improved connections between western Sydney, Sydney Airport and Port Botany and south and south-west Sydney, as well as better connectivity between the important economic centres along Sydney's Global Economic Corridor and through local communities.

A more comprehensive overview of the M4-M5 Link project, as well as other aspects of the WestConnex program of works, is provided within the EIS and the Submissions and Preferred Infrastructure Report (SPIR).

1.2 Overview of modification

The proposed modification relates to Stage 1 of the approved project. The following points provide an overview of the proposed modification:

- The Northcote Street civil site (C3a) would become a civil and tunnel site. This would result in 24 hours, seven days a week tunnelling works being carried out from this location within an existing acoustic shed. The Northcote Street site is being used for tunnelling as part of the M4 East project. A construction access tunnel is to be provided from the Northcote Street site that utilises part of the existing access tunnel for the M4 East project. Proposed spoil haulage routes to and from this site are identified in this modification report. Relevant conditions of the project approval would apply to the use of this site for tunnelling and civil works to ensure potential impacts are managed consistently with the project approval

[1] M4-M5 Link Stage 1 (the mainline tunnels) is also commonly referred to as Stage 3A of the WestConnex program of works

[2] M4-M5 Link Stage 2 (the Rozelle interchange and Iron Cove Link) is also commonly referred to as Stage 3B of the WestConnex program of works

- The Parramatta Road West and Parramatta Road East civil sites (C1b and C3b) would be used as civil sites in accordance with condition of approval C19 and other conditions of the project approval. 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. No tunnelling, tunnel spoil handling or tunnel spoil stockpiling and haulage would occur at these sites
- A temporary pedestrian walkway would be constructed above Parramatta Road to connect the Parramatta Road East and Parramatta Road West civil sites. The pedestrian walkway would only be available for use by project staff during the construction phase of the project and would not be available for public use. The pedestrian walkway would be demobilised upon completion of the construction phase of the project
- Removal of the Darley Road civil and tunnel site (C4) from the project. No construction activities or permanent operational infrastructure would be provided at this location. The EIS provided for construction spoil to be removed from the Darley Road site. This spoil would now be removed from other tunnelling sites
- The relocation of the operational water treatment plant from the Darley Road motorway operations complex (as described in the EIS) to the Campbell Road motorway operations complex at the St Peters interchange.

Section 2 provides a more detailed overview of the proposed modification to the project. **Figure 4-1** shows the study area for this assessment.

The proposed modification would require changes to the conditions of the project approval. Proposed changes to the project approval are detailed in Chapter 7 (Conditions of approval) of the modification report.

Site establishment works (in accordance with an approved Site Establishment Management Plan) and/or construction works (in accordance with an approved Construction Environmental Management Plan) are proposed at a number of the project construction sites and will be carried out in accordance with the existing conditions of approval for the project.

The scope of this assessment of potential air quality impacts during construction is focused on the proposed change in use of the Northcote Street and Parramatta Road East and West construction ancillary facilities. The likely air quality impacts during construction associated with the other aspects of the proposed modification have been determined to be negligible and have therefore not been considered further as part of this assessment.

1.3 Purpose of this report

The purpose of this report is to identify dust generating activities related to the proposed change in use of the construction ancillary facilities in Haberfield and Ashfield proposed as part of this modification and to assess the likelihood of these resulting in impacts at the nearest sensitive receptors. A number of management and mitigation measures are also noted to minimise the risk of these impacts.

1.4 Structure of this report

This report has been structured as follows:

- **Chapter 2** presents an overview of the modification to the approved project
- **Chapter 3** presents the assessment methodology that was used
- **Chapter 4** considers the potential impacts associated with construction activities
- **Chapter 5** documents management measures that are proposed to mitigate impacts.

2 Key aspects of the proposed modification relevant to this assessment

2.1 Change of use at the Northcote Street civil and tunnel site

The Northcote Street site is located between Wattle Street and Wolseley Street at Haberfield. The site is currently being used as a tunnelling site for the M4 East project and was approved for use as a civil site during construction of the M4-M5 Link project.

The Northcote Street site is proposed to be used as a civil and tunnel site for the project. Once construction works for the M4 East project are completed at this site, the site would be altered to make it suitable for use by the M4-M5 Link project. Existing construction infrastructure that is currently being used for the M4 East project would, where required, be retained and used for the project. This includes hoarding, offices, access gates, noise walls, the acoustic shed structure and part of the construction access tunnel.

2.1.1 Site layout

The proposed site layout is provided in **Figure 2-1**. Key elements that would be consistent with the existing layout for the M4 East project include the vehicle entry and exit locations, the acoustic shed and the entry to the temporary access tunnel. Infrastructure not required for construction of the M4-M5 Link project would be removed from the site. The final layout for this site would be confirmed during detailed design and detailed in the approved Site Establishment Management Plan (SEMP) and/ or approved Construction Environmental Management Plan (CEMP).

2.1.2 Operating hours

Construction activities would operate 24 hours a day, seven days a week at the Northcote Street civil and tunnel site. Activities would predominately include tunnelling, spoil handling and spoil haulage and the delivery of shotcrete and concrete and general construction vehicles. The proposed hours of operation would be consistent with the operating hours used by the M4 East project at this site.

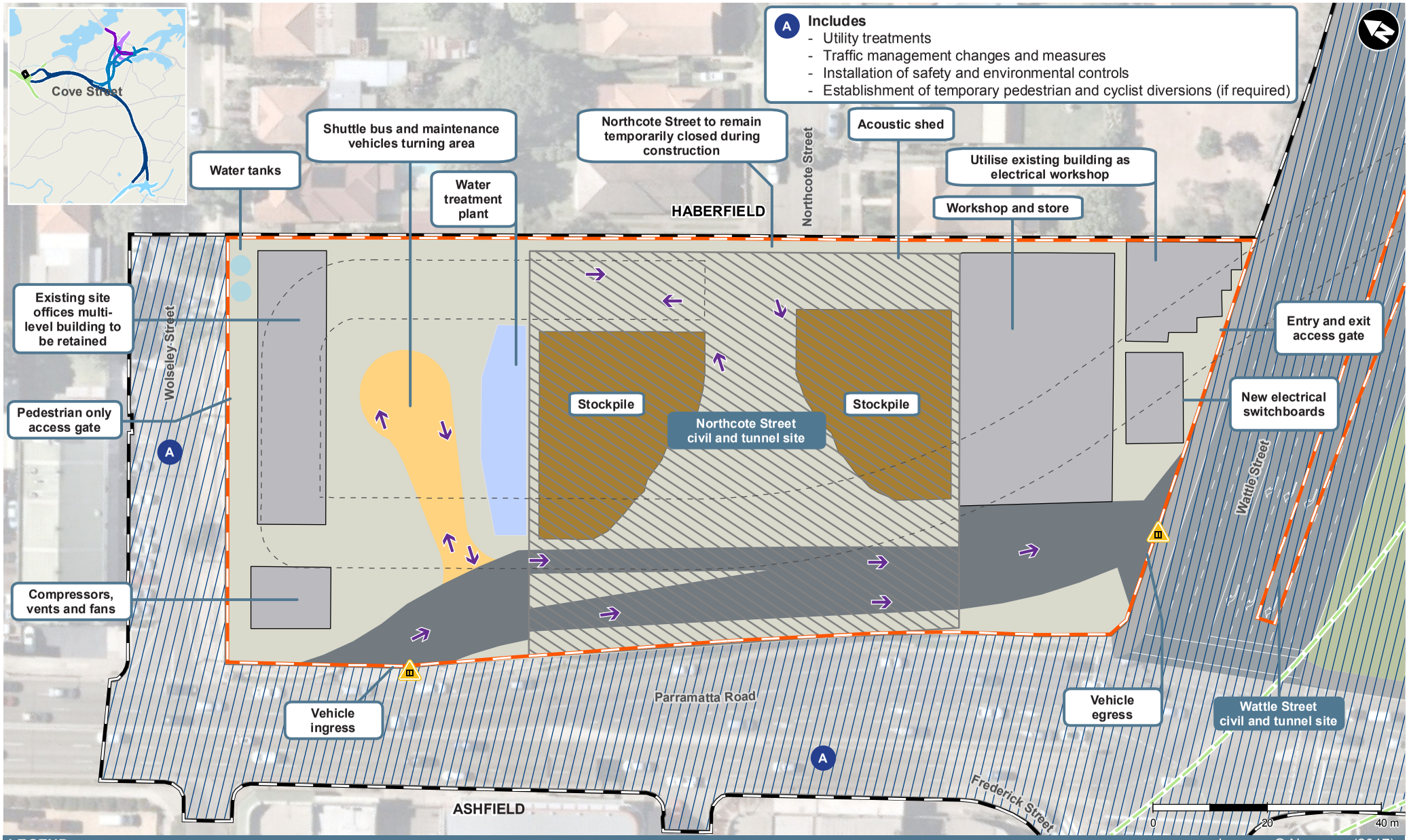


Figure 2-1 Indicative Northcote Street civil and tunnel site layout

2.1.3 Construction access tunnel

The existing construction access tunnel located at the northern end of the site would be altered to meet the needs of the M4-M5 Link project. At present the access tunnel heads west under Parramatta Road to join the M4 East mainline tunnel. On completion of the M4 East project, demobilisation would occur, with some elements being retained for the M4-M5 Link project. Part of the existing M4 East access tunnel would be retained and blocked off adjacent to the eastern side of Parramatta Road. This would enable construction of the M4-M5 Link access tunnel.

For the M4-M5 Link project, the new construction access tunnel would head generally in a south eastern direction beneath Wattle Street, to the north of the Haberfield civil site and beneath a small number of residential properties in Walker Avenue and Alt Street to connect with the M4-M5 Link mainline tunnels. This route has been selected as it would provide the most direct route from the access tunnel to the M4-M5 Link mainline tunnels. The route avoids the M4 East Motorway tunnels and Parramatta Road ventilation facility and ventilation tunnels. **Figure 2-2** shows the indicative alignment of the access tunnel.

The access tunnel would have an average grade of around 14 per cent with a maximum depth of around 50 metres and would be around 430 metres in length. The access tunnel would connect to the mainline tunnels at around 30 metres below ground. The access tunnel would have an average width of 12 metres to allow two heavy construction vehicles to comfortably travel side by side in the access tunnel.

Two options are provided for how the construction access tunnel connects with the mainline tunnels. Both options would connect to the mainline tunnels under a small number of residential properties (less than 10 properties) situated between Walker Avenue and Alt Street. The point of connection between the two options is around 20 metres apart.

For the construction of the access tunnel, roadheaders would be used to cut the top heading with a roadheader, surface miner or excavators with breakers used to excavate the bench. To support the access tunnel, steel rock bolts, mesh and shotcrete would be used. Spoil would be removed by off road articulated trucks to the surface where it would be stockpiled in the acoustic shed until transported to a disposal or reuse site. Construction of the access tunnel would take around six months. Once construction works are complete the construction access tunnel would be backfilled.

Figure 2-2 Indicative alignment of construction access tunnel

2.1.4 Spoil haulage routes

Two spoil haulage routes have been assessed for Northcote Street civil and tunnel site. **Table 2-1** describes each route proposed for spoil haulage. **Figure 2-3** shows the proposed spoil haulage routes.

Table 2-1 Indicative spoil haulage routes for Northcote Street civil and tunnel site

Route	Indicative spoil haulage route
Route A	Entry: via Parramatta Road city bound and then left turn into the site
	Exit: via left turn from site onto Wattle Street, then left turn into Ramsay Street/ Road, then left turn into Fairlight Street, then left turn into Great North Road, then right turn into Parramatta Road
Route B	Entry: via Parramatta Road city bound and then left turn into the site
	Exit: via left turn from site onto Wattle Street, then left turn onto the dedicated temporary construction vehicle turning lane (known as the G-loop) at the intersection of Dobroyd Parade and Waratah Street within part of the Reg Coady Reserve. Right turn onto Wattle Street from truck turning facility toward M4 East Motorway tunnels or Parramatta Road. The G-loop has been used during the construction of the M4 East project.

Traffic signals are provided at intersections where vehicle turning is required for both Route A and Route B. All of the roads included in the proposed haulage routes are state roads managed by Roads and Maritime. Generally, all roads along the proposed routes have two traffic lanes in each direction with some on street parking and are heavily trafficked.

The G-loop at the intersection of Dobroyd Parade and Waratah Street was established in the M4 East project and would be utilised for the proposed Route B. M4 East construction traffic and public motorists are able to use the G-loop during construction of the M4 East project. The access to the G-loop for public motorists was provided because the construction of the M4 East project removed the ability to turn right into Waratah Street when travelling eastbound on Dobroyd Parade.

Minor changes would be required to the proposed intersection design at Dobroyd Parade and Waratah Street (after completion of the M4 East project at the end of Q1 2019) 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.

Use of the G-loop for the proposed modification would be restricted to M4-M5 Link construction vehicles. This restriction would be communicated through appropriate signage and line marking. Public motorists would not be able to use the G-loop. However, the completed M4 East project will provide a right turn lane from the M4 East eastbound lanes into Waratah Street at this location and a right turn lane from the Wattle Street eastbound lanes into Ramsay Street.

On completion of construction of the M4-M5 Link project, the G-loop infrastructure would be removed and that part of Reg Coady Reserve would be rehabilitated in accordance with the M4 East Residual Land Management Plan.

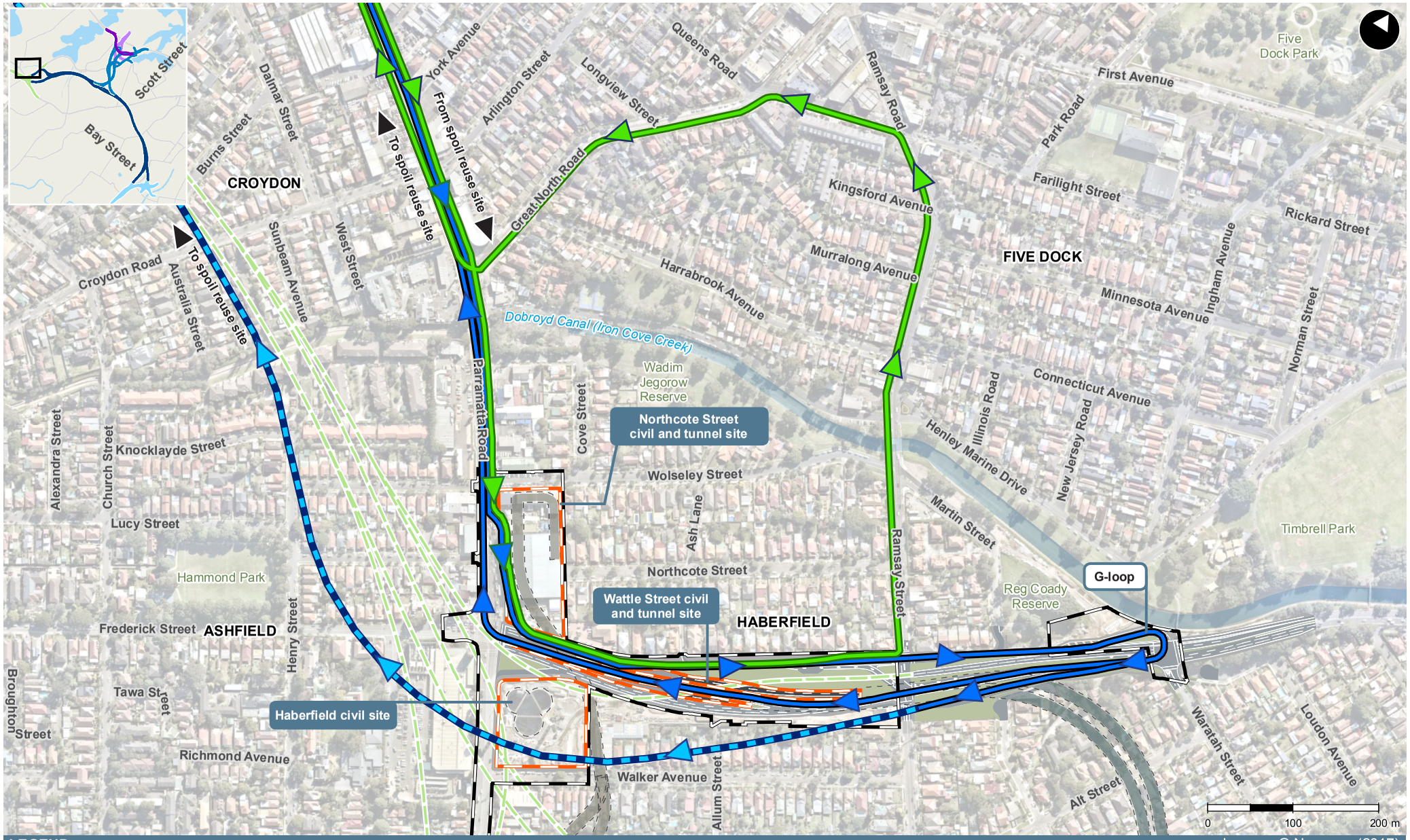


Figure 2-3 Northcote Street civil and tunnel site proposed spoil haulage routes

2.1.5 Car parking

Limited car parking would be provided at the Northcote Street civil and tunnel site due to space constraints. Car parking for the construction workforce would primarily be provided at the Parramatta Road West and Parramatta Road East civil sites with a total of around 200 spaces being provided at these two sites.

A shuttle bus would be provided to transport the majority of construction workforce to and from designated parking areas, which are anticipated to be predominantly at the Parramatta Road East and Parramatta Road West civil sites and the Northcote Street civil and tunnel site. Where possible, the workforce will be encouraged to walk between the Northcote Street, Parramatta Road and Wattle Street sites.

2.1.6 Program

An indicative program of works for the Northcote Street civil and tunnel site is shown in **Table 2-2**. The program shows that the construction activity at the Northcote Street site commences in Q2 2019 and continues through to end of Q1 2023. Once construction works are complete, construction facilities would be demobilised and the site would be rehabilitated in accordance with the M4 East Residual Land Management Plan. It is expected that Northcote Street would be reinstated, as provided for under the M4 East project approval.

Table 2-2 Indicative program of works - Northcote Street civil and tunnel site

Construction Activity	Indicative construction timeframe																							
	2018				2019				2020				2021				2022				2023			
Refurbishment and traffic management						■	■																	
Site establishment						■	■																	
Construct temporary access tunnel							■	■	■															
Tunnelling										■	■	■	■	■	■	■	■							
Civil and mechanical fitout											■	■	■	■	■	■	■	■						
Testing and commissioning																■	■	■	■	■				
Site demobilisation and rehabilitation																	■	■	■	■	■			

2.2 Parramatta Road West and Parramatta Road East civil sites

The Parramatta Road West and Parramatta Road 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 Parramatta Road 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 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 vehicles. 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 handling or tunnel spoil haulage would occur at these sites.

2.2.1 Site layout

The proposed indicative site layout for Parramatta Road West and Parramatta Road East civil sites is provided in **Figure 2-4**. The layout for the sites would be confirmed during detailed design and in the approved Site Establishment Management Plan (SEMP) and/or approved Construction Environmental Management Plan (CEMP).

Vehicle access points are provided for Parramatta Road West civil site from Parramatta Road, Bland Street (west of Parramatta Road) and Alt Street. The entry along Parramatta Road would only be accessible for westbound traffic with a left turn into the site. Exit onto Parramatta Road would be left turn out to travel westbound. Entry and exit points are proposed on Bland Street, west of Parramatta Road, and Alt Street to allow traffic to access between the sites or onto Parramatta Road.

The vehicle access point for Parramatta Road East civil site would be from Parramatta Road and Alt Street. Entry would be left turn in, only available for eastbound traffic. Exit would be left turn out to travel eastbound along Parramatta Road. Crossover would occur between sites on Alt Street. Vehicle access points would not be provided from Bland Street for this site.

It is proposed that the existing bus stop on the western side of Parramatta Road, north of the intersection with Bland Street, would be relocated to avoid conflict between buses and heavy vehicles attempting to access the nearby Parramatta Road West civil site. The bus stop would be moved to a new location around 150 metres to the north on Parramatta Road. The relocation of the bus stop would be subject to on-going consultation with Transport for NSW, Transit Services and other stakeholders and would be detailed in the Construction Traffic, Transport and Access Management Sub-Plan.

Table 2-3 provides indicative heavy and light vehicle numbers for Parramatta Road West Parramatta Road East civil site.

Table 2-3 Indicative construction vehicle numbers

Parramatta Road West and Parramatta Road East civil sites										
Site	**Daily Vehicles**		**AM peak hour**				**PM peak hour**			
	(one way)		**(7.30-8.30am)**				**(4.15-5.15pm)**			
	Heavy	**Light**	**Heavy vehicles**		**Light vehicles**		**Heavy vehicles**		**Light vehicles**	
			Arrive	**Depart**	**Arrive**	**Depart**	**Arrive**	**Depart**	**Arrive**	**Depart**
West	25	306	7	7	18	5	7	7	5	31
East	25	210	1	1	12	4	1	1	4	20

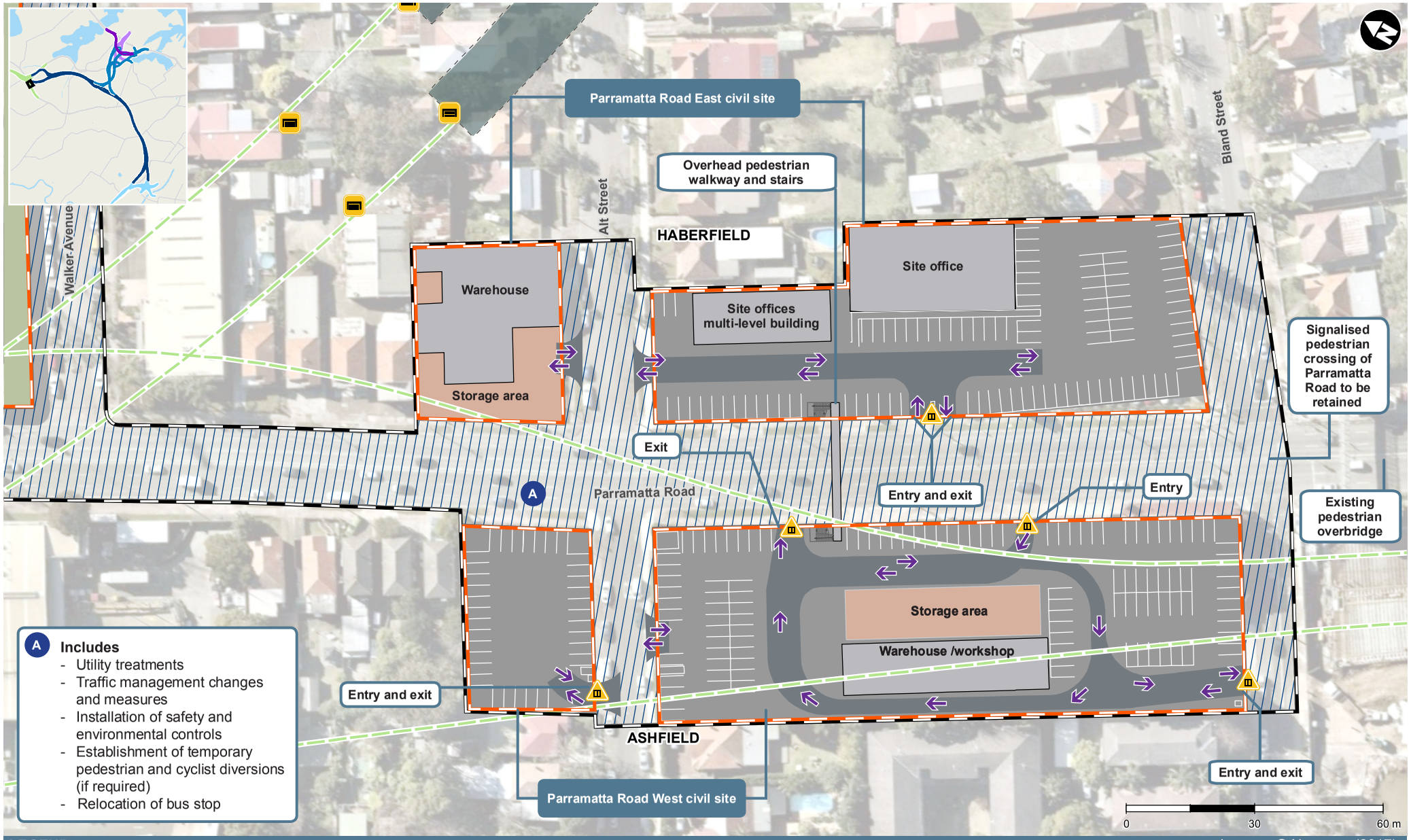


Figure 2-4 Indicative layout Parramatta Road West and Parramatta Road East civil sites

2.2.2 Operating hours

The Parramatta Road West and Parramatta Road East civil sites would be used 24 hours a day, seven days a week 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.

Site establishment works would generally occur during standard construction hours of 7.00 am to 6.00 pm Monday to Friday and 8.00 am to 6.00 pm on Saturdays (as permitted by conditions of approval E68 and E69) or as provided for in other conditions of approval and the project Environment Protection Licence (EPL).

2.2.3 Car parking

A total of around 200 car parking spaces would to be provided at the Parramatta Road West and Parramatta Road East civil sites for the construction workforce. The parking spaces would be used by construction workforce staff working at other project construction sites. A shuttle bus service would be provided to transport the majority of construction workforce to and from construction sites. Where possible the workforce would be encouraged to walk between sites. As required by condition of approval E54, a Construction Parking and Access Strategy would be prepared by the contractor to assist with managing parking demand for the project.

The site would also be used for heavy vehicle parking. The type of heavy vehicles likely to use the sites for parking would include rigid and articulated trucks dropping off or picking up materials or equipment from laydown areas, vehicles or equipment to be serviced at the workshop and short term layover of trucks across working shifts. No tunnel spoil trucks would use these sites.

2.2.4 Program

An indicative program of works for Parramatta Road West and Parramatta Road East civil sites is provided in **Table 2-4**. The construction program shows construction activities commencing in Q3 2018 and continuing through to the end of Q1 2023. Once construction activities are complete, construction facilities would be removed and the site would be rehabilitated in accordance with the Residual Land Management Plan for the project.

Table 2-4 Indicative program of works - Parramatta Road West and East civil sites

Construction Activity	Indicative construction timeframe																							
	2018				2019				2020				2021				2022				2023			
Site establishment and utility works			■	■	■	■																		
Site operations – offices, warehouse/storage, workshop and parking				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■						
Site demobilisation and rehabilitation																		■	■	■	■			

2.2.5 Parramatta Road West and Parramatta Road East civil sites – pedestrian walkway

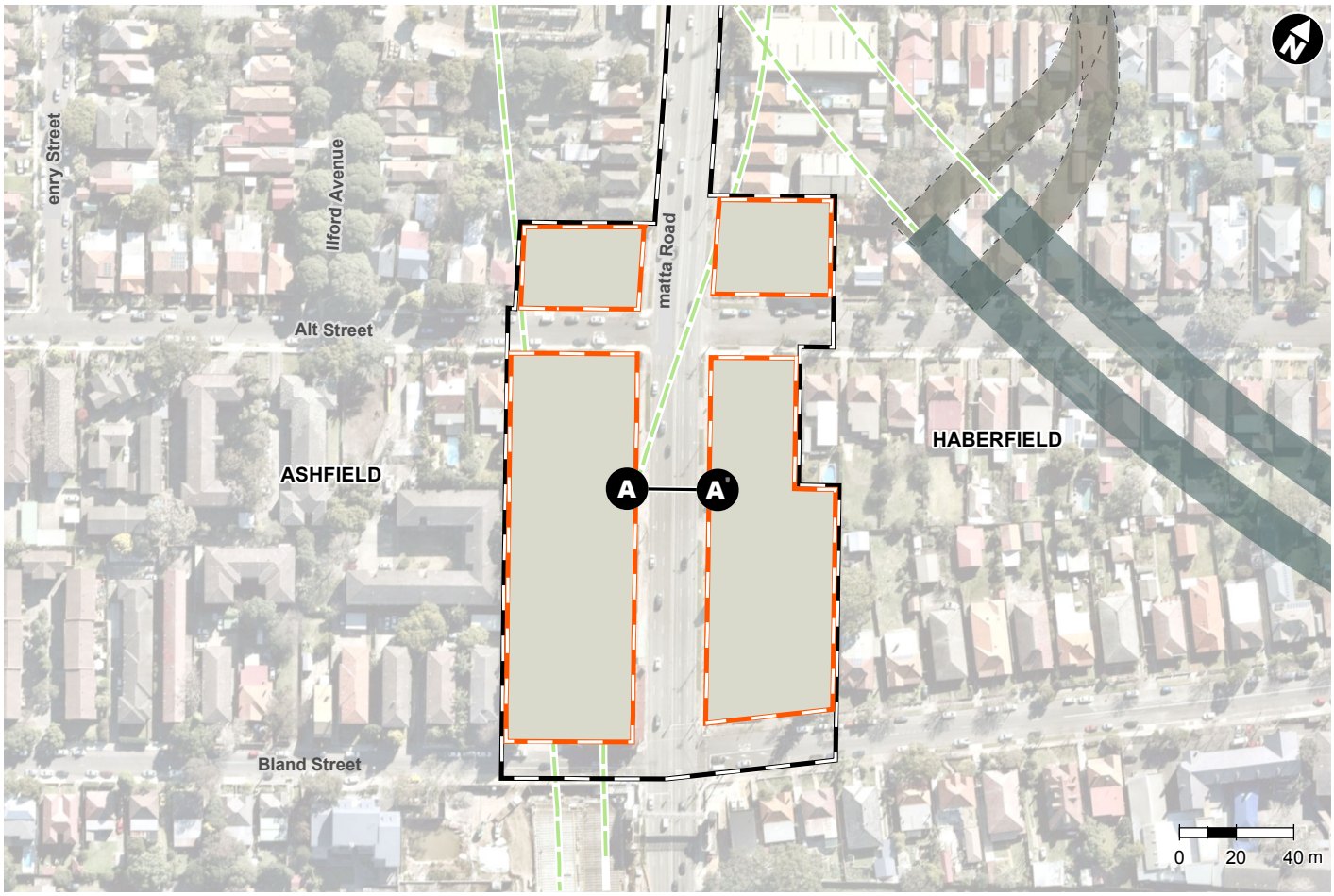
This modification proposes to link the Parramatta Road West and Parramatta Road East civil sites with a temporary overhead pedestrian walkway above Parramatta Road which would only be used by the construction workforce and would not be available for public use. Access to the walkway would be via stairs at either end located within the work sites. The pedestrian walkway is provided to allow the construction workforce to easily move between the two sites without the need to use the existing at-grade pedestrian crossing on Parramatta Road at the traffic signals.

The structure would provide sufficient clearance for vehicles travelling along Parramatta Road with the base of the walkway being around six metres above Parramatta Road. The Roads and Maritime Special Permits Unit are to be notified for the management of over height vehicle permits. The overall height of the walkway structure would extend to around 10 metres above Parramatta Road. Both the walkway and access towers would be enclosed to provide weather protection for users and enable use 24 hours a day, seven days a week. Lighting would be provided to allow the walkway to be used after daylight hours.

The bridge structure would be fabricated offsite in sections that are of suitable size for transportation to the site. The sections would be welded or bolted together at the Parramatta Road sites. The supporting steel towers would be assembled on site and mounted on concrete foundations to support the pedestrian walkway. The bridge would be a single span and would be lifted into position by a crane. Installation of the span would be carried out at night with full road closure of Parramatta Road and traffic detours provided. A Road Occupancy Licence from the TMC would be required for the installation of the pedestrian walkway, allowing for the temporary closure of Parramatta Road. Once the walkway span is in place the roof and deck would be installed.

The pedestrian walkway is expected to be in place from around late 2018 to the end of Q1 2023. Once construction works are complete, the pedestrian walkway would be removed following a similar process to that described above, but in reverse.

An indicative location and design of the overhead pedestrian walkway is shown in **Figure 2-5**.



Imagery © Nearmap (2017)

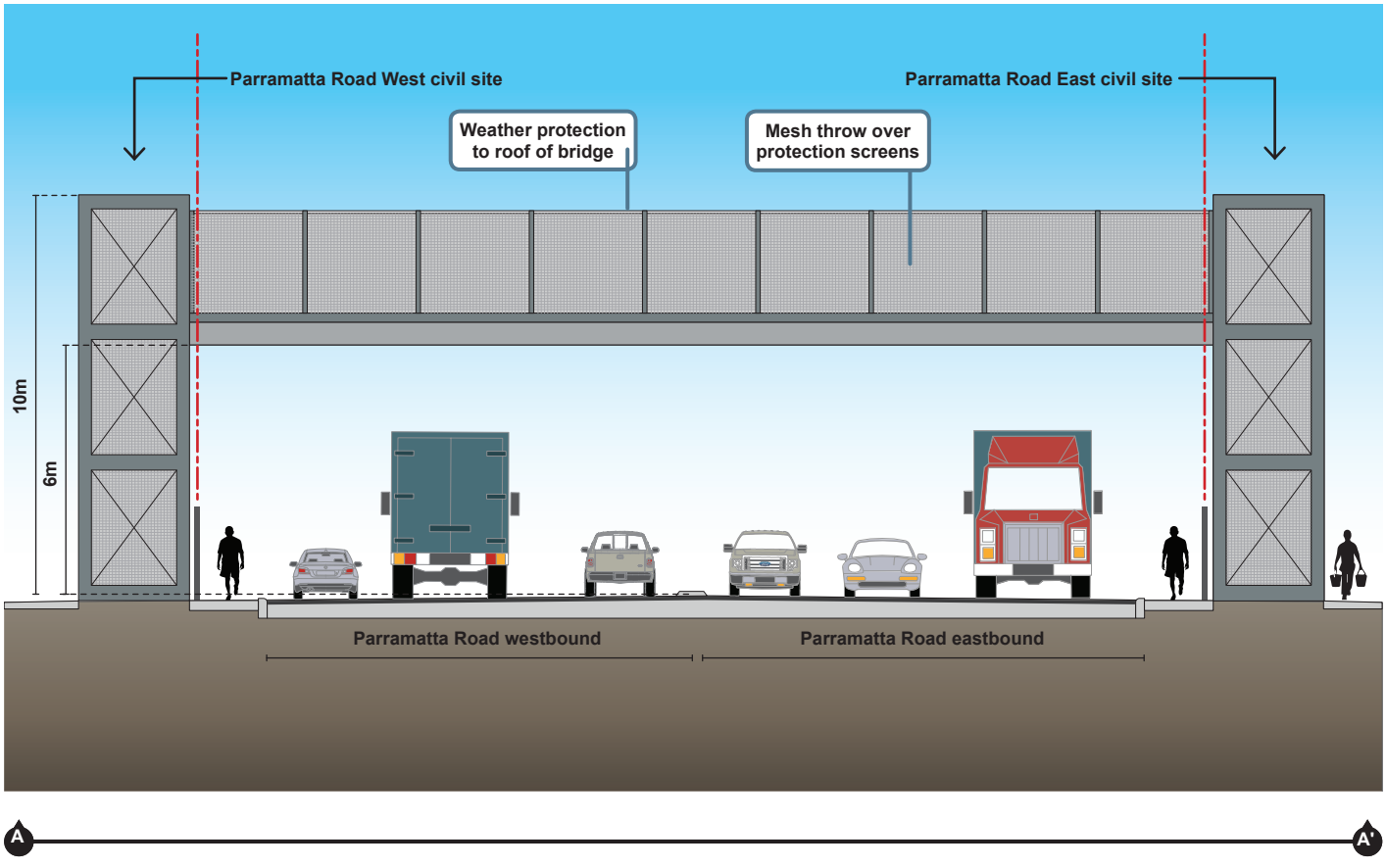


Figure 2-5 Indicative location and design of Parramatta Road West and Parramatta Road East overhead predestrian walkway

2.3 Removal of Darley Road site from project

The EIS identified the site as the Darley Road civil and tunnel site (C4) for the construction of the project and as the Darley Road motorway operations complex (MOC1) for the operation of the project.

Ongoing construction design and planning has determined that the Darley Road site is no longer required to support the construction and operation of the project.

2.3.1 Relocation of construction activities

Construction activities would not be carried out at the Darley Road civil and tunnel site. The construction activities proposed for Darley Road civil and tunnel site as described in the EIS 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 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.

2.3.2 Relocation of operational ancillary infrastructure

The EIS described that an operational water treatment plant and substation would be located at the Darley Road motorway operations complex. The removal of the Darley Road site from the project would result in the relocation of the operational water treatment plant to the Campbell Road motorway operations complex at St Peters interchange. The relocation of the operational water treatment plant is described in **section 2.4** below.

The permanent substation proposed at the Darley Road site in the EIS is no longer required. As described in the EIS, permanent power for Stage 1 of the M4-M5 link project would be supplied via the intake substation at the Campbell Road motorway operations complex at the St Peters interchange. Section 5.10.1 of the EIS and section 4.2.4 of Appendix F (Utilities Management Strategy) of the EIS provides further details on the proposed arrangements to provide electricity to the project.

The removal of the motorway operation complex from Darley Road would result in no permanent infrastructure for the project being located at this location.

2.4 Relocation of operational water treatment plant to St Peters

The proposed relocation of the operational water treatment plant to the Campbell Road motorway operations complex would result in the operational footprint of the motorway operations complex at St Peters being increased.

Figure 2-6 provides an indicative site layout for the Campbell Road motorway operations complex at St Peters interchange which includes an indicative location for the operational water treatment plant. The motorway operation complex is located on the cut and cover structure above the M4-M5 Link ramps at the St Peters interchange which is being constructed by the New M5 project and on land to the immediate east. The motorway operations complex as described in the EIS includes ventilation facilities and a substation. Additional land adjacent to, and to the immediate south east of the motorway operations complex would be required to accommodate the operational water treatment plant.

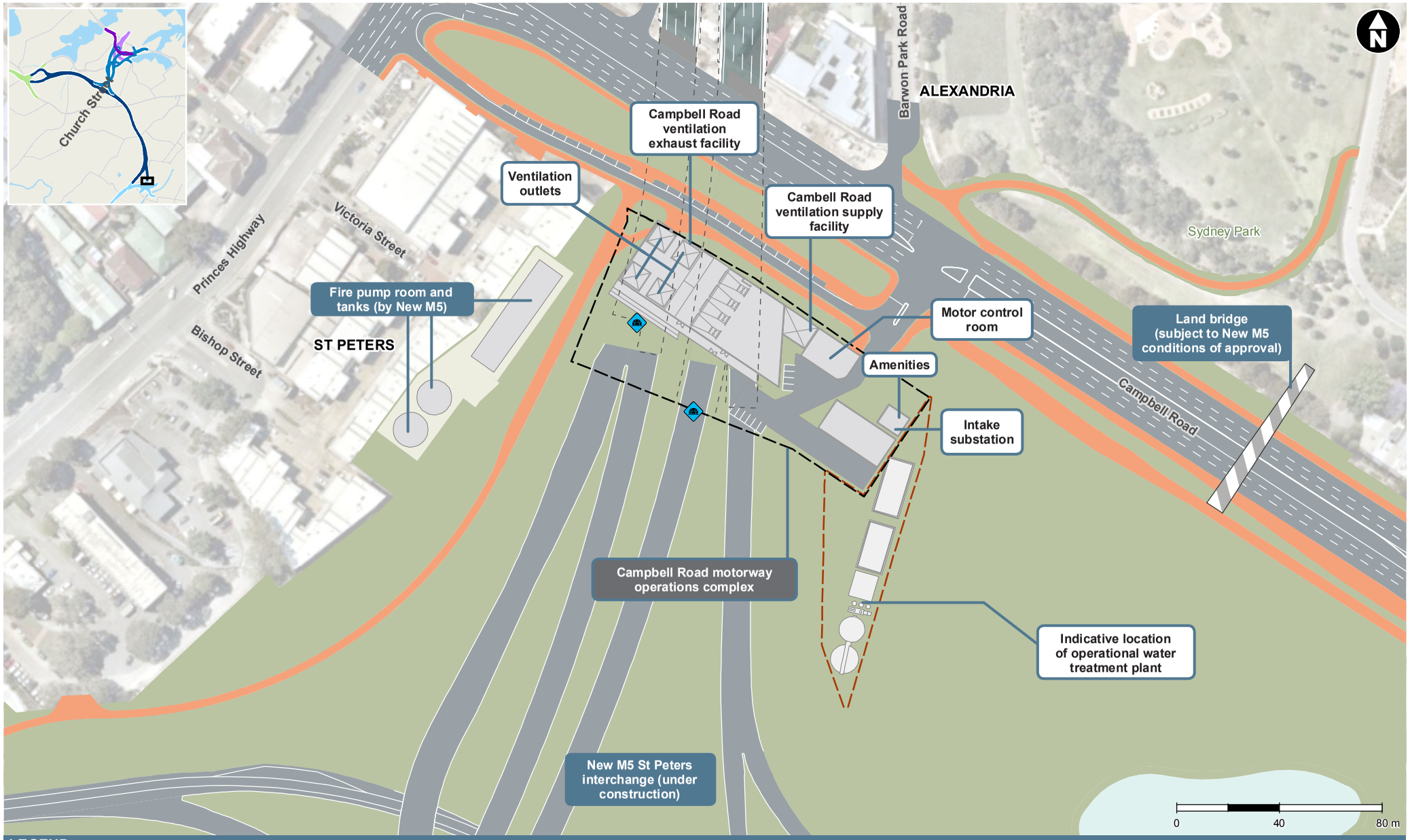


Figure 2-6 Indicative layout of the Campbell Road motorway operations complex

3 Assessment methodology

3.1 Background

This section deals with the potential impacts of the construction phase of the project. The main air pollution and amenity issues at construction sites are:

- Annoyance due to dust deposition (soiling of surfaces) and visible dust plumes
- Elevated PM_{10} concentrations due to dust-generating activities
- Exhaust emissions from diesel-powered construction equipment.

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 in this methodology. $PM_{2.5}$ emissions are more relevant as part of the operational assessment for the project.

Exhaust emissions from on-site plant and site traffic are unlikely to have a significant impact on local air quality, and in the majority of cases they would not need to be quantitatively assessed. Other potential impacts need to be considered on a site-by-site basis (IAQM, 2014). A wide range of demolition and construction equipment is likely to be used for the project and the associated infrastructure.

Dust emissions would occur during the preparation of the land (eg demolition and earth moving), bringing tunnelled spoil to the surface and loading activities within the sheds, and can vary substantially from day to day depending on the level of activity, the specific operations being undertaken, and the weather conditions. If dirt or mud is tracked onto public roads, dust emissions can occur at some distance from the construction site (IAQM, 2014).

The risk of dust impacts from a demolition/construction site causing loss of amenity and/or health or ecological impacts is related to the following:

- The nature of the activities being undertaken
- The duration of the activities
- The size of the site and area disturbed
- The meteorological conditions (wind speed, direction and rainfall). Adverse impacts are more likely to occur downwind of the site and during drier periods
- The proximity of receptors to the activities
- The sensitivity of the receptors to dust
- The adequacy of the mitigation measures applied to reduce or eliminate dust.

It is very difficult to quantify dust emissions from construction activities. Dust emissions can vary substantially from day to day depending on the level of activity, the operations being undertaken, and the local weather conditions (for example, depending on the amount of exposed surfaces and/or stockpiles during high wind events). While tunnelling itself would be ongoing for the length of the project, this would be carried out underground. With appropriate mitigation measures[3] underground and at the surface, this should not result in significant emissions at the surface. The assessment and control of construction-related air quality therefore focussed on identifying and managing risk, with a particular focus on the tunnelling support activities that would occur at the surface.

[3] This would include such things as mist sprays in acoustics sheds, regular sealed surface sweeping

The construction 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 project. The approach was also tailored according to the nature of the project (ie predominantly a tunnelling project). The assessment of potential air quality impacts during construction involved the following main steps:

- 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)
- The division of activities according to their different potential 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.

3.2 Overview of the method

The IAQM assessment procedure for assessing risk is shown in **Figure 3-1**. Professional judgement is required in some steps, and where justification cannot be given a precautionary approach should be adopted.

Activities on construction sites can be divided into four types to reflect their different potential impacts, and the potential for dust emissions is assessed for each activity that is likely to take place. These activities include the types of construction activities that would be carried out to support the project, including tunnelling support activities such as spoil management within construction ancillary facilities. These activities are:

- 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. A structure would include elements such as residential dwelling, office building, retail outlet and road
- Track-out. This involves the transport of dust and dirt by Heavy Duty Vehicles (HDVs) 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 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 PM_{10}
- Harm to ecological receptors.

The assessment is used to define appropriate mitigation measures to minimise the risk of any potential impacts.

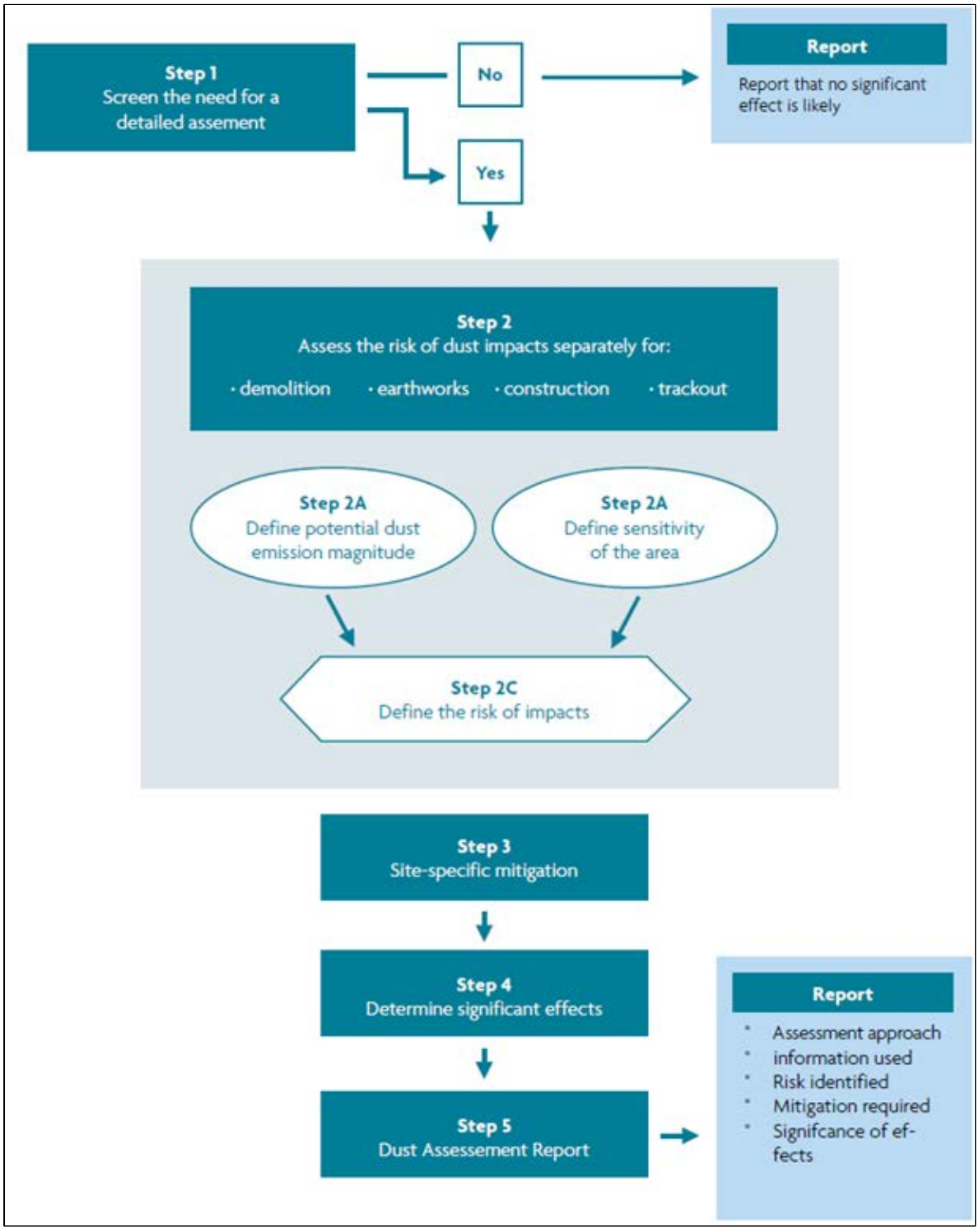


Figure 3-1 Steps in an assessment of construction dust (IAQM, 2014)

4 Potential impacts – construction

4.1 Step 1: Screening

Step 1 is a screening assessment. A construction dust assessment is normally required where:

- There are human receptors within 350 metres of the boundary of the site and/or within 50 metres of the route(s) used by construction vehicles on the public highway, up to 500 metres from the site entrance(s)
- There are ecological receptors within 50 metres of the boundary of the site and/or within 50 metres of the route(s) used by construction vehicles on the public highway, up to 500 metres from the site entrance(s).

In this screening stage the assessment area was assumed to be limited to the construction footprint boundary around Haberfield and Ashfield and includes the proposed change to construction activities at construction ancillary facilities set out in **section 2**. **Figure 4-1** shows that there are sensitive receptors within 350 metres of the boundaries of the construction footprint boundary at this location. A construction dust assessment is therefore required. There are no ecological receptors to consider.

A screening assessment was also carried out to assess whether the proposed changes at the Campbell Road motorway operations complex would change the construction dust risk assessment presented in Appendix I of the M4-M5 Link EIS (Technical working paper: Air quality) (see **Annexure A**). The screening assessment identified negligible change would be expected having regard to the assessment in the M4-M5 Link EIS and therefore no further assessment of this location has been carried out.

4.2 Step 2: Risk assessment

In Step 2, the risk of dust arising in sufficient quantities to cause annoyance and/or health effects has been determined for each of the four activities (demolition, earthworks, construction, and track-out). Risk categories were assigned to the site based on two factors:

- The scale and nature of the works, which determines the magnitude of potential dust emissions. This is assessed in Step 2A
- The sensitivity of the area. The proximity of sensitive receptors (ie the potential for effects). This is assessed in Step 2B.

These factors are combined in Step 2C to determine the risk of dust impacts. Risks are described in terms of there being a low, medium or high risk of dust impacts for each of the four separate potential activities. Where there is risk of an impact, then site-specific mitigation would be required in proportion to the level of risk.

Figure 4-1 Screening assessment – sensitive receptors near the Haberfield and Ashfield construction ancillary facilities

4.2.1 Step 2A: Potential for dust emissions

The criteria for assessing the potential scale of emissions based on the scale and nature of the works are shown in **Table 4-1**. Based on these criteria, the appropriate categories for the project are shaded in blue.

Table 4-1 Site categories (scale of works)

Type of activity	Site category Large	Medium	Small
Demolition	Building volume >50,000 m3, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >20 m above ground level.	Building volume 20,000–50,000m3, potentially dusty construction material, demolition activities 10-20 m above ground level.	Building volume <20,000 m3, construction material with low potential for dust release (e.g. metal cladding, timber), demolition activities <10 m above ground and during wetter months.
Earthworks	Site area >10,000 m2, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth-moving vehicles active at any one time, formation of bunds>8 m in height, total material moved >100,000 tonnes.	Site area 2,500-10,000 m2, moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4-8 m in height, total material moved 20,000-100,000 tonnes.	Site area <2,500 m2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4 m in height, total material moved <20,000 tonnes, earthworks during wetter months.
Construction	Total building volume >100,000 m3, piling, on site concrete batching; sandblasting	Building volume 25,000-100,000 m3, potentially dusty construction material (e.g. concrete), piling, on site concrete batching.	Total building volume <25,000 m3, construction material with low potential for dust release (e.g. metal cladding or timber).
Track-out	>50 HDV (>3.5t) OUTWARD movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100 m.	10-50 HDV (>3.5t) OUTWARD movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50–100 m.	<10 HDV (>3.5t) OUTWARD movements in any one day, surface material with low potential for dust release, unpaved road length <50 m.

4.2.2 Step 2B: Sensitivity of area

The sensitivity of the area takes account of the specific sensitivities of local receptors, the proximity and number of the receptors, and the local background PM_{10} concentration. Dust soiling and health impacts are treated separately.

Sensitivity of area to dust soiling effects on people and property

The criteria for determining the sensitivity of an area to dust soiling effects are shown in **Table 4-2**. Based on the IAQM guidance[4] the receptor sensitivity was assumed to be 'high'.

Table 4-2 Criteria for sensitivity of area to dust soiling effects

Receptor sensitivity	Number of receptors	Distance from source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

The number of receptors in each distance band was estimated from an aerial photograph of the construction footprint around Haberfield and Ashfield (see **Figure 4-1**). Exact counting of the number of 'human receptors' is not required by the IAQM guidance; instead it is recommended that judgement is used to determine the approximate number of receptors within each distance band. For receptors which are not dwellings, professional judgement should be used to determine the number of human receptors.

The estimated numbers of receptors for each scenario and activity, and the resulting outcomes are shown in **Table 4-3**.

Table 4-3 Results - sensitivity to dust soiling effects

Activity	Receptor sensitivity	Number of receptors by distance from source				Sensitivity of area
		<20 m	20-50 m	50-100 m	100-350 m	
Demolition	High	901	585	919	5,186	High
Earthwork	High	901	585	919	5,186	High
Constructi	High	901	585	919	5,186	High
Track-out	High	901	585	N/A	N/A	High

[4] Professional judgement is used to identify where on the spectrum between high and low sensitivity a receptor lies. High sensitivity receptors can reasonably expect enjoyment of a high level of amenity. The appearance, aesthetics or value of their properties would be diminished by soiling, and the people or properties would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. Indicative examples include dwellings, museums and other culturally important collections, medium and long term car parks and car showrooms.

Sensitivity of area to human health impacts

The criteria for determining the sensitivity of an area to human health impacts caused by construction dust are shown in **Table 4-4**. Based on the IAQM guidance[5] the receptor sensitivity was assumed to be 'high'. The estimated numbers of receptors for each scenario and activity, and the resulting outcomes are shown in **Table 4-5**.

Table 4-4 Criteria for sensitivity of area to health impacts

Receptor sensitivity	Annual mean PM_{10} conc. ($\mu g/m^3$)[(a)]	Number of receptors	Distance from source (m)				
			<20	<50	<100	<200	<350
High	>24	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	21-24	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	18-21	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<18	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	-	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

[5] The sensitivity of people to the health effects of PM_{10} is based on exposure to elevated concentrations over a 24-hour period. High sensitivity receptors relate to locations where members of the public are exposed over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day). Indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.

Table 4-5 Results - sensitivity to health impacts

Activity	Receptor sensitivity	Annual mean PM_{10} conc. ($\mu g/m^3$)	Number of receptors by distance from source (m)					Sensitivity of area
			<20	20-50	50-100	100-200	200-350	
Demolition	High	<18	901	585	919	2,144	3,042	Medium
Earthworks	High	<18	901	585	919	2,144	3,042	Medium
Constructio	High	<18	901	585	919	2,144	3,042	Medium
Track-out	High	<18	901	585	N/A	N/A	N/A	Medium

4.2.3 Step 2C: Risk of dust impact

The dust emission potential determined in Step 2A is combined with the sensitivity of the area determined in Step 2B to give the risk of impacts with no mitigation applied. The criteria are shown in **Table 4-6**.

Table 4-6 Criteria for sensitivity of area to health impacts

Type of activity	Sensitivity of area	Dust emission potential		
		Large	Medium	Small
Demolition	High	High Risk	Medium Risk	Medium Risk
	Medium	High Risk	Medium Risk	Low Risk
	Low	Medium Risk	Low Risk	Negligible
Earthworks	High	High Risk	Medium Risk	Low Risk
	Medium	Medium Risk	Medium Risk	Low Risk
	Low	Low Risk	Low Risk	Negligible
Construction	High	High Risk	Medium Risk	Low Risk
	Medium	Medium Risk	Medium Risk	Low Risk
	Low	Low Risk	Low Risk	Negligible
Track-out	High	High Risk	Medium Risk	Low Risk
	Medium	Medium Risk	Low Risk	Negligible
	Low	Low Risk	Low Risk	Negligible

The final results for the Step 2 risk assessment are provided in **Table 4-7**. All four activities were shown to be predominantly 'medium risk', similar to that noted in the M4-M5 Link EIS for the sites around Haberfield and Ashfield. High risk of dust impacts in relation to dust soiling are predicted during demolition and track out activities, and during demolition in relation to risk of dust impacts on human health.

The proposal as part of this modification to change the use of the Northcote Street site to a civil and tunnel site means that construction activities that were approved to occur at the Parramatta Road West site would move to the Northcote Street site. However, as both of these sites are part of the same construction footprint for both this study and the EIS, there is little change anticipated for the receptors outside the footprint. Much of the site preparation work at the Northcote Street civil and tunnel site will 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 will lessen potential impacts from earthworks and construction activities. Demolition would still occur at the Parramatta Road East

and West civil sites as well as the construction of a temporary pedestrian overpass between these sites.

Table 4-7 Summary of risk assessment for the four activities

Type of Activity	Step 2A: Potential for dust emissions	Step 2B: Sensitivity of area		Step 2C: 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

4.3 Step 3: Mitigation

Step 3 involved determining mitigation measures for each of the four potential activities in Step 2. This was based on the risk of dust impacts identified in Step 2C. For each activity, the highest risk category was used, which in this case is 'high risk' or 'medium risk'.

Mitigation measures are set out in detail in **section 5** and are consistent with those set out in the M4-M5 Link EIS, M4-M5 Link SPIR and the conditions of approval for the project. No additional mitigation measures are proposed as a result of the proposed modification.

4.4 Step 4: Significance of risks

Once the risk of dust impacts has been determined in Step 2C, and the appropriate dust mitigation measures identified in Step 3, the final step is to determine whether there are significant residual effects arising from the construction phase of a proposed development. For all activities, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience on projects of a similar scale and carried out in similar environments shows that this is normally possible. Hence the residual effect would normally be 'not significant' (IAQM, 2014).

However, even with a rigorous Dust Management Plan in place (see **section 5**), it is not possible to guarantee that the dust mitigation measures would be effective all the time. There is the risk that receptors in the immediate vicinity of the construction zones might experience some occasional impacts from dust emissions on site. This does not mean that impacts would be frequent or persistent.

Overall, construction dust is unlikely to represent a serious ongoing problem. Any effects 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 likely scale of this would not normally be considered sufficient to change the conclusion that with mitigation the effects would be 'not significant'.

5 Mitigation measures

Step 3 of the construction assessment involved determining mitigation measures for each of the four potential activities in Step 2. This was based on the risk of dust impacts identified in Step 2C. For each activity, the highest risk category was used.

A Construction Air Quality Management Sub-Plan will be prepared as part of the project Construction Environmental Management Plan and will be implemented during the construction period. This will contain details of the site-specific mitigation measures to be applied.

The recommended mitigation measures are as detailed in the revised environmental management measures detailed in the M4-M5 Link SPIR and are summarised in **Table 5-1**. They are generally consistent with the standard measures used by Roads and Maritime on projects of a similar scale and nature. Additional guidance on the control of dust at construction sites in NSW is provided as part of the NSW EPA Local Government Air Quality Toolkit. Detailed guidance is also available from the UK (GLA, 2006) and the United States (Countess Environmental, 2006). Most of the recommended measures are routinely employed as 'good practice' on construction sites such as this one.

Table 5-1 Main recommended mitigation measures for construction

Aspect	Measure	Responsibility	Phase
Impacts on local air quality and human health from dust generation and plant	A construction Air Quality management Plan will be developed and implemented to monitor and manage potential air quality impacts associated with the construction for the project. The management plan will include controls required to reduce the emission of dust out of the door openings of acoustic sheds. The Plan will be implemented for the duration of construction.	Contractor	Pre-Construction
	Regular communication to be carried out with other WestConnex projects under construction in close proximity to ensure that measures are in place to manage cumulative impacts.	Contractor	Construction
	Regular site inspections will be conducted to monitor potential dust issues. The site inspections, required actions and ongoing issues arising, will be recorded and actioned appropriately within agreed timeframes by relevant project personnel.	Contractor	Construction
	Construction activities with the potential to generate dust will be modified or ceased during unfavourable weather conditions to reduce the potential for dust generation.	Contractor	Construction
	Measures to reduce potential dust generation, such as the use of water carts, sprinklers, dust screens and surface treatments, will be implemented within project sites as required.	Contractor	Construction
	Access roads within project sites will be maintained and managed to reduce dust generation.	Contractor	Construction
	Where reasonable and feasible, appropriate control methods will be implemented to minimise dust emissions from the project site.	Contractor	Construction
	Storage of materials that have the potential to result in dust generation will be minimised within project sites at all times.	Contractor	Construction

Aspect	Measure	Responsibility	Phase
	All construction vehicles and plant will be inspected regularly and maintained to ensure that they comply with relevant emission standards.	Contractor	Construction
	Engine idling will be minimised when plant is stationary, and plant will be switched off when not in use to reduce emissions.	Contractor	Construction
	The use of mains electricity will be favoured over diesel or petrol-powered generators where practicable to reduce site emissions.	Contractor	Construction
	Haul roads will be treated with water carts and monitored during earthworks operations, ceasing works if necessary during high winds where dust controls are not effective.	Contractor	Construction
	Suitable dust suppression and/or collection techniques will be used during cutting, grinding or sawing activities likely to generate dust in close proximity to sensitive receivers.	Contractor	Construction
	The potential for dust generation will be considered during the handling of loose materials. Equipment will be selected and handling protocols developed to minimise the potential for dust generation.	Contractor	Construction
	All loaded spoil haulage trucks and other project-related heavy vehicles carrying materials with the potential to result in dust generation will be covered to prevent dust emissions during transport in accordance with relevant road regulations.	Contractor	Construction
	Demolition activities will be planned and carried out to minimise the potential for dust generation.	Contractor	Construction
	Adequate dust suppression will be applied during all demolition works required to facilitate the project.	Contractor	Construction
	All potentially hazardous material will be identified and removed from buildings in an appropriate manner prior to the commencement of and/or progressively during demolition and in accordance with all relevant codes of practice demolition.	Contractor	Construction
	Areas of soil exposed during construction will be minimised at all times to reduce the potential for dust generation.	Contractor	Construction
	Exposed soils will be temporarily stabilised during weather conditions conducive to dust generation and prior to extended periods of inactivity to minimise dust generation.	Contractor	Construction
	Exposed soils will be permanently stabilised as soon as practicable following disturbance to minimise the potential for ongoing dust generation.	Contractor	Construction
	Ensure that stockpiles of materials with the potential to result in dust emissions are adequately protected and managed to reduce potential dust generation.	Contractor	Construction

Aspect	Measure	Responsibility	Phase
	Ensure fine materials are stored and handled to minimise dust.	Contractor	Construction
	All sealed surfaces within sites and site accesses will be managed to reduce dust generation and sediment tracking onto roads	Contractor	Construction
	At the commencement of establishment of project ancillary facilities, controls such as wheel washing systems and rumble grids will be installed at all site exits to prevent deposition of loose material on sealed surfaces outside project sites to reduce potential dust generation.	Contractor	Construction

6 References

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GLA (2006).The control of dust and emissions from construction and demolition Best Practice Guidance. Greater London Authority.

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Annexure A – Campbell Road civil and tunnel site

Figure A-1 Sensitive receptors near the Campbell Road construction site