WestConnex M4-M5 Link

Mainline Tunnel

Modification report

Appendix B

Traffic and transport report

Roads and Maritime Services

WestConnex M4-M5 Link

Mainline Tunnel – Modification report

Appendix B Traffic and transport report

September 2018

Prepared for

Roads and Maritime Services

Prepared by

AECOM Australia

Contents

Glossary of terms and abbreviations

Term	Definition
A	
AM peak hour	Unless otherwise stated, this refers to vehicle trips arriving at their destination during the average peak one hour in the AM peak period between 7.00 am–9.00 am on a normal working weekday
C	
Campbell Road civil and tunnel site	A construction ancillary facility for the M4-M5 Link project at St Peters
Capacity	The nominal maximum number of vehicles which has a reasonable expectation of passing over a given section of a lane or roadway in one direction during a given time period under prevailing roadway conditions
Carriageway	The portion of a roadway used by vehicles including shoulders and ancillary lanes
Construction	Includes all physical work required to construct the project
Construction ancillary facilities	Temporary facilities during construction that include, but are not limited to construction sites (civil and tunnel), sediment basins, temporary water treatment plants, precast yards and material stockpiles, laydown areas, workforce parking, maintenance workshops and offices
Construction Traffic Transport and Access Management Sub-Plan	Traffic and Transport Construction Environmental Management Plan sub-plan
Cumulative impacts	Impacts that, when considered together, have different and/or more substantial impacts than a single impact assessed on its own
D	
Darley Road civil and tunnel site	A construction ancillary facility for the M4-M5 Link project located at Leichhardt. This modification application proposes to remove this construction ancillary facility from the project
Divided road	A road with a separate carriageway for each direction of travel created by placing a physical separation (eg median) between the opposing traffic directions
DPE	NSW Department of Planning and Environment
E	
EB	Eastbound
EIS	Environmental Impact Statement
Entry ramp	A ramp by which one enters a limited-access highway/tunnel
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
Exit blocking	Queuing traffic from a downstream link or intersection that blocks traffic from being able to travel through and exit an intersection
Exit ramp	A ramp by which one exits a limited-access highway/tunnel
F	
Footpath	The paved area in a footway
Footprint	The extent of the impact that a development (in plan-view) makes on the land
Footway	An area open to the public designated for the movement of pedestrians or has one of its main uses for pedestrians
Freeways	Fast, high volume, access controlled roads that primarily link regional hubs and cities usually with grade separated intersections and without traffic lights
G	
G-loop	A construction traffic only turnaround that allows eastbound trucks on Dobroyd Parade to turn around and head westbound on Dobroyd Parade using a temporary northern leg of the Dobroyd Parade / Waratah Street signalised intersection.

Term	Definition
H	
h	Hour
Haberfield civil site	Construction ancillary facilities for the M4-M5 Link project located at Haberfield. This modification proposes to remove this construction ancillary facility from the project
HV (Heavy vehicles)	A heavy vehicle is classified as a Class 3 vehicle (a two axle truck) or larger, in accordance with the Austroads Vehicle Classification System
I	
Impact	Influence or effect exerted by a project or other activity on the natural, built and community environment
L	
Local road	A road or street used primarily for access to abutting properties
LoS	Level of service. A qualitative measure describing operational conditions within a traffic stream or intersection and the perception by motorists and/or passengers
M	
M4 East Motorway/project	A component of the WestConnex program of works. Extension of the M4 Motorway in tunnels between Homebush and Haberfield via Concord. Includes provision for a future connection to the M4-M5 Link at the Wattle Street interchange
M4-M5 Link	The project which is the subject of this modification. A component of the WestConnex program of works
Midblock	A general location on a road between two intersections
Motorway	Fast, high volume controlled access roads. May be tolled or untolled
N	
NB	Northbound
Northcote Street civil and tunnel site	A construction ancillary facility for the M4-M5 Link project located at Haberfield
Northcote Street civil and tunnel site –Route A spoil haulage route	Via a 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
Northcote Street civil and tunnel site – Route B spoil haulage route	Via left turn from site onto Wattle Street, then left turn onto a 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 tunnels or Parramatta Road.
NSW	New South Wales
P	
Parramatta Road East civil site	A construction ancillary facility for the M4-M5 Link project at Haberfield
Parramatta Road West civil site	A construction ancillary facility for the M4-M5 Link project at Ashfield
PCU	Passenger Car Unit
PM peak hour	Unless otherwise stated, this refers to trips travelling on the network during the average peak one hour in the PM peak period between 3.00 pm–6.00 pm on a normal working weekday
Portal	The entry and/or exit to a tunnel

Term	Definition
Project	A new multi-lane road link between the M4 East Motorway at Haberfield and the New M5 Motorway at St Peters. The project would also include an interchange at Lilyfield and Rozelle (the Rozelle interchange) and a tunnel connection between Anzac Bridge and Victoria Road, east of Iron Cove Bridge (Iron Cove Link). In addition, construction of tunnels, ramps and associated infrastructure to provide connections to the proposed future Western Harbour Tunnel and Beaches Link project would be carried out at the Rozelle interchange
Public transport	Includes train, bus (government and private), ferry (government and private) and light rail (government and private) services
Pyrmont Bridge Road tunnel site	A construction ancillary facility for the M4-M5 Link project at Annandale
R	
Roads and Maritime	NSW Roads and Maritime Services (formerly NSW Roads and Traffic Authority (RTA))
Roundabout	An intersection where all traffic travels in one direction clockwise around a central island
Rozelle interchange	A new interchange at Lilyfield and Rozelle that would connect the M4-M5 Link mainline tunnels with City West Link, Anzac Bridge, the Iron Cove Link and the proposed future Western Harbour Tunnel and Beaches Link
S	
SB	Southbound
SMC	Sydney Motorway Corporation
SPIR	Submissions and Preferred Infrastructure Report
STM	Strategic Travel Model, operated by Transport for NSW Transport Performance and Analytics
T	
Traffic efficiency	Measured by savings (and delays) in travel time
Transport infrastructure	Permanent installations including roads, rail, buildings and storage associated with transport
Transport for NSW	NSW Government Department Transport for NSW
Truck and dog construction vehicle	A vehicle with 20 cubic metre capacity and maximum length of 19 metres
V	
Veh	Vehicle
Veh/h	Vehicle per hour
V/C	Volume to capacity ratio, ratio of the traffic volume to the road capacity
W	
Wattle Street civil and tunnel site	A construction ancillary facility for the M4-M5 Link project located at Haberfield
Wattle Street interchange	An interchange to connect Wattle Street (City West Link) with the M4 East and the M4-M5 Link tunnels. Approved and under construction as part of the M4 East project. Additional construction works proposed as part of the M4-M5 Link project
WB	Westbound
WRTM	WestConnex Road Traffic Model
WTP	Water treatment plant

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.

These modifications would result in a small change in construction traffic volumes across the road network relative to that identified in the M4-M5 Link SPIR.

Traffic and transport impacts

The traffic and transport assessment considered potential impacts on the modelled road network associated with changes to the haulage route for the Northcote Street civil and tunnel site. The results of the assessment indicate that there would be minimal impact on the mid-block roadway and intersection level of service through the Haberfield and Ashfield modelled road network compared to the assessment presented in the M4-M5 Link SPIR and the 'without construction' scenarios. No changes in roadway or intersection level of service are forecast through the Five Dock modelled road network as a result of the proposed modification.

A preliminary assessment of parking provision anticipate the total parking provision within the Haberfield and Ashfield construction sites would be able to meet the forecast parking demand.

The construction of a temporary pedestrian walkway above Parramatta Road to connect the Parramatta Road East and Parramatta Road West civil sites, which would only be available for use by project staff during the construction phase of the project, is likely to have a minimal impact on traffic and transport. Impacts on the road network would occur primarily during establishment and decommissioning and therefore over a short duration.

It is likely Parramatta Road would need to be closed overnight for installation of the pedestrian bridge. Approval would be required from the Transport Management Centre (TMC) for a Road Occupancy Licence and diversion routes would be in place during the overnight installation. Impacts on pedestrian, cycle or public transport users are likely to be negligible and able to be adequately managed through the Construction Traffic, Transport and Access Management Sub-Plan that will be prepared for the project.

The relocation of the operational water treatment plant from Darley Road to the Campbell Road motorway operation complex (MOC5) at St Peters interchange is likely to have a negligible change in impact on traffic and transport users compared to the impact assessment in the M4-M5 Link EIS and SPIR, as no change in peak construction traffic volume or length of construction is forecast. The removal of the Darley Road site means that construction vehicles would not need to turn into and out of James Street at the City West Link/James Street intersection. This would improve the performance of this intersection compared to the assessment in the M4-M5 Link SPIR. The removal of site access/egress on Darley Road would also remove potential conflicts with other road users, pedestrians and cyclists.

The proposed use of the Parramatta Road West and Parramatta Road East sites as civil sites for lower impact activities, with no tunnelling works carried out from either site, would mean a reduction in heavy vehicle traffic impacts compared to the M4-M5 Link SPIR. The largest change would be the reduction in daily forecast heavy vehicles to and from the Parramatta Road West site, reducing to 25 heavy vehicles per day compared to 140 heavy vehicles per day as assessed in the M4-M5 Link SPIR. The access points on Parramatta Road, Alt Street and Bland Street (west of Parramatta Road only) would be used by heavy and light vehicles. Safe pedestrian and cyclist access and access to nearby properties would be maintained during construction in accordance with relevant conditions of approval.

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.

Management and mitigation measures

Impacts would 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.

The Route A spoil haulage route from the Northcote Street civil and tunnel site may require pedestrian protection in the signal timing for pedestrian crossings (ie a head start for the green signal for pedestrians before the green signal for left-turning vehicles) on the western leg of the Great North Road/Parramatta Road, Ramsay Road/Fairlight Street and Fairlight Road/Great North Road intersections. This would be decided in conjunction with TMC and documented in the Construction Traffic Transport and Access Management Sub-Plan that will be prepared for the project.

In the Route B spoil haulage route from the Northcote Street civil and tunnel site, the design of the reinstated G-loop would include provision for safe pedestrian movements, as per the Road Safety conditions of the Planning Approval. A Road Safety Audit would be carried out on the Dobroyd Parade/Waratah Street intersection configuration with the G-loop during detailed design (in accordance with condition of approval E56).

During detailed design of the temporary pedestrian walkway connection above Parramatta Road to connect the Parramatta Road East and Parramatta Road West civil sites, a road safety audit would be carried out to ensure that the bridge would not obstruct or reduce motorists' sight distance to any signs / directional signs or important traffic directions / infrastructure (in accordance with condition of approval E56).

The management and mitigation measures identified in Chapter E1 of the M4-M5 Link SPIR and the conditions of approval for the project would appropriately manage other traffic and transport impacts from 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). **Figure 1-1** provides an overview of the approved project.

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] 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

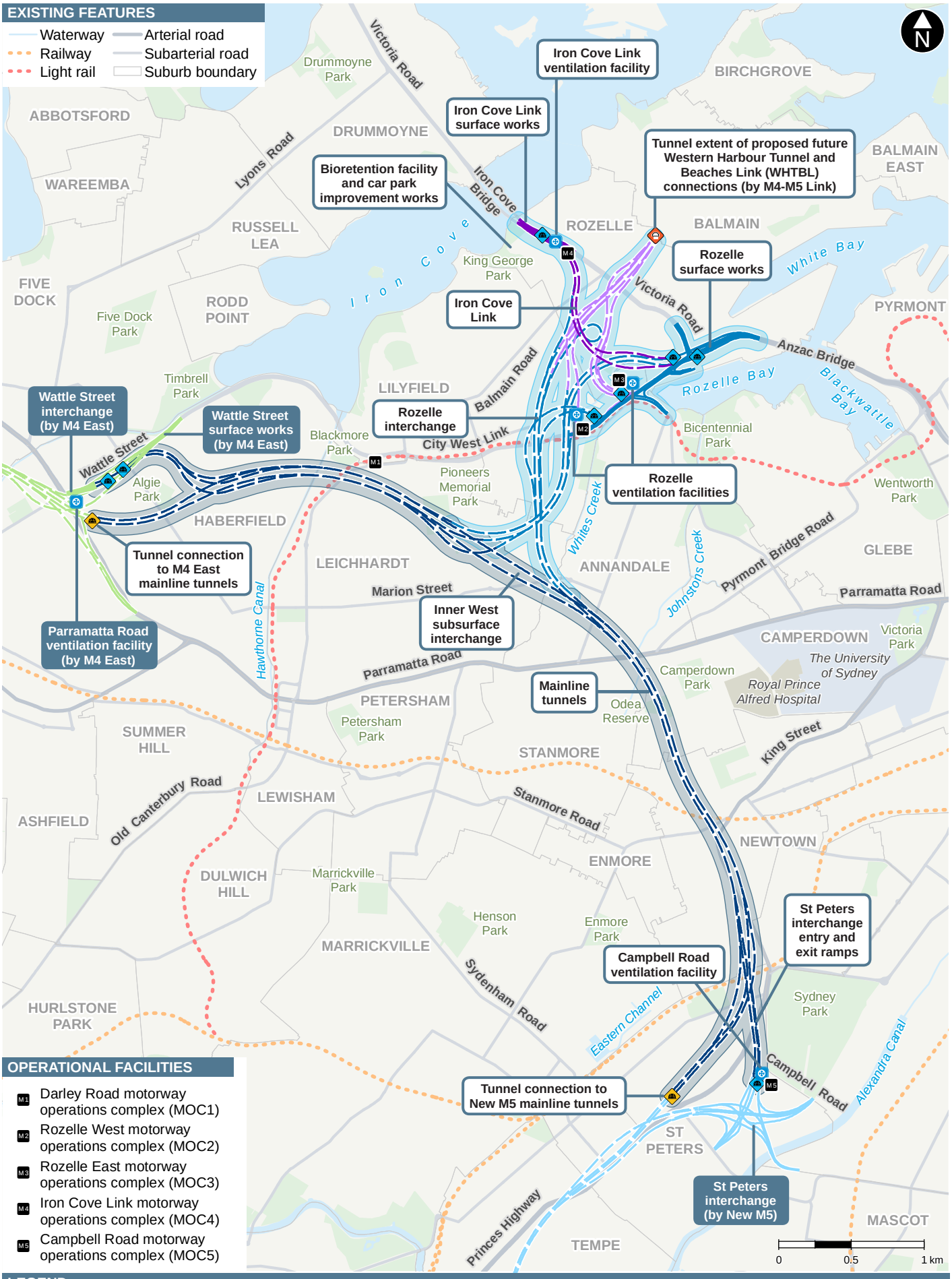


Figure 1-1 EIS Overview of approved project

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
- 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.

Key aspects of the proposed modification relevant to the assessment of potential traffic and transport impacts are described in further detail in **Chapter 2**. Chapter 4 (Proposed modification) of the modification report provides a detailed description of the proposed modification.

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.

1.3 Purpose of this report

The purpose of the traffic and transport assessment is to support the environmental assessment for the project modification by assessing and reporting existing and future traffic and transport conditions under the proposed modifications. Specifically, the assessment includes the following:

- Quantitative assessment of traffic impacts associated with the proposed heavy vehicle and light vehicle modifications on the surrounding road network during the AM and PM peak hours in the forecast peak construction year (2021). The impact of shuttle buses on the road network surrounding the Northcote Street civil and tunnel site was included in this assessment as shuttle buses were included in the light vehicle volumes
- Qualitative assessment of other traffic and transport impacts including access, on-street parking, pedestrians and cyclists, public transport and traffic crashes

- Swept-path analysis of key intersections along the proposed heavy vehicle haulage route from the Northcote Street civil and tunnel site
- Qualitative assessment of the construction of the temporary pedestrian walkway connection above Parramatta Road to connect the Parramatta Road East and Parramatta Road West civil sites
- Qualitative assessment of the potential construction traffic and transport impacts from the proposed relocation of the permanent water treatment plant from Darley Road to the Campbell Road motorway operation complex (MOC5) at the St Peters interchange.

The elements of the proposed modification would result in potential traffic and transport impacts during the construction phase only. No traffic and transport impact assessment during the operational phase is therefore required for the proposed modification.

1.4 Structure of this report

This report has been structured as follows:

- **Chapter 2** presents an overview of the key aspects of the proposed modification as they relate to the assessment of potential traffic and transport impacts
- **Chapter 3** presents the assessment methodology to be used
- **Chapter 4** considers the potential impacts associated with construction activities
- **Chapter 5** documents management measures that are proposed to mitigate impacts
- **Chapter 6** provides a conclusion to the assessment.

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 indicative 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.

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. 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 (less than 10 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. Access to the M4 East access tunnel at the alignment of Parramatta Road would be blocked off on completion of the M4 East project. An indicative alignment of the construction access tunnel is shown in **Figure 2-2**.

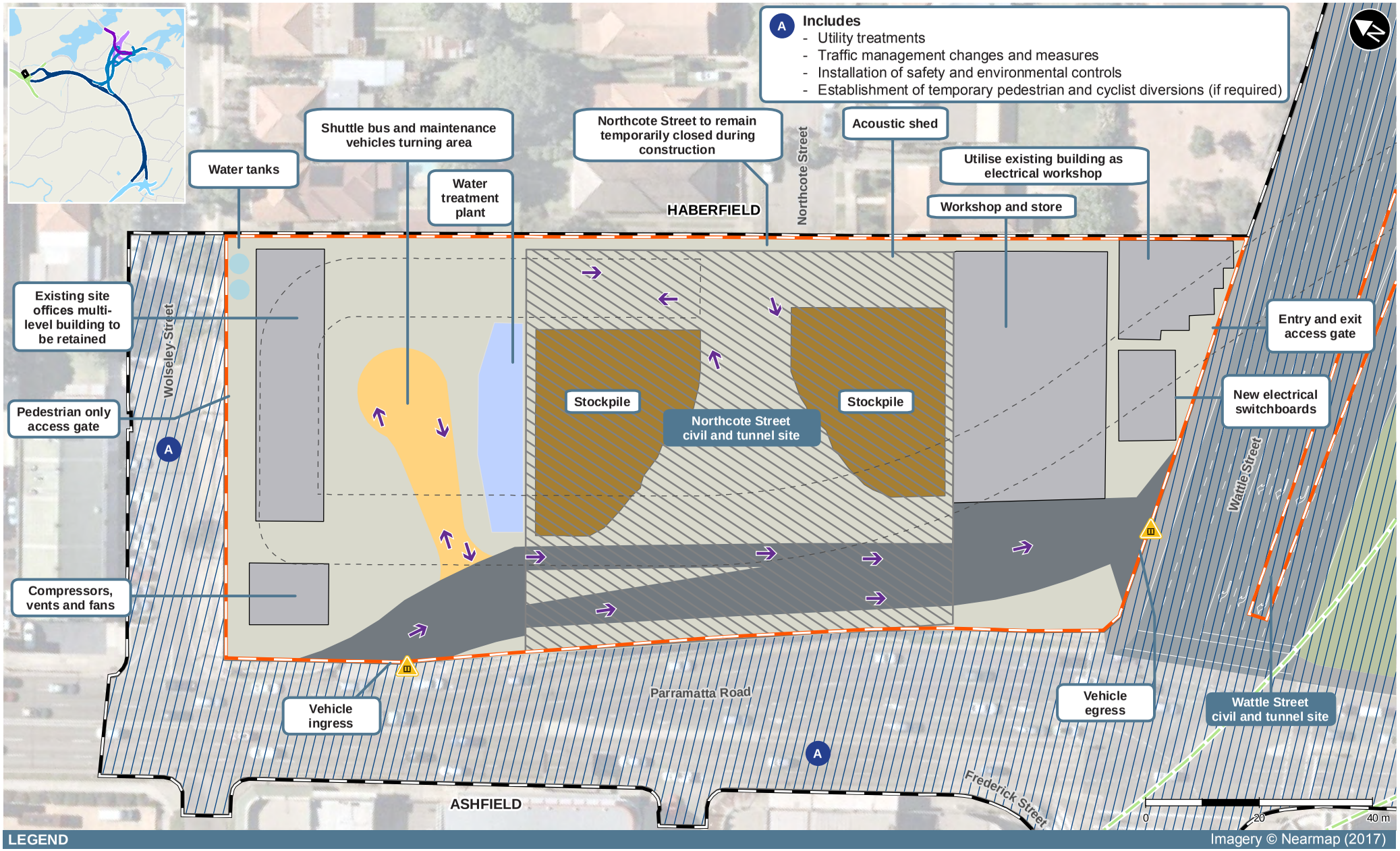


Figure 2-1 Indicative Northcote Street civil and tunnel site layout

Figure 2-2 Indicative alignment of construction access tunnel

2.1.4 Spoil volumes and spoil haulage route

It is anticipated that around 566,300 cubic metres of spoil would be extracted via the Northcote Street civil and tunnel site over the duration of the project.

Two spoil haulage routes are proposed to be used in association with the Northcote Street civil and tunnel site. **Table 2-1** describes each proposed route for spoil haulage. **Figure 2-3** shows the proposed spoil haulage routes.

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

Route	Spoil haulage route
Route A	Entry: via Parramatta Road city bound and 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 This heavy vehicle movement may require pedestrian protection in the signal timing (i.e. a head start for the green signal for pedestrians before the green signal for left-turning vehicles) for pedestrian crossings on the western leg of the Great North Road/Parramatta Road, Ramsay Road/Fairlight Street and Fairlight Road/Great North Road intersections. This would be decided in conjunction with Roads and Maritime and Transport for NSW's Transport Management Centre (TMC) and would be documented in the Construction Traffic Transport and Access Management Sub-Plan that will be prepared for the project. All of the roads are state roads managed by Roads and Maritime. The roads all have two traffic lanes, some with provision for car parking in each direction, and aside from the section of Wattle Street where the M4 East entry and exit ramps are located, are not divided carriageways. Photos along the route are shown in **Figure 2-4**, **Figure 2-5** and **Figure 2-6**. The speed limit along the route is 60 kilometres per hour.
Route B	Entry: via Parramatta Road city bound and make left turn into the site
	Exit: via left turn from site onto Wattle Street, then left turn onto a 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 tunnels or Parramatta Road. The G-loop was used during the construction of the M4 East project. An indicative layout is shown in **Figure 2-7**. Photos of the previous layout provided in **Figure 2-8** and **Figure 2-9** and provide an indication of the arrangement that is proposed to be used for the project. An advance warning sign was previously positioned prior to Martin Street to indicate the presence of the G-loop, as shown in **Figure 2-10**. A similar sign would be used for the project. The length of the G-loop would allow about four truck and dog trailer combinations (each truck and dog trailer is about 20 metres long) to queue in the G-loop, away from the eastbound Dobroyd Parade carriageway. The public roads along this route are state roads and there are traffic signals at the intersections of Wattle Street and Ramsay Street and Dobroyd Parade and Waratah Street. The 'G-loop' would be accessible by construction traffic only.

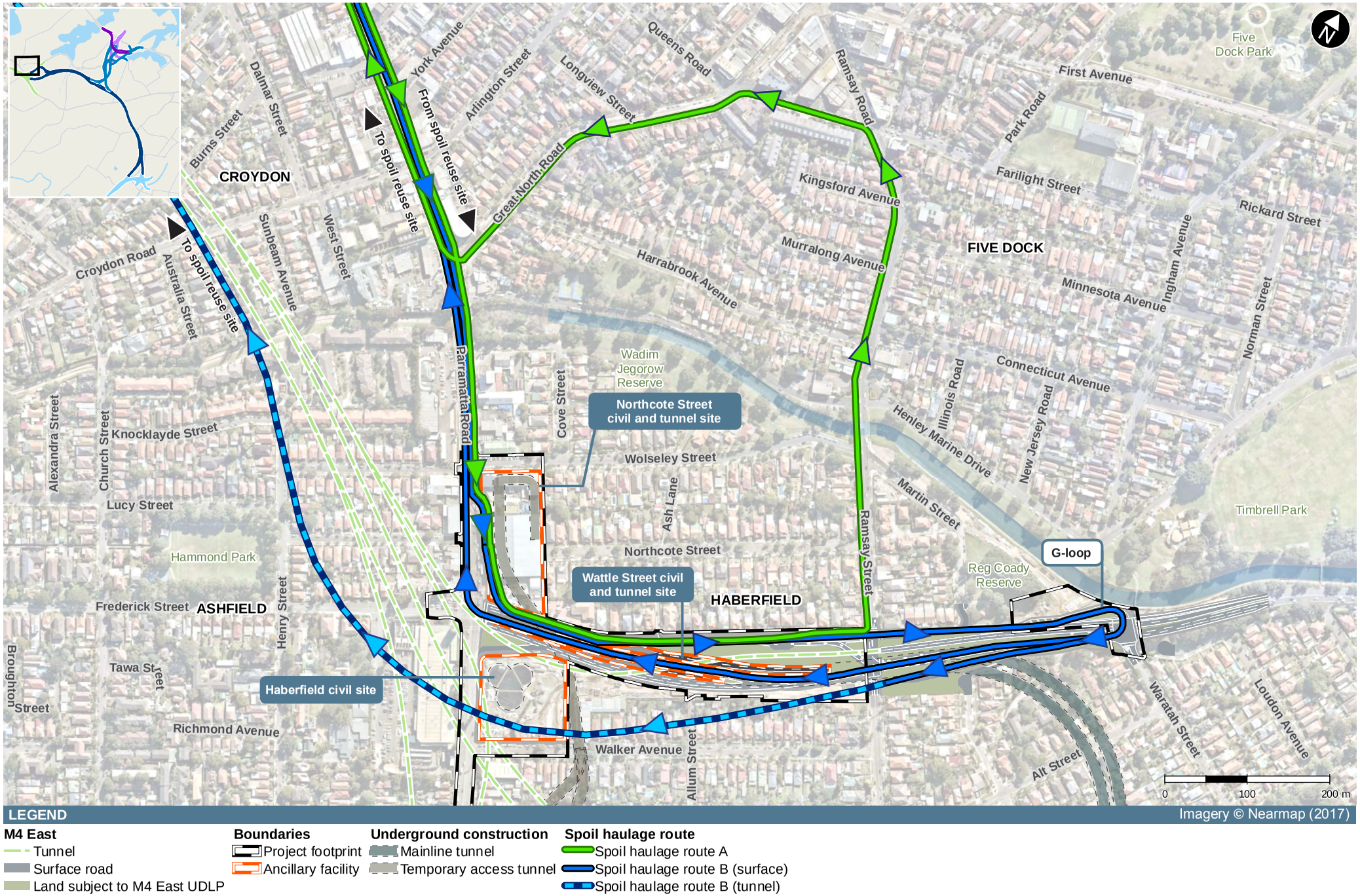


Figure 2-3 Northcote Street civil and tunnel site proposed spoil haulage routes

Figure 2-4 Ramsay Street – looking south towards Wattle Street

Figure 2-5 Ramsay Road – looking south

Figure 2-6 Great North Road – looking south towards Parramatta Road

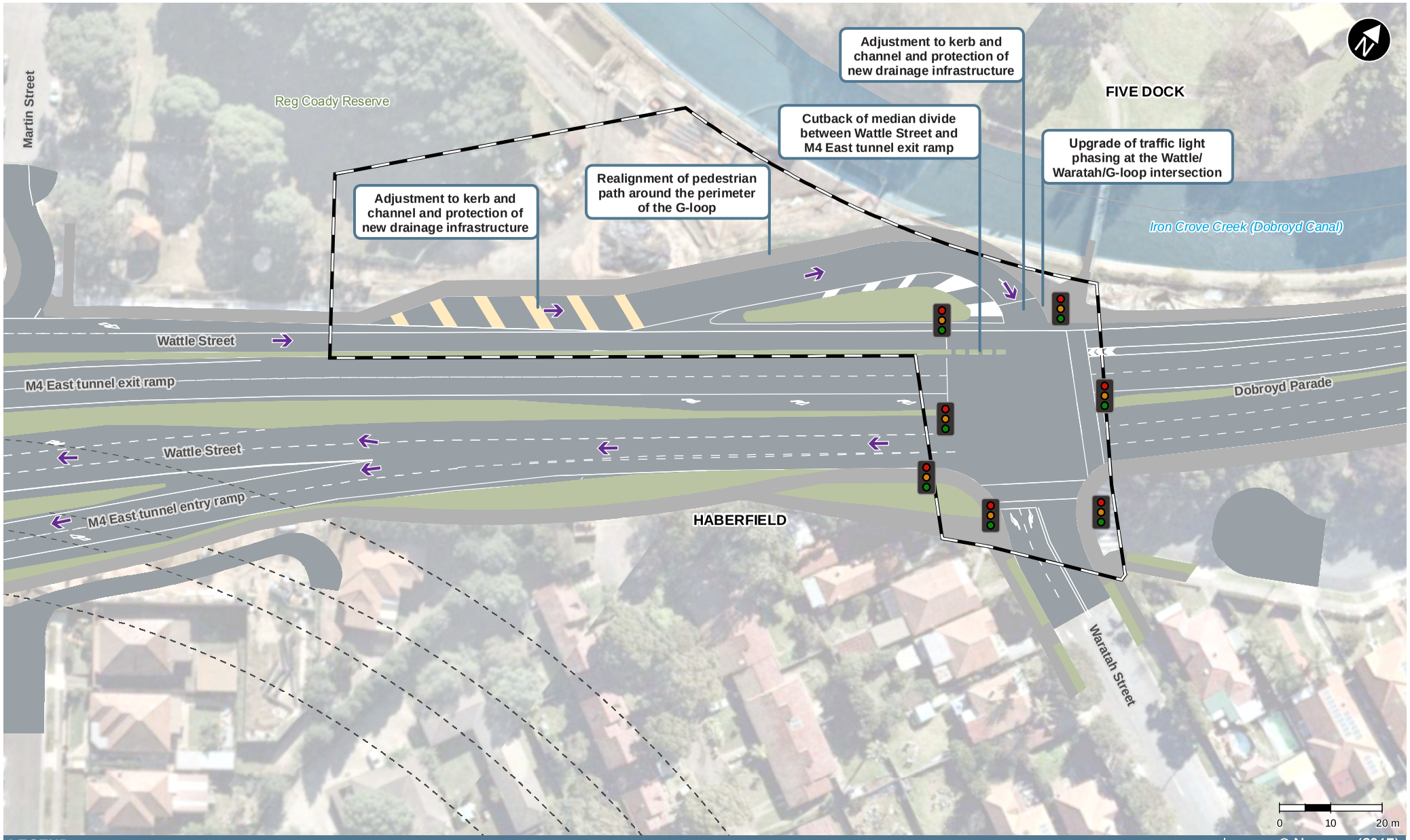


Figure 2-7 Layout of the G-loop north of the Dobroyd Parade eastbound carriageway

Figure 2-8 Approach to G-loop looking east along Dobroyd Parade

Source: Google Maps, Feb 2018. A similar arrangement would be used for the project

Figure 2-9 Exit from G-loop looking west along Dobroyd Parade

Source: Google Maps, Feb 2018. A similar arrangement would be used for the project

Figure 2-10 Advance warning sign prior to Martin Street to indicate the presence of the G-loop

Source: Google Maps, Feb 2018. A similar arrangement would be used for the project

The M4 East is due to open to traffic in early 2019. **Figure 2-11** presents the future layout of the Dobroyd Parade / Waratah Street intersection and eastbound approach to the intersection after the M4 East opens. For the G-loop to be reinstated for use during construction, the following amendments to the road layout would be required:

- The northern kerb of the eastbound carriageway of Dobroyd Parade would be adjusted to allow a left slip lane into the G-loop and the northern leg of the intersection (the G-loop exit) to be reinstated.

  On the eastbound carriageway a left slip deceleration lane into the G-loop, of the same length as was previously there (about 45m including taper), would be provided, while still providing two eastbound general traffic lanes (merging into one lane on approach to the intersection). Advance warning signs and signs and road markings (yellow hatching) would be installed to advise drivers the G-loop is for construction vehicles only. The left slip deceleration lane would therefore not create a less safe situation than would currently exist. A similar situation was in place on the westbound Dobroyd Parade during M4 East construction (see **Figure 2-12**). Safe pedestrian and cyclist access would be maintained around the G-loop during construction in accordance with condition of approval E57.

- The median designed to separate eastbound traffic from Dobroyd Parade from the eastbound traffic from the M4 East Wattle Street exit ramp and prevent the Dobroyd Parade traffic from attempting to make a right turn into Waratah Street would be reduced in length to allow trucks to turn right into Dobroyd Parade (westbound) from the G-loop.

  The median could still extend into the intersection to prevent the right turn from Dobroyd Parade eastbound into Waratah Street, as shown in the swept path analysis in **section 4.7**. Additional signage may be required to reinforce the right turn ban from Dobroyd Parade, but the median reduction would not create a less safe situation than would exist after the M4 East is open.

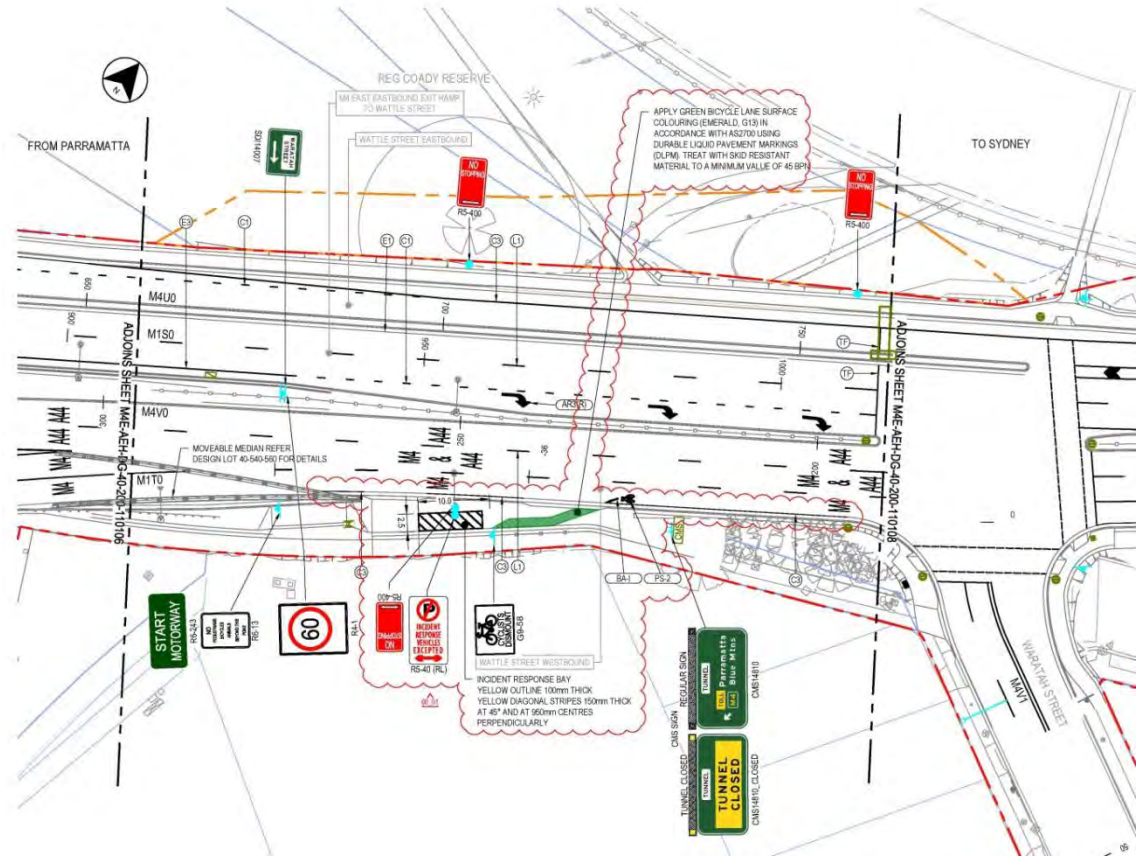


Figure 2-11 Layout of the Dobroyd Parade / Waratah Street intersection after the M4 East opens

Source: WCX Pty Ltd, M4E-AEH-DG-40-660-932-221-E00 and M4E-AEH-DG-40-660-932-222-E00

Figure 2-12 Slip lane to the M4 East construction site marked with yellow hatching

Source: Google Maps, Feb 2018

A swept path analysis was undertaken of trucks turning right from the G-loop to confirm if:

- Trucks would impact on right-turning traffic from Waratah Street
- Trucks could turn into the middle lane of the three exit lanes heading westbound and, in so doing, be able to travel to either the M4 East entry ramp or to Dobroyd Parade (facilitating access to Parramatta Road).

The results of the swept path analysis are presented in **section 4.7** and indicate that the use of the G-loop would not impact on the right turn movement from Waratah Street and so they could both operate at the same time in the same signal phase.

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.

Once the G-loop is in operation, Route B would be the preferred spoil haulage route and would be available for use 24 hours a day and 7 days a week in accordance with condition E70 of the project approval.

Route A would also be used as a spoil haulage route. However, in response to feedback received from stakeholders during the consultation process, it is proposed that Route A would generally only be used between 7am and 6pm Monday to Friday and 8am to 6pm on Saturdays except in the following circumstances and in accordance with the relevant conditions of the project approval:

- During the early stages of construction until such time as the works to facilitate operation of the G-loop were completed and the G-loop was functional
- In the event of heavy traffic congestion, an incident or maintenance works on the arterial road and/or motorway network which has the potential to detrimentally impact on the efficient use of the G-loop and result in delays for spoil haulage vehicles.

A spoil haulage protocol would be developed by the contractor in consultation with Roads and Maritime and the Transport for NSW Traffic Management Centre to manage spoil haulage movements on Routes A and B. The protocol would be documented in the Construction Traffic Transport and Access Management Sub-Plan.

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 around a total of 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.

2.2 Parramatta Road West and East civil sites

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 Parramatta Road East civil sites would be used generally 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 stockpiling and 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 2-13** . 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 as shown in **Figure 2-3**.

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 east bound traffic. Exit would be left turn out to travel east bound 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.

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 approvalE68 and E69 of the project approval) 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 E54 of the project approval, 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 Parramatta Road West and 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 end of Q1 in 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 2-14**.

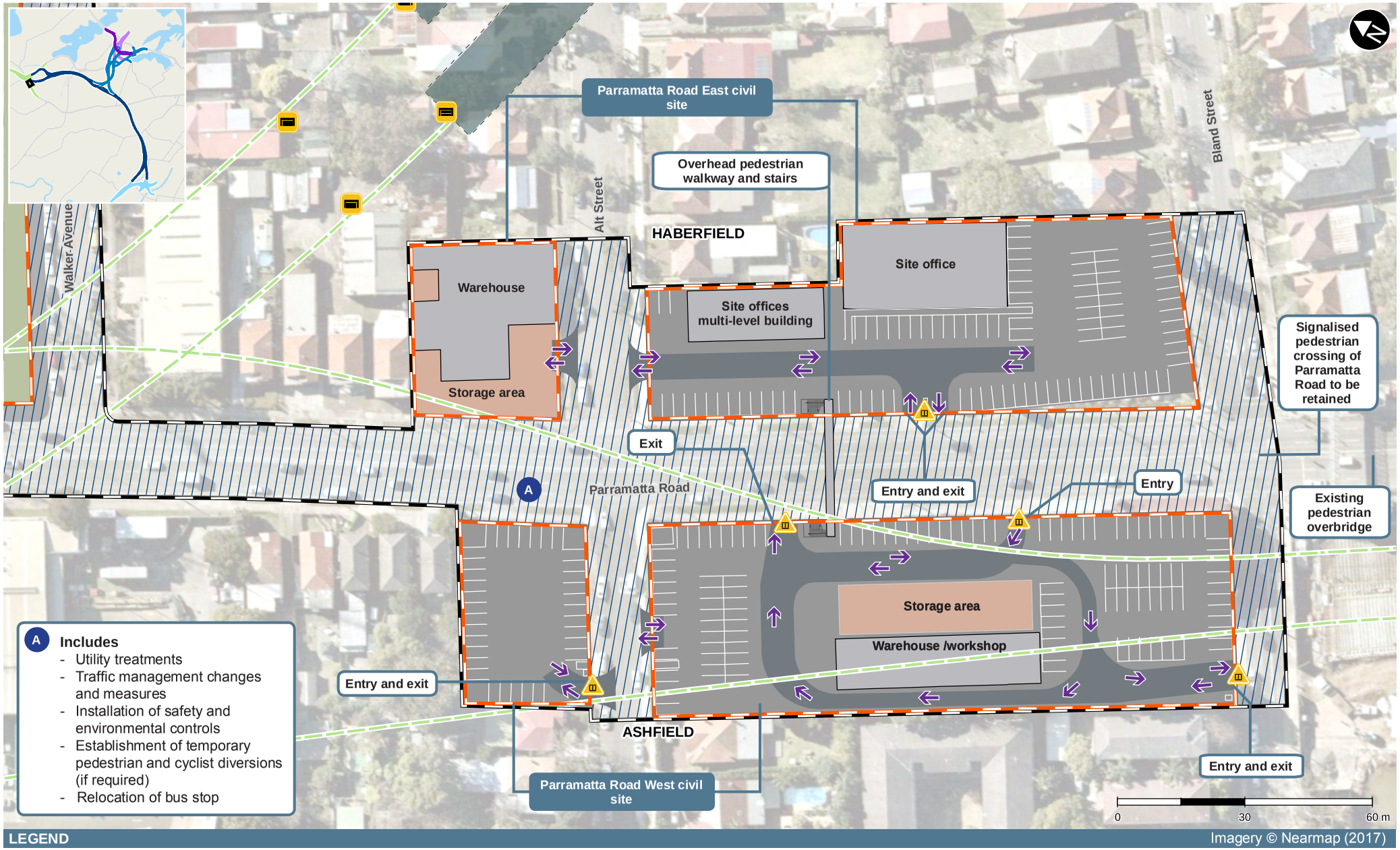
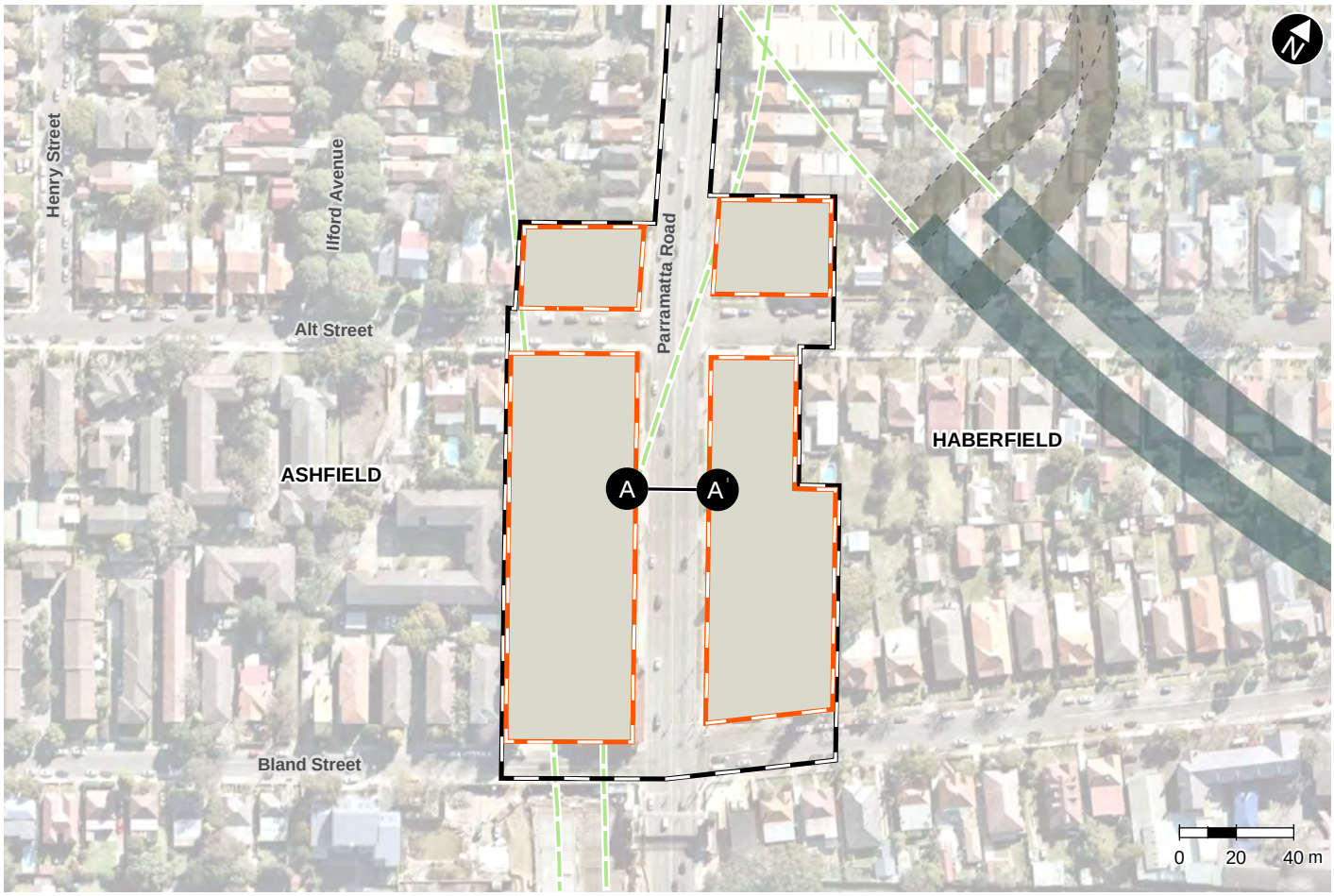


Figure 2-13 Indicative Parramatta Road West and Parramatta Road East sites layouts



Imagery © Nearmap (2017)

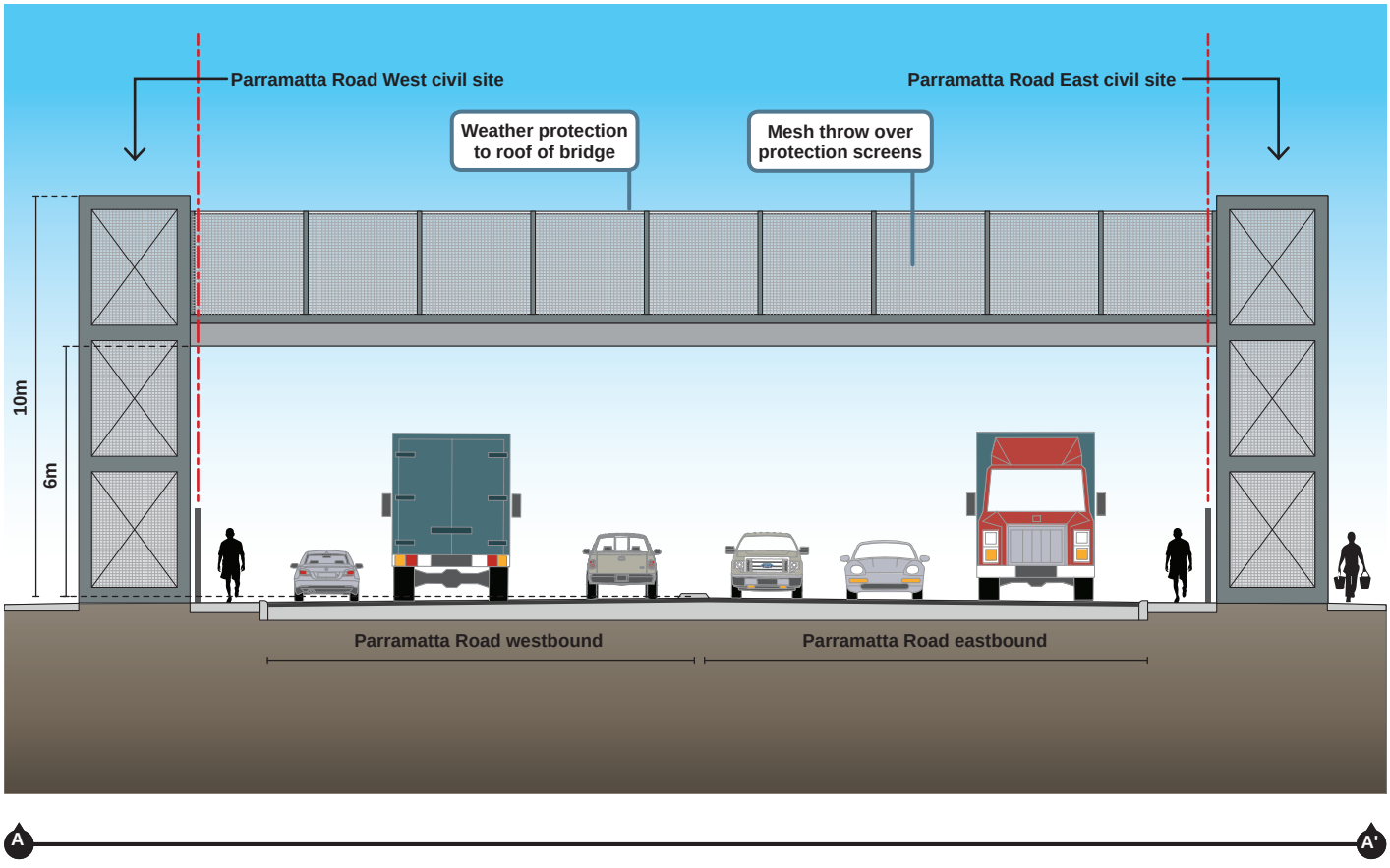


Figure 2-14 Indicative location and design of Parramatta Road West and Parramatta Road East overhead pedestrian walkway