

## 6 Construction work

This chapter describes the proposed approach to the construction of the project. It outlines the proposed construction program, footprint, methodology, working hours, materials, equipment, traffic management, spoil haulage routes, and temporary construction ancillary facilities. The description of the construction work provided in this chapter is based on methodologies developed to construct the project described in **Chapter 5** (Project description).

The Secretary of the NSW Department of Planning and Environment (DP&E) has issued environmental assessment requirements for the project. These are referred to as Secretary's Environmental Assessment Requirements (SEARs). **Table 6-1** sets out these requirements and the associated desired performance outcomes that relate to the construction work program, and identifies where they have been addressed in this environmental impact statement (EIS).

**Table 6-1 SEARs – construction work**

| Desired Performance Outcome  | SEARs  | Where addressed in the EIS  |
|--|--|---|
| <b>2. Environmental Impact Statement</b><br>The project is described in sufficient detail to enable clear understanding that the project has been developed through an iterative process of impact identification and assessment and project refinement to avoid, minimise or offset impacts so that the project, on balance, has the least adverse environmental, social and economic impact, including its cumulative impacts. | 1. The EIS must include, but not necessarily be limited to, the following:<br>(b) A description of the project and all components and activities (including ancillary components and activities) required to construct and operate it, including:                                      | A description of the project is included in <b>Chapter 5</b> (Project description).   |
|  | <ul style="list-style-type: none"> <li>the proposed route</li> </ul>   | A description of the project is included in <b>Chapter 5</b> (Project description).<br><br>Construction activities associated with tunnelling for the project are described in <b>section 6.4.2</b> .<br><br>Construction activities associated with other bulk earthworks including upgrades and modifications to the surface road network are described in <b>section 6.4</b> , bridge works in <b>section 6.4.3</b> , ancillary infrastructure and operational facilities in <b>section 6.4.4</b> and drainage and water management infrastructure in <b>section 6.4.5</b> . |
|  | <ul style="list-style-type: none"> <li>design of the tunnels, interchanges (inclusive of tunnel portals and entry and exit ramps), and connections to Stage 1 and Stage 2 of WestConnex and other proposals, and road user, pedestrian and cyclist facilities, and lighting</li> </ul> | A description of the project is included in <b>Chapter 5</b> (Project description).<br><br>Construction activities associated with tunnelling for the project are described in <b>section 6.4.2</b> . This section includes a description of the construction activities associated with connecting the project to the M4 East and New M5 projects and other proposals.   |

| Desired Performance Outcome | SEARs   | Where addressed in the EIS  |
|-----------------------------|---|---|
|                             |   | <p>Construction activities associated with other bulk earthworks including upgrades and modifications to the surface road network are described in <b>section 6.4</b>, bridge works in <b>section 6.4.3</b>, ancillary infrastructure and operational facilities in <b>section 6.4.4</b> and drainage and water management infrastructure in <b>section 6.4.5</b>.</p> <p>A description of the iterative process of impact identification and assessment and project refinement relating to the construction of the project is included in <b>Chapter 4</b> (Project development and alternatives).</p>   |
|                             | <ul style="list-style-type: none"> <li>• surface road upgrade works, including road widening, intersection treatment and grade separation works, property access, parking, pedestrian and cyclist facilities (including appropriate locations for overbridges) and public transport facilities</li> </ul> | <p>Construction activities associated with other bulk earthworks including upgrades and modifications to the surface road network are provided in <b>section 6.4</b>, bridge works in <b>section 6.4.3</b>, ancillary infrastructure and operational facilities in <b>section 6.4.4</b> and drainage and water management infrastructure in <b>section 6.4.5</b>.</p> <p>Direct and indirect impacts on property access are described in <b>Chapter 5</b> (Project description) and assessed in <b>Chapter 12</b> (Land use and property). Access to properties not acquired, leased or otherwise occupied for project purposes would be maintained at all times during construction and operation. Traffic management and access during construction is detailed in <b>section 6.6</b> and includes potential impacts and/or alterations to public transport services and pedestrian and cyclist facilities.</p> |

| Desired Performance Outcome | SEARs  | Where addressed in the EIS   |
|-----------------------------|--|--|
|                             | <ul style="list-style-type: none"> <li>ancillary infrastructure and operational facilities, such as operational and maintenance facilities, ventilation structures and systems, and fire and emergency services and infrastructure for the proposal, including (if required) additional infrastructure (such as tolling infrastructure) for the M4 East and New M5 Motorway</li> </ul> | <p>A description of the project is included in <b>Chapter 5</b> (Project description).</p> <p>Construction activities associated with ancillary infrastructure and permanent operational facilities are described in <b>section 6.4.4</b>.</p> <p>Construction activities associated with drainage and water management infrastructure are detailed in <b>section 6.4.5</b>.</p> <p>Construction activities associated with finishing works such as tolling infrastructure are detailed in <b>section 6.4.7</b>.</p> |
|                             | <ul style="list-style-type: none"> <li>location and operational requirements of construction ancillary facilities and access</li> </ul>  | <p>Construction ancillary facilities required to support the tunnelling and surface works associated with the project are described in <b>section 6.5</b>.</p>   |
|                             | <ul style="list-style-type: none"> <li>land use changes as a result of the proposal and the acquisition of privately owned, Council and Crown lands, and impacts on Council and Crown lands</li> </ul>   | <p>Temporary changes to access during construction are described in <b>section 6.6</b>.</p> <p>Land use changes as a result of the construction and operation of the project, including property acquisition and impacts on council and Crown lands, are detailed in <b>Chapter 12</b> (Land use and property).</p>  |

## 6.1 Construction strategy

The construction strategy for the project focuses on balancing the need for construction to occur in a safe and efficient manner, while managing constructability constraints and minimising impacts on local communities, the environment, and users of the surrounding road and other transport networks. The construction methodologies described in this EIS are based on the concept design for the project.

As described in **Chapter 1** (Introduction), this EIS has been prepared prior to the appointment of a design and construction contractor(s) and as such, the construction strategy presented and assessed in this EIS aims to provide an assessment of probable construction methodologies, while retaining flexibility for the contractor to refine the construction methodology following their appointment. This means that the detail of the design and construction approach presented in this concept design is indicative only, and is subject to detailed design to be carried out by the design and construction contractor(s). However, the design presented by the contractor(s) would be consistent with the environmental performance outcomes and environmental management measures described in this EIS, changes identified in a Submissions and Preferred Infrastructure Report, the conditions of approval for the project and other requirements identified during the assessment of the project.

The concept design considers two possible combinations for construction ancillary facilities around Haberfield and Ashfield. These are described and assessed in this EIS as Option A and Option B. The construction ancillary facilities that comprise these options have been grouped together and are denoted by the suffix *a* (for Option A) or *b* (for Option B) eg Wattle Street civil and tunnel site (C1a). The construction ancillary facilities that comprise these options have been selected to assist in informing the preferred combination of construction ancillary facilities that would be used to construct the project. The preferred combination would be determined during detailed design and would meet the environmental performance outcomes stated in the EIS and the Submissions and Preferred Infrastructure Report, satisfy criteria that would be identified in any relevant conditions of approval and manage environmental risks.

Further information on construction ancillary facilities is provided in **section 6.5**. Construction ancillary facilities are shown in overview in **Figure 6-1** and relative to the project's project footprint in **Figure 6-2** to **Figure 6-10**.

The concept design will continue to be refined where relevant to improve road network and safety performance, minimise impacts on receivers and the environment, and in response to feedback from stakeholders and the community. Changes made to the design may be subject to further assessment and consultation, if required by the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act).

### 6.1.1 General principles of the construction strategy

General principles of the construction strategy for the project include:

- The project would be constructed:
  - Generally in accordance with the description of the project in this EIS or as amended by the description in the Submissions and Preferred Infrastructure Report
  - In accordance with all procedures, commitments, preventative actions, performance criteria and mitigation measures set out in the EIS or as amended in the Submissions and Preferred Infrastructure Report (if required), and the project approval
- Design and plan efficient site layouts that ensure the safety of project staff and the public
- Make construction staging and sequencing as safe and efficient as possible, providing a simplified construction process (where practical) and assisting to minimise the duration and significance of impacts from construction works on nearby receivers
- Minimise the length of the construction period and the duration of construction activities, which would assist in minimising the duration of impacts on nearby receivers during construction
- Minimise disruptions to traffic on the existing road network - including during peak times - through construction staging and night works (where appropriate), to allow for safe construction while maintaining vehicle movements on the existing road network
- Where possible, locate temporary construction facilities on sites where permanent works are proposed
- Achieve safe, efficient and convenient access for construction vehicles, plant and equipment, while minimising impacts on the local road network by using state, regional and arterial roads, where possible, for heavy vehicle construction traffic. Some use of local roads by heavy vehicles delivering materials and/or equipment may be required, however this would be minimised as far as practicable
- Minimise adverse changes to the safety, efficiency and accessibility of road and related transport networks (including public transport and pedestrian and cyclist paths) and ensure ongoing community access and connectivity
- Minimise interdependencies between the construction disciplines of tunnelling, surface works, and mechanical and electrical fitout and commissioning to allow for construction activities to occur at the same time, reducing the duration and impact of construction works
- Manage risks to existing infrastructure including roads, railways, utilities and services



- Minimise impacts on parking by providing off-street parking for the construction workforce and encouraging the use of alternative transport (such as buses and light rail) to construction ancillary facilities and construction work sites, where practical
- Manage community and environmental issues including noise, access, amenity and general disruption
- Carry out construction during the hours detailed in the project approval.

### 6.1.2 Construction staging

As described in **Chapter 5** (Project description), the project would be constructed and opened to traffic in two stages.

Stage 1 would include:

- Construction of the mainline tunnels between the M4 East at Haberfield and the New M5 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 tunnels open to traffic in 2022. At the completion of Stage 1, the mainline tunnels would operate with two traffic lanes in each direction. This would increase to generally four lanes at the completion of Stage 2, when the full project is operational.

Stage 2 would include:

- Construction of the Rozelle interchange and Iron Cove Link including:
  - Connections to the stub tunnels at the Inner West subsurface interchange (built during Stage 1)
  - Ancillary infrastructure at the Rozelle West motorway operations complex (MOC2), Rozelle East motorway operations complex (MOC3) and Iron Cove Link motorway operations complex (MOC4)
  - Connections to the surface road network at Lilyfield and Rozelle
  - 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
- Stage 2 works are expected to commence in 2019 with these components of the project open to traffic in 2023.

The total construction period for both stages of the project is expected to be around five years, which includes commissioning that would occur concurrently with the final stages of construction. Further staging details would be confirmed when construction contractors have been engaged.

The potential benefits of a staged opening of the project are detailed in **Chapter 4** (Project development and alternatives). An assessment of the traffic and transport impacts of opening the project in stages is included in **Chapter 8** (Traffic and transport).

### Stage 1 – mainline tunnels

The key elements of the project that would be constructed during Stage 1 include:

- Temporary access tunnels to provide construction access to the mainline tunnels from the following construction ancillary facilities:
  - Parramatta Road West civil and tunnel site (C1b) at Ashfield
  - Darley Road civil and tunnel site (C4) at Leichhardt
  - Pyrmont Bridge Road tunnel site (C9) at Camperdown
  - Campbell Road civil and tunnel site (C10) at St Peters

- Twin, mainline tunnels connecting the M4 East/Wattle Street interchange at Haberfield and the New M5/St Peters interchange at St Peters
- Finishing works, including pavement and line marking, at the Wattle Street interchange and the St Peters interchange (which are being built as part of the M4 East and New M5 projects respectively) to integrate the M4–M5 Link entry and exit ramps into these interchanges
- Underground stub tunnels at the Inner West subsurface interchange that would enable future connections between the mainline tunnels and the Rozelle interchange
- Mechanical and electrical fitout of a section of the Parramatta Road ventilation facility (being built as part of M4 East project) to enable use of this facility by the M4-M5 Link project
- Construction of the Darley Road motorway operations complex (MOC1) at Leichhardt including the permanent water treatment facility and substation
- Construction of The Campbell Road motorway operations complex (MOC5) at St Peters including the Campbell Road ventilation facility and an intake substation for the mainline tunnels
- Utility works including protection and/or adjustment of existing utilities, removal of redundant utilities and installation of new utilities
- Earthworks and landscaping works adjacent to permanent operational infrastructure such as the Campbell Road ventilation facility, the Darley Road water treatment facility and electrical substations.

Rehabilitation and landscaping works around the Wattle Street interchange at Haberfield and the St Peters interchange at St Peters would be in accordance with the respective M4 East and New M5 project conditions of approval and Urban Design and Landscape Plans that have been prepared for these projects.

## **Stage 2 – Rozelle interchange and Iron Cove Link**

The key elements of the project that would be constructed during Stage 2 include:

- Tunnel connections between the stub tunnels at the Inner West subsurface interchange (constructed as part of Stage 1), the Rozelle interchange, the Iron Cove Link and the surface road network
- Tunnel portals, dive structures and cut-and-cover tunnels to connect the Rozelle interchange and the Iron Cove Link with the surface road network
- Upgrades and modifications to the surface road network at Lilyfield and Rozelle including City West Link, The Crescent and Victoria Road/Anzac Bridge approach
- Widening and realignment of Victoria Road at the eastern abutment of Iron Cove Bridge to allow for the tunnel portals, dive structures and cut-and-cover tunnels associated with the Iron Cove Link to be built between the Victoria Road eastbound (northern) and westbound (southern) carriageways
- Civil construction to provide connections to the proposed future Western Harbour Tunnel and Beaches Link, including:
  - Tunnels that would allow for underground connections between the M4 East and New M5 motorways and the proposed future Western Harbour Tunnel and Beaches Link (via the M4-M5 Link mainline tunnels)
  - A dive structure, portals and entry and exit ramps (below ground) extending from the Rozelle Rail Yards to the Western Harbour Tunnel and Beaches Link connection tunnels. This would enable future surface connections between the City West Link/The Crescent intersection and the proposed future Western Harbour Tunnel and Beaches Link tunnels
- Minor surface works to local roads
- A constructed wetland, a bioretention basin, bioretention swales and drainage channels at the Rozelle interchange within the Rozelle Rail Yards
- Naturalisation of a section of Whites Creek between The Crescent and Rozelle Bay

- Upgrade and widening of the culvert between the Rozelle Rail Yards and Rozelle Bay, including construction of a new headwall and outlet into Rozelle Bay northeast of the City West Link/The Crescent intersection
- A bioretention facility within King George Park, adjacent to Manning Street at Rozelle, and upgrades to the drainage network along Byrnes Street to pipe water from Victoria Road to the new bioretention facility. Construction works would also include upgrades and improvements to the informal car park at this location. An equivalent number of car parking spaces would be provided as a result of these upgrades and improvements
- Construction of the Rozelle West motorway operations complex (MOC2) including a ventilation supply building and a substation
- Construction of the Rozelle East motorway operations complex (MOC3) including a ventilation exhaust facility and three ventilation outlets. Two of these ventilation outlets would be used for the M4-M5 Link project. The third outlet would be constructed for use by the proposed future Western Harbour Tunnel and Beaches Link project. This outlet would only become operational if this project is approved
- Construction of the Iron Cove Link motorway operation complex (MOC4) including the Iron Cove Link ventilation facility. This facility would be split with the ventilation outlet located between the eastbound and westbound Victoria Road carriageways and the ventilation exhaust facility and associated infrastructure located south of Victoria Road between Springside Street and Toelle Street
- Utility works including protection and/or adjustment of existing utilities, removal of redundant utilities and installation of new utilities
- New and upgraded pedestrian and cyclist facilities at Rozelle and Lilyfield
- Earthworks and landscaping works, including:
  - Adjacent to permanent operational infrastructure such as ventilation facilities, water treatment facilities and substations
  - Adjacent to disturbed areas, such as surface roads that are being upgraded and improved as part of the project
  - Within the Rozelle Rail Yards, associated with the provision of new open space at this location
  - Around the Iron Cove Link tunnel portals, and south of Victoria Road at Rozelle between around Springside Street and Byrnes Street.

The construction strategy recognises that project delivery duration is significantly influenced by the complexity and magnitude of the interfaces between tunnelling activities and the construction of the surface civil structures and would seek to reduce the overall duration of construction, to minimise risk to delivery timing and impacts on nearby communities, including cumulative impacts from construction at Haberfield and St Peters.

## 6.2 Construction program

As described in **section 6.1.2**, the project would be constructed and opened to traffic in two stages. An indicative construction program is shown in **Table 6-2**.

Table 6-2 Indicative construction program

| Construction activity   | Indicative construction timeframe |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |
|---|-----------------------------------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|
|   | 2018                              |    |    |    | 2019 |    |    |    | 2020 |    |    |    | 2021 |    |    |    |
|   | Q1                                | Q2 | Q3 | Q4 | Q1   | Q2 | Q3 | Q4 | Q1   | Q2 | Q3 | Q4 | Q1   | Q2 | Q3 | Q4 |
| <b>Mainline tunnels</b>   |                                   |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |
| Site establishment and establishment of construction ancillary facilities |                                   |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |
| Utility works and connections   |                                   |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |
| Tunnel construction   |                                   |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |
| Portal construction   |                                   |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |
| Construction of permanent operational facilities                          |                                   |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |
| Mechanical and electrical fitout works                                    |                                   |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |
| Establishment of tolling facilities                                       |                                   |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |
| Site rehabilitation and landscaping                                       |                                   |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |
| Surface road works  |                                   |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |
| Demobilisation and rehabilitation   |                                   |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |
| Testing and commissioning   |                                   |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |
| <b>Rozelle interchange and Iron Cove Link</b>                             |                                   |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |
| Site establishment and establishment of construction ancillary facilities |                                   |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |
| Utility works and connections and site remediation                        |                                   |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |
| Tunnel construction   |                                   |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |
| Portal construction   |                                   |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |
| Construction of surface road works  |                                   |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |
| Construction of permanent operational facilities                          |                                   |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |
| Mechanical and electrical fitout works                                    |                                   |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |
| Establishment of tolling facilities                                       |                                   |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |
| Site rehabilitation and landscaping                                       |                                   |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |
| Demobilisation and rehabilitation   |                                   |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |
| Testing and commissioning   |                                   |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |

### 6.3 Project footprint

The area required for construction and/ or operation of the project is referred to as the 'project footprint'. The project footprint comprises the construction ancillary facility footprint (see **section 6.5** for details about construction ancillary facilities) and additional areas where work would be required to construct the project. In addition, utility works to support the project would occur within and outside the project footprint. These are identified as areas of interest in **Appendix F** (Utilities Management Strategy).

An overview of the project footprint is shown in **Figure 6-1**, with greater detail provided in **Figure 6-2** to **Figure 6-10**. The types of activities that would occur within the project footprint are identified in **section 6.4**.

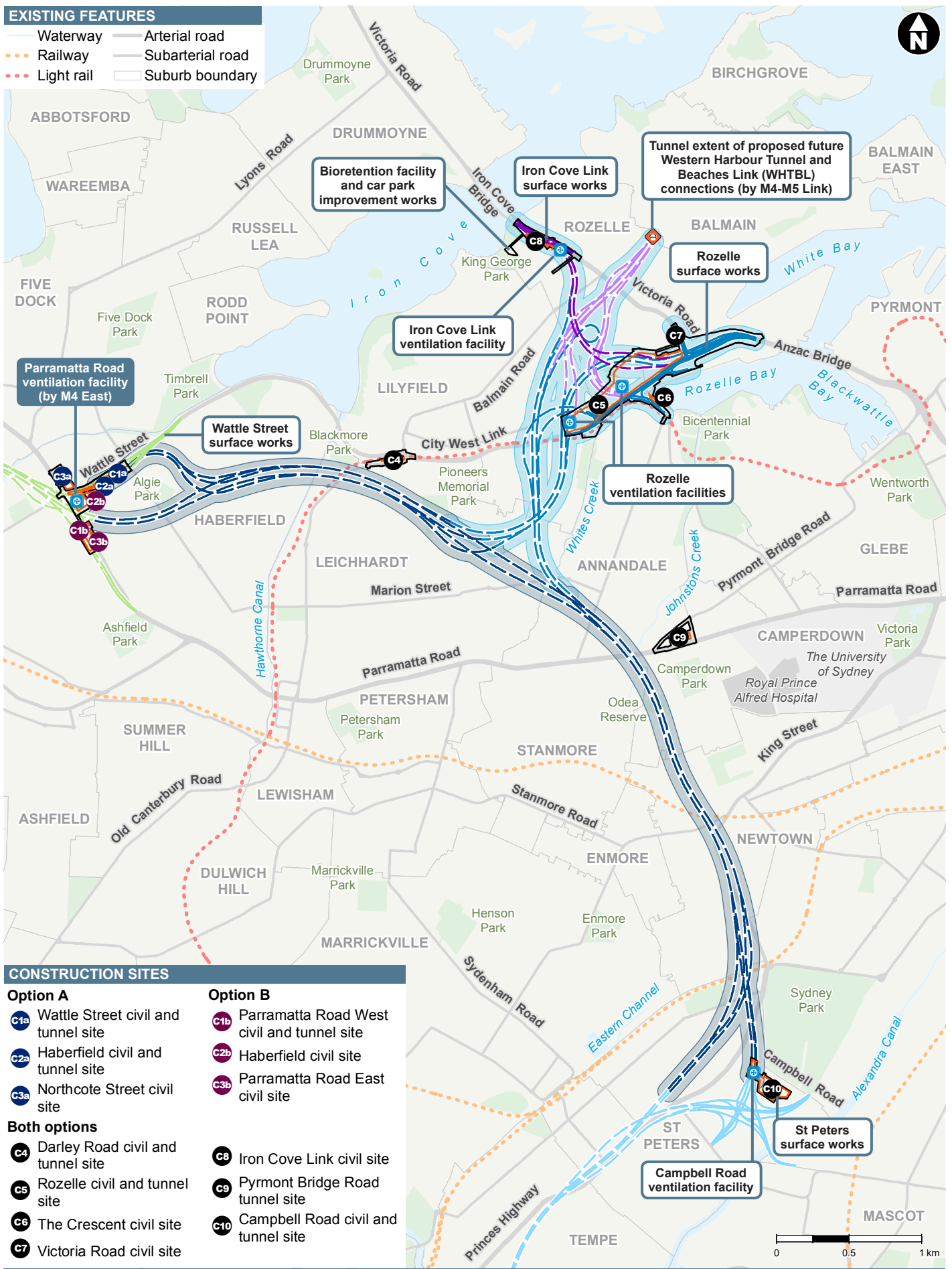


Figure 6-1 Overview of project footprint and construction ancillary facilities





#### LEGEND

##### M4 East

- Tunnel
- Surface road
- Land subject to M4 East UDLP

##### M4-M5 Link Boundaries

- Project footprint
- Ancillary facility
- Surface works

##### Underground construction

- Mainline tunnel
- Temporary access tunnel

##### Project features

- ⊕ Ventilation outlet
- ⊕ Ventilation facility

##### A Includes

- Utility treatments
- Traffic management changes and measures
- Installation of safety and environmental controls
- Establishment of temporary pedestrian and cyclist diversions (if required)

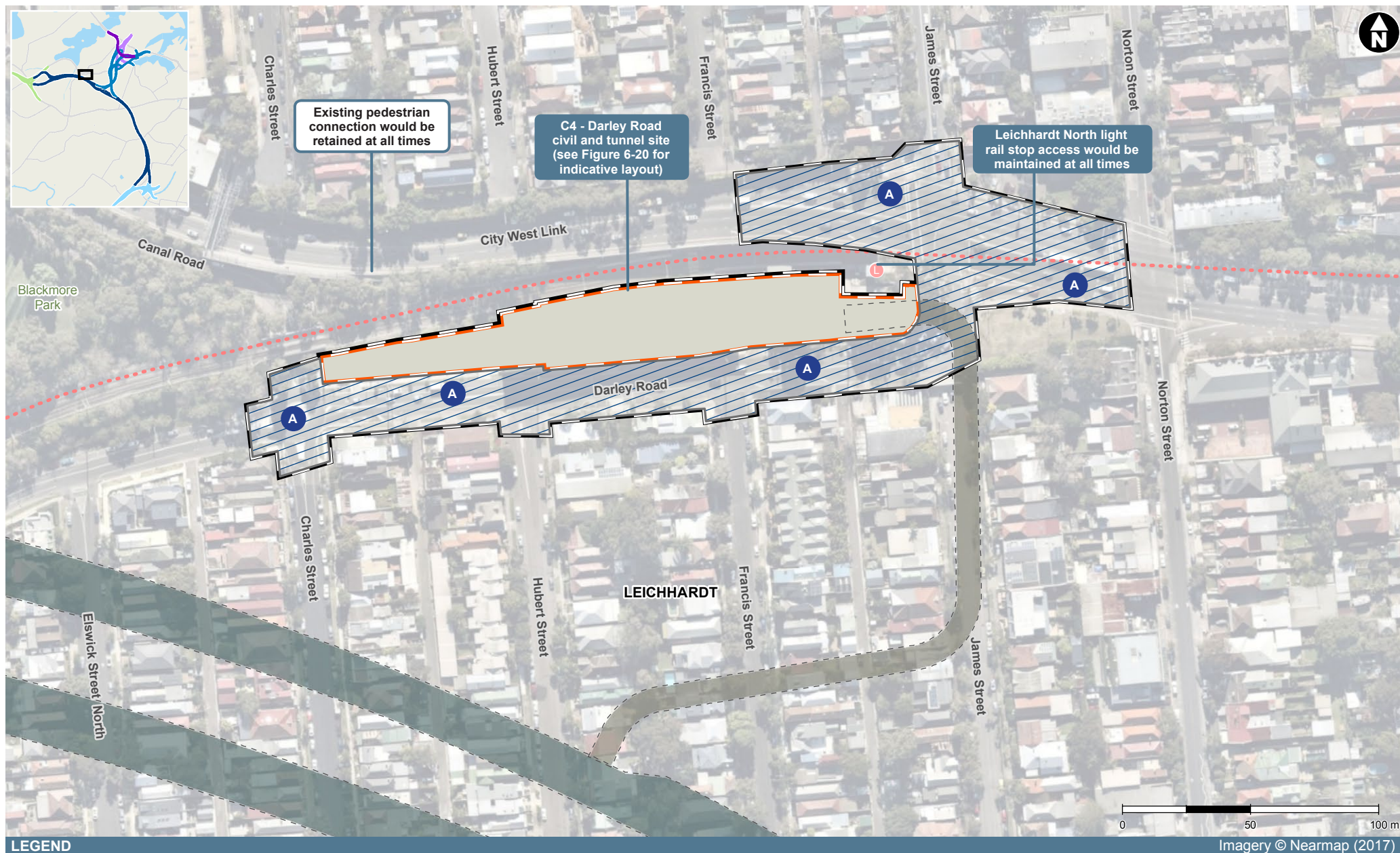
Figure 6-2 Project footprint – Map 1 (Option A)





Figure 6-3 Project footprint – Map 1 (Option B)





#### LEGEND

##### Existing infrastructure M4-M5 Link

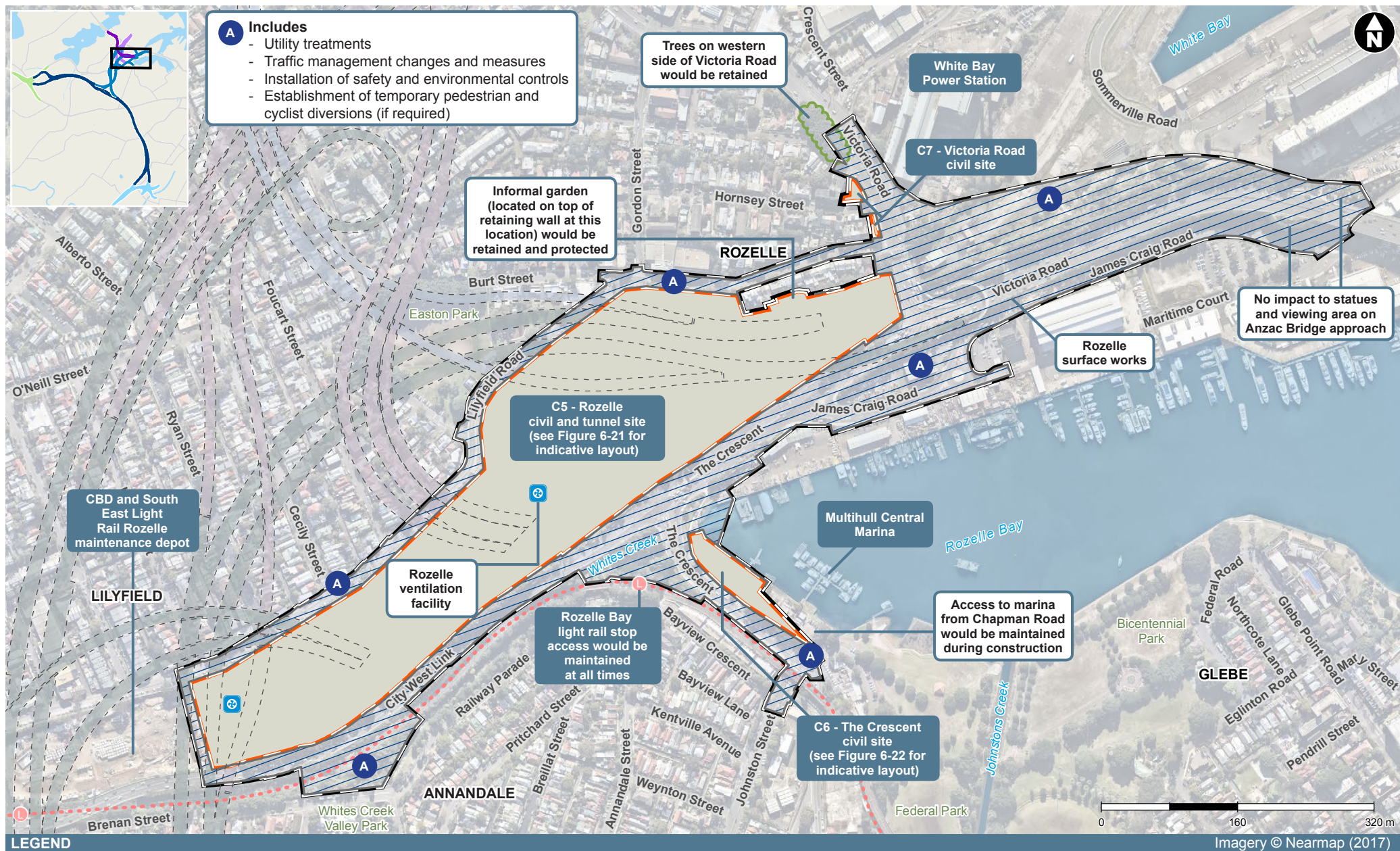
|                   |                      |                                 |
|-------------------|----------------------|---------------------------------|
| --- Light rail    | <b>Boundaries</b>    | <b>Underground construction</b> |
| Ⓛ Light rail stop | ▬ Project footprint  | ▨ Mainline tunnel               |
|                   | ▬ Ancillary facility | ▨ Temporary access tunnel       |
|                   | ▨ Surface works      |                                 |

##### A Includes

- Utility treatments
- Traffic management changes and measures
- Installation of safety and environmental controls
- Establishment of temporary pedestrian and cyclist diversions (if required)

Figure 6-4 Project footprint – Map 2





#### LEGEND

##### Existing infrastructure M4-M5 Link

- Light rail
- Light rail stop

##### Boundaries

- Project footprint
- Ancillary facility
- Surface works
- Rozelle interchange tunnel
- Iron Cove Link tunnel

##### Underground construction

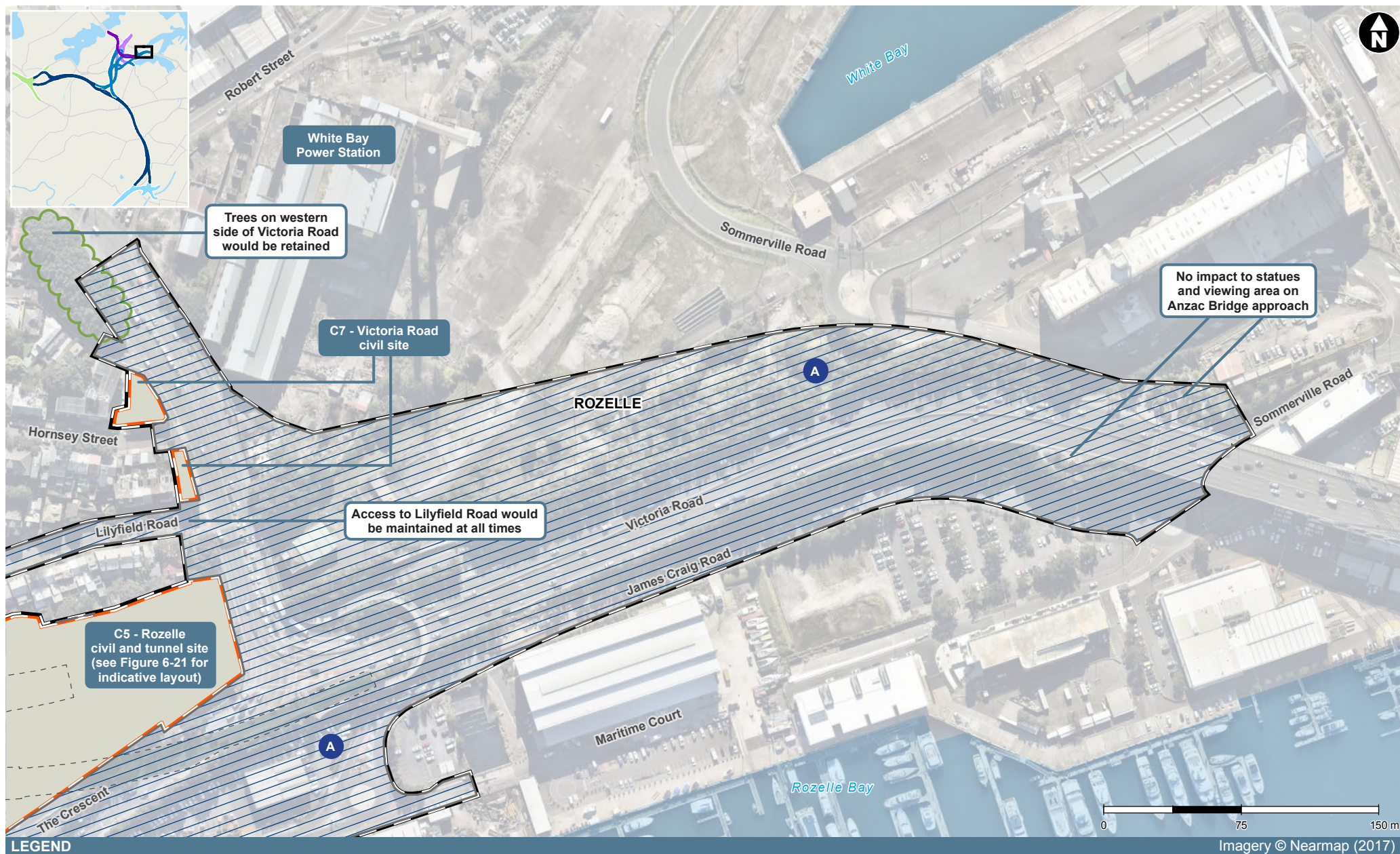
- Proposed future WHTBL connections (civil)
- Proposed future WHTBL construction only)

##### Project features

- Ventilation facility

Figure 6-5 Project footprint – Map 3





#### LEGEND

#### M4-M5 Link

#### Boundaries

Project footprint

Ancillary facility

Surface works

#### Underground construction

Rozelle interchange tunnel

#### A Includes

- Utility treatments
- Traffic management changes and measures
- Installation of safety and environmental controls
- Establishment of temporary pedestrian and cyclist diversions (if required)

Figure 6-6 Project footprint – Map 4





#### LEGEND

##### Existing infrastructure M4-M5 Link

- Light rail
- Ⓛ Light rail stop
- ▬ Project footprint
- ▬ Ancillary facility
- ▬ Surface works

##### Boundaries

#### A Includes

- Utility treatments
- Traffic management changes and measures
- Installation of safety and environmental controls
- Establishment of temporary pedestrian and cyclist diversions (if required)

Figure 6-7 Project footprint – Map 5



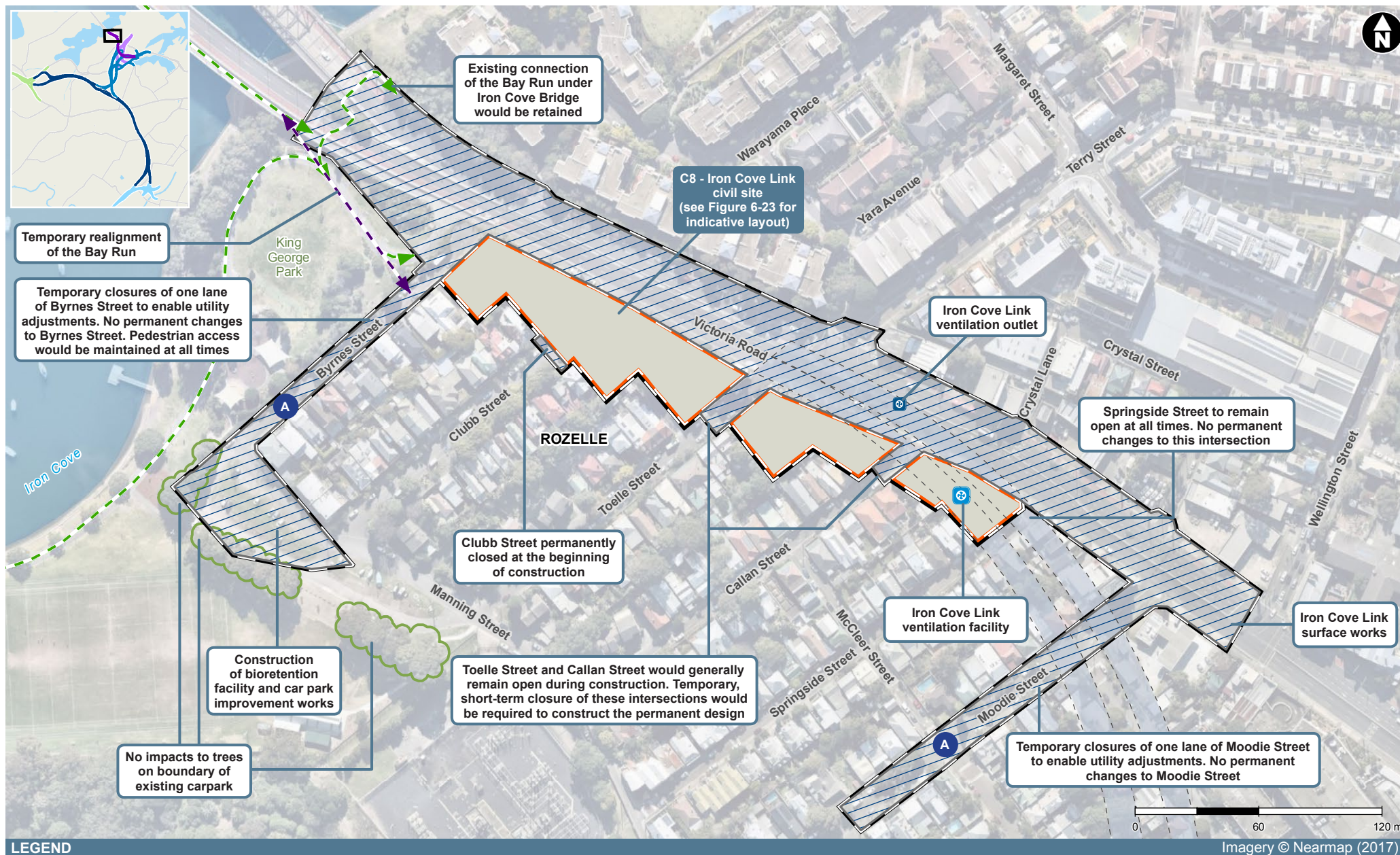


Figure 6-8 Project footprint – Map 6







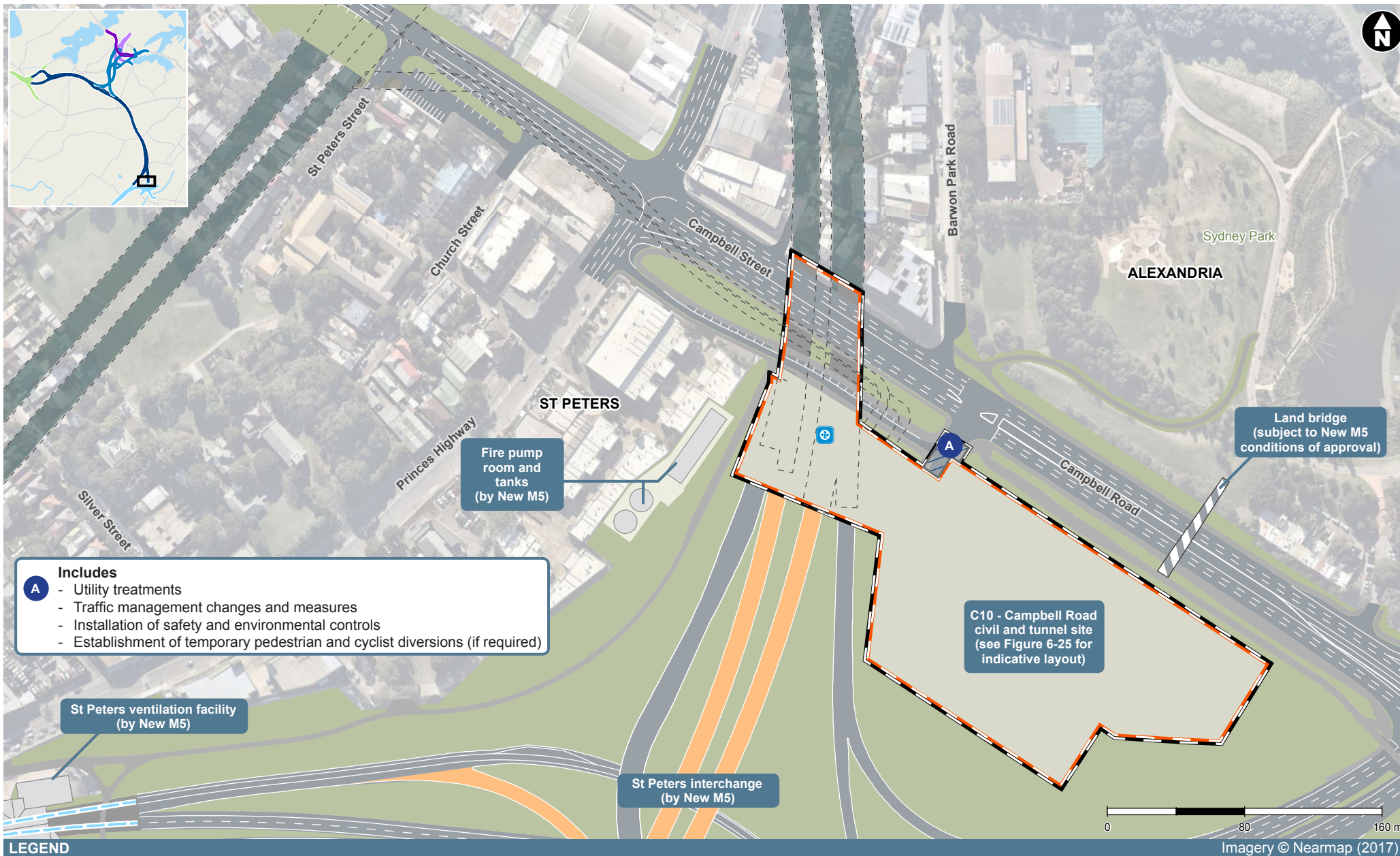


Figure 6-10 Project footprint – Map 8

## 6.4 Project construction activities

The proposed construction activities for the project would include site establishment and enabling works, tunnelling activities, and surface civil, road and building works. These activities are summarised in **Table 6-3** and detailed in the respective sections of this chapter.

**Table 6-3 Overview of construction activities**

| Component                             | Typical activities   |
|---------------------------------------|--|
| Site establishment and enabling works | <ul style="list-style-type: none"> <li>• Vegetation clearing and removal</li> <li>• Utility works</li> <li>• Traffic management measures</li> <li>• Install safety and environmental controls</li> <li>• Install site fencing and hoarding</li> <li>• Establish temporary noise attenuation measures</li> <li>• Demolish buildings and structures</li> <li>• Carry out site clearing</li> <li>• Heritage salvage or conservation works (if required)</li> <li>• Establish construction ancillary facilities and access</li> <li>• Establish acoustic sheds</li> <li>• Supply utilities (including construction power) to construction facilities</li> <li>• Establish temporary pedestrian and cyclist diversions</li> </ul> |
| Tunnelling                            | <ul style="list-style-type: none"> <li>• Construct temporary access tunnels</li> <li>• Excavate mainline tunnels, entry and exit ramps and associated tunnelled infrastructure and install ground support</li> <li>• Spoil management and haulage</li> <li>• Finishing works in tunnel and provision of permanent tunnel services</li> <li>• Test plant and equipment</li> </ul>   |
| Surface earthworks and structures     | <ul style="list-style-type: none"> <li>• Vegetation clearing and removal</li> <li>• Topsoil stripping</li> <li>• Excavate new cut and fill areas</li> <li>• Construct dive and cut-and-cover tunnel structures</li> <li>• Install stabilisation and excavation support (retention systems) such as sheet pile walls, diaphragm walls and secant pile walls (where required)</li> <li>• Construct required retaining structures</li> <li>• Excavate new road levels</li> </ul>  |
| Bridge works                          | <ul style="list-style-type: none"> <li>• Construct piers and abutments</li> <li>• Construct headstocks</li> <li>• Construct bridge decks, slabs and girders</li> <li>• Demolish and remove redundant bridges</li> </ul>  |
| Drainage                              | <ul style="list-style-type: none"> <li>• Construct new pits and pipes</li> <li>• Construct new groundwater drainage system</li> <li>• Connect drainage to existing network</li> <li>• Construct sumps in tunnels as required</li> <li>• Construct water quality basins, constructed wetland, and bioretention facility and basin</li> <li>• Construct drainage channels</li> <li>• Construct spill containment basin</li> <li>• Construct onsite detention tanks</li> <li>• Adjustments to existing drainage infrastructure where impacted</li> <li>• Carry out widening and naturalisation of a section of Whites Creek</li> <li>• Demolish and remove redundant drainage</li> </ul>  |
| Pavement                              | <ul style="list-style-type: none"> <li>• Lay select layers and base</li> <li>• Lay road pavement surfacing</li> <li>• Construct pavement drainage</li> </ul>   |



| Component                        | Typical activities  |
|----------------------------------|---|
| Operational ancillary facilities | <ul style="list-style-type: none"> <li>• Install ventilation systems and facilities</li> <li>• Construct water treatment facilities</li> <li>• Construct fire pump rooms and install water tanks</li> <li>• Test and commission plant and equipment</li> <li>• Construct electrical substations to supply permanent power to the project</li> </ul>   |
| Finishing works                  | <ul style="list-style-type: none"> <li>• Line mark to new road surfaces</li> <li>• Erect directional and other signage and other roadside furniture such as street lighting</li> <li>• Erect toll gantries and other control systems</li> <li>• Construct pedestrian and cyclist paths</li> <li>• Carry out earthworks at disturbed areas to establish the finished landform</li> <li>• Carry out landscaping</li> <li>• Closure and backfill of temporary access tunnels (except where these are to be used for inspection and/or maintenance purposes)</li> <li>• Site demobilisation and preparation of the site for a future use</li> </ul> |

#### 6.4.1 Site establishment and establishment of construction ancillary facilities

Site establishment works for major infrastructure are typically commenced before the start of substantial construction to make ready the key construction sites, including construction ancillary facilities, and provide protection to the public. Site establishment works are expected to include the following:

- Vegetation clearing and removal
- Utility works including protection and/or adjustment of existing utilities, removal of redundant utilities, and the installation of new utilities
- Installation of traffic management measures and changes
- Installation of sediment and erosion control measures
- Installation of other environmental controls (such as screening and noise attenuation)
- Installation of site fencing and hoarding
- Demolition and clearing of structures, including buildings
- Heritage salvage (if required)
- Establishment of acoustic sheds
- Installation of site offices and crib rooms
- Establishment of temporary pedestrian and cyclist diversions.

#### 6.4.2 Tunnelling

##### Tunnel excavation

The project would involve tunnel excavation for:

- Twin mainline tunnels, each around 7.5 kilometres long, including connections to the Wattle Street and St Peters interchanges
- The Rozelle interchange, including entry and exit ramps to connect with the surface road network
- The Iron Cove Link
- Connections to the proposed future Western Harbour Tunnel and Beaches Link tunnels at Rozelle
- Temporary access tunnels
- Pedestrian cross-passages and longitudinal egress passages for emergency egress

- Vehicular cross-passages
- Low point sumps (engineered depressions in which water collects). Collected water would be piped to a water treatment facility
- Ventilation tunnels.

The depth of the tunnels below ground level would vary according to geological conditions. The deepest point of the tunnel crowns (top of the tunnels) would be about 65 metres below ground level, with shallower sections approaching the interchanges and the connections to the surface road network. The indicative depths of the tunnel below ground level are shown in **Figure 6-11** (mainline tunnels) and **Figure 6-12** (Rozelle interchange and Iron Cove Link). A long-section of the tunnels is included in **Appendix E** (Geological long-sections).

The tunnel excavation methods would be confirmed by the contractors engaged to construct the project. An indicative description of the likely tunnel excavation process is provided below. It is anticipated that the tunnels would be excavated using a heading and bench construction methodology as determined in **Chapter 4** (Project development and alternatives). Excavation of the heading (top section of the tunnel) would be carried out using roadheaders, launched from the tunnelling sites. A roadheader is an excavation machine consisting of a boom-mounted, rotating cutter head fitted on bulldozer-style tracks (for moving the machine around), and a loader device (usually on a conveyor). An indicative tunnel excavation method using roadheaders is illustrated in **Figure 6-13**.

The bench (lower section) in the mainline tunnels could be excavated using a profiler or roadheader. Another technique that may be used for excavating the bench is by controlled blasting, which would reduce the reliance on roadheaders. The controlled blasting method involves a sequence of:

- Drilling holes and charging the holes with explosive
- Blasting
- Removal of loosened material (mucking out).

Blasting methods can significantly reduce potential exposure to noise and vibration for residents and businesses above the tunnels. If blasting is proposed, a Blast Management Strategy will be prepared in accordance with relevant guidelines before blasting begins. Blast patterns would be designed and sequenced to minimise impacts of vibration on properties above the tunnels and on existing below ground infrastructure such as utilities. Blasting would only be undertaken underground and only in locations where the geology is suitable for safe and effective use. An assessment of the impacts on receivers at the surface from blasting during construction is provided in **Chapter 10** (Noise and vibration). Entry and exit ramp tunnels would be constructed primarily using roadheaders.

Cross-passages between the tunnels would typically be about 5.4 metres wide. Some cross-passages would be used to move excavation machinery between the tunnels, to allow movement of plant in both directions. Cross-passages would typically be excavated by blasting techniques, excavated by roadheaders or excavators with rock hammers.

For the entry and exit ramps, connection to an adjoining tunnel is in some cases impractical and therefore the use of longitudinal egress passages would be required. Longitudinal egress passages would be constructed where the adjoining entry and exit ramps are separated by long distances, are at significantly different elevations or are on either side of the mainline tunnels, which prevents the use of a level cross-passage. Where the ramps begin to move closer to each other, both in separation distance and elevation, the longitudinal egress passages would end and cross-passages would be provided. Cross-passages would typically be excavated by blasting techniques, roadheaders or excavators with rock hammers.

Ground support, including rock bolting and shotcrete, would be installed as the tunnelling face is advanced. Tunnel lining would also be installed progressively following tunnel excavation. The type of lining would depend on the local geology and groundwater inflows:

- In areas that are predominantly dry and occur within low permeability sandstone, a sprayed shotcrete lining will generally be used
- In areas with medium groundwater inflows, a sprayed or sheet waterproofing membrane could be installed, with a shotcrete or cast in situ concrete secondary lining
- Where there are significant groundwater inflows, grouting may also be used to reduce the permeability of the surrounding rock mass.

Tunnelling launch and support sites would be required, as outlined in **section 6.5**. Each tunnelling site would provide support services for the tunnelling activity including power supply, ventilation, water supply, construction water treatment plants, workforce facilities, and spoil handling and removal areas and facilities. At the tunnel launch sites, construction access tunnels that connect to the tunnels would be excavated in generally the same manner as the tunnels.

In addition to the tunnels and entry and exit ramps, the following tunnelled infrastructure would be constructed using either roadheaders, excavators with rock hammers, or blasting:

- Temporary access tunnels to access the road and ventilation tunnels from construction ancillary facilities
- Ventilation shafts and tunnels
- Niches for underground substations
- Breakdown and maintenance bays.

### **Tunnel civil finishing works**

On completion of the tunnel excavation works, a variety of civil finishing works would be carried out, including:

- Installation of stormwater and groundwater drainage systems, including sumps
- Application of waterproofing membrane (where required)
- Finishing of:
  - Cross-passages and longitudinal egress passages
  - Substation niches
- Pavement construction and line marking
- Installation of:
  - Electrical and communication conduits
  - Deluge and hydrant fire mains
  - Road furniture (eg lighting, signage)
  - Architectural panels
- Painting.

### **Tunnel fitout**

Following tunnel excavation and civil finishing works, the tunnels would be fitted out with operational infrastructure including power, ventilation systems, fire safety systems, communications, traffic control device and systems, tunnel lighting, tolling infrastructure and the operations management and control systems.

This would be followed by a comprehensive commissioning process to validate the operation and integration of tunnel systems before the M4-M5 Link tunnels open.

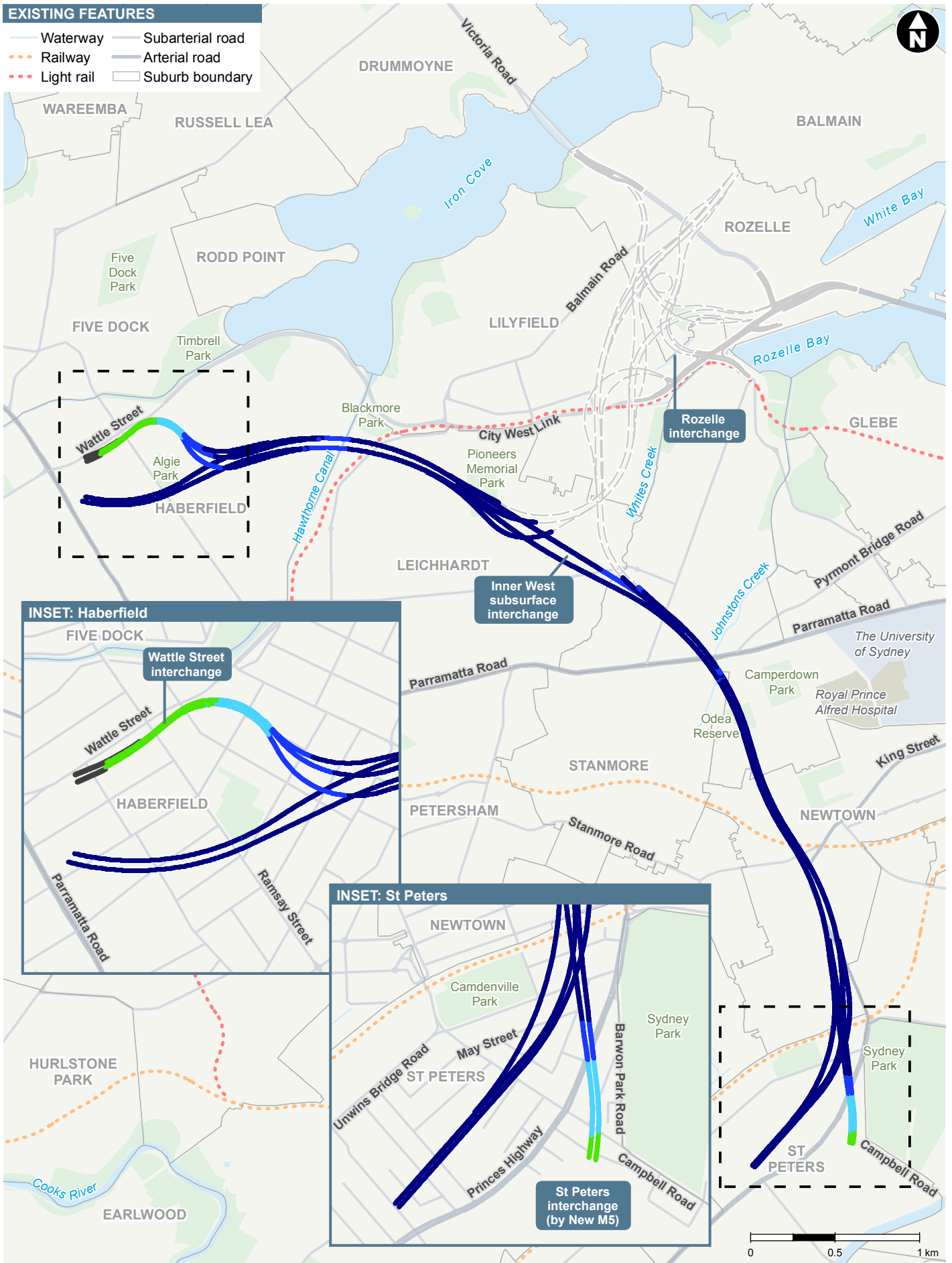


Figure 6-11 Indicative tunnel depths - mainline tunnels

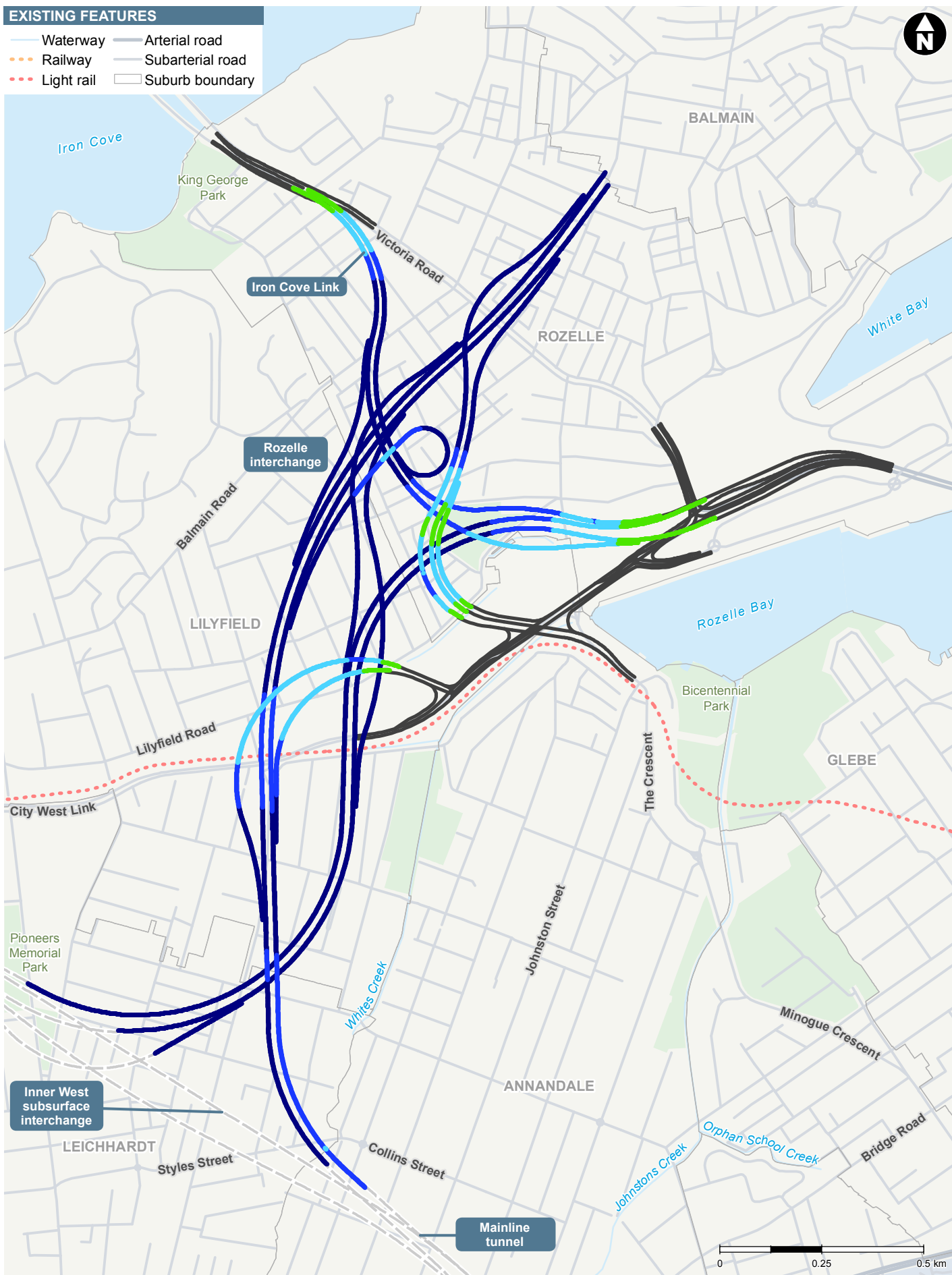
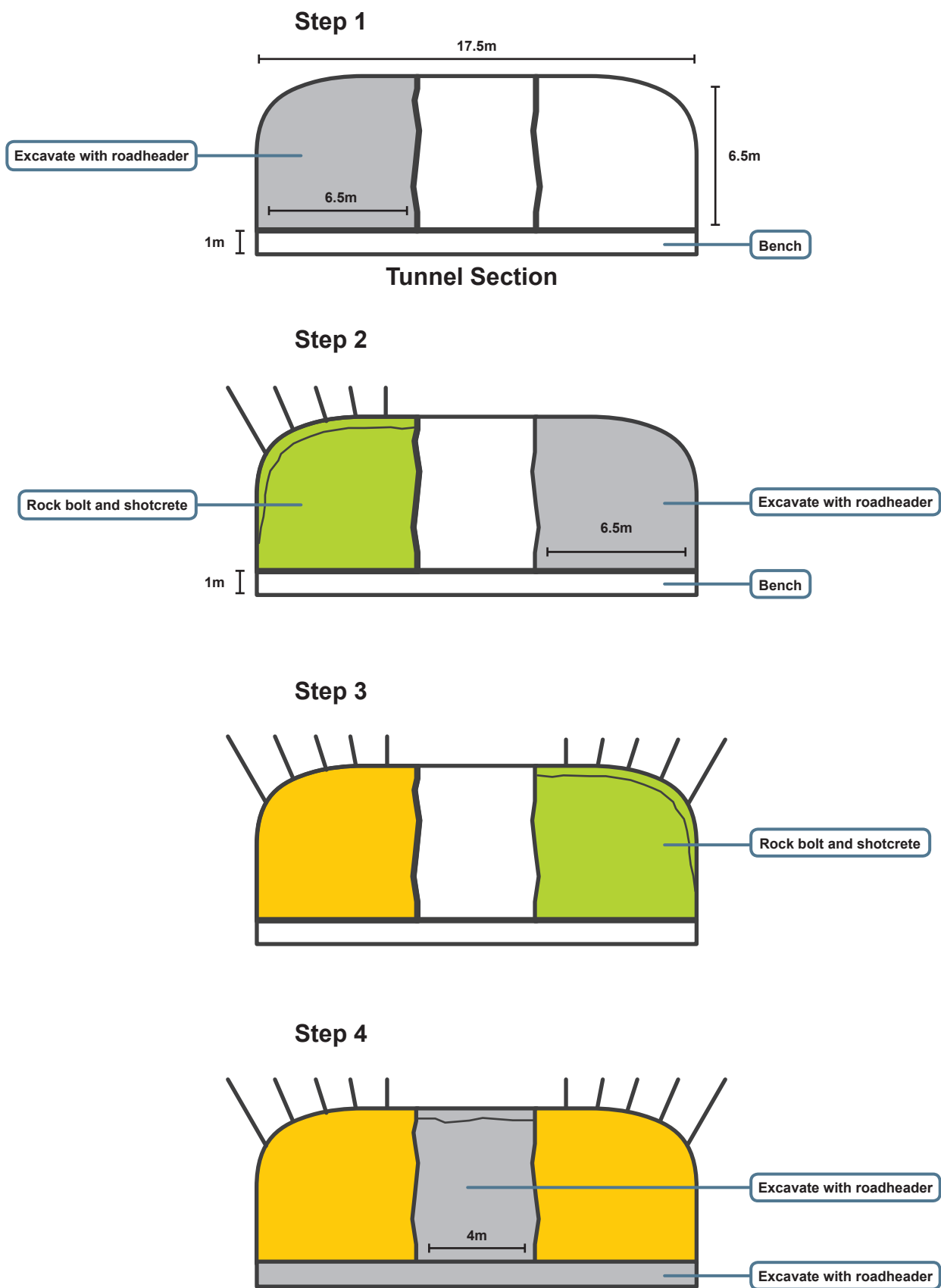


Figure 6-12 Indicative tunnel depths - Rozelle interchange and Iron Cove Link

## Excavation Sequence



### LEGEND

- Excavation with roadheader
- Rock bolt and shotcrete
- Completed tunnel excavation

Figure 6-13 Indicative roadheader excavation method

## Other bulk earthworks

In addition to tunnel excavation, bulk earthworks would be required for:

- Tunnel drive and cut-and-cover structures
- Managing any contaminated land identified or encountered during site establishment and construction. Further information on contamination is provided in **Chapter 16** (Contamination)
- Constructing the public open space at the Rozelle Rail Yards and around the Iron Cove Link tunnel portals
- Surface road works
- Constructing road and pedestrian and cyclist bridges
- Drainage structures including the constructed wetland, drainage channels, bioretention swales and a bioretention facility
- Utility works including protection and/or adjustment of existing utilities, removal of redundant utilities and installation of new utilities.

'Cut-and-cover' is a tunnel excavation methodology that generally involves excavating downwards from the surface of the ground, and installing a tunnel structure including a base, walls and a roof. Once the roof is in place, surface activity can generally resume as construction works continue below. Five cut-and-cover structures would be constructed for the project at locations where the tunnels are close to the surface (ie at the tunnel portals) including:

- Tunnel portals at the Rozelle interchange, comprising:
  - The New M5 to City West Link tunnel portals
  - The M4 East and Iron Cove Link to Victoria Road/Anzac Bridge tunnel portals
  - The proposed future Western Harbour Tunnel and Beaches Link to City West Link/The Crescent tunnel portals
- The Iron Cove Link tunnel portals on Victoria Road at Rozelle near the eastern abutment of Iron Cove Bridge
- A cut-and-cover structure about 60 metres long over the southbound exit ramp at the St Peters interchange, to extend the tunnel to accommodate ventilation exhaust arrangements.

Cut-and-cover structures for the entry and exit ramps at the Wattle Street interchange are being constructed as part of the M4 East project.

Typical construction activities associated with these structures would include:

- Excavation
- Stabilisation and excavation support (retention systems) such as sheet pile walls, diaphragm walls and secant pile walls (where required)
- Piling works
- Construction of pile capping beams
- Installation of temporary and permanent roof beams
- Installation of permanent struts and form, reinforcement and pouring of horizontal beams used for bracing and support
- Waterproofing
- Finishing works.

## Surface works

Earthworks would be required for the construction of above ground sections of the project, including the Rozelle surface works and the Iron Cove Link surface works. Earthworks for surface works would be completed using conventional methods of construction and may include the following:

- Vegetation clearing and topsoil stripping
- Areas of new cut and fill, and widening of existing cuts and embankments, including construction of retaining walls and reinforced soil walls to design levels
- Installation of drainage infrastructure
- Utility works including protection and/or adjustment of existing utilities, removal of redundant utilities and installation of new utilities.

### 6.4.3 Bridge works

The project would involve the replacement of two road bridges and the construction of new pedestrian and cyclist bridges. Details on these new and replacement bridges are provided in **Chapter 5** (Project description). Construction of new and replacement bridges would generally involve:

- For road bridges, establishment of traffic management controls to create safe work areas and maintain traffic flow
- Construction of the substructure (piers and abutments), likely to be from cast in situ concrete, in the following sequence:
  - Piling works, such as driven or bored piles
  - Pile cap construction including localised excavation around the piles
  - Pier or column construction
- Construction of the headstock (pier cap, which transfers loads from the superstructure to the piers)
- Construction of the superstructure (bridge deck, slab and girders), likely to be through the placement of precast concrete segments
- Road pavement installation and associated works
- Installation of street furniture including signage and lighting.

### 6.4.4 Construction of permanent operational infrastructure

As detailed in section 5.8 of **Chapter 5** (Project description), permanent operational infrastructure would be required for the ongoing management and operation of the project. This operational infrastructure would be mainly located in five motorway operations complexes:

- The Darley Road motorway operations complex (MOC1), to be constructed on the site of the Darley Road civil and tunnel site (C4)
- The Rozelle West motorway operations complex (MOC2), to be constructed on the site of the Rozelle civil and tunnel site (C5)
- The Rozelle East motorway operations complex (MOC3), to be constructed on the site of the Rozelle civil and tunnel site (C5)
- The Iron Cove Link motorway operations complex (MOC4), to be constructed on the site of the Iron Cove civil site (C8). This would also include land between the eastbound and westbound carriageways of Victoria Road to accommodate the ventilation exhaust outlet for the Iron Cove Link ventilation facility
- The Campbell Road motorway operations complex (MOC5), to be constructed on the site of the Campbell Road civil and tunnel site (C10).



Key operational infrastructure to be constructed within the motorway operations complexes would include:

- Two water treatment plants; one at the Darley Road motorway operations complex (MOC1) and one at the Rozelle East motorway operations complex (MOC3)
- Ventilation facilities, including outlets, at the Rozelle West motorway operations complex (MOC2), the Rozelle East motorway operations complex (MOC3), the Iron Cove Link motorway operations complex (MOC4) and the Campbell Road motorway operations complex (MOC5)
- Mechanical and electrical fitout of the Parramatta Road ventilation facility at Haberfield (being constructed by the M4 East project)
- Fire and life safety systems
- Emergency evacuation and extraction infrastructure
- Electrical substations.

Construction activities for these key operational infrastructure components are detailed in the following sections.

### **Water treatment plants**

Water treatment plants are anticipated to be constructed within the Darley Road motorway operations complex (MOC1) and the Rozelle West motorway operations complex (MOC3) (refer to **Chapter 5** (Project description)). In addition, a constructed wetland would be constructed adjacent to the water treatment plant at Rozelle.

The water treatment plants would be constructed using prefabricated components, which would be assembled on site as follows:

- Excavation, footing and base slab installation
- Transport components to site
- Mechanical assembly of operational water treatment plant components, including rising main and discharge pipework
- Complete electrical connections between the operational water treatment plant components and incoming power supply
- Commission the operational water treatment plant.

The construction of the constructed wetland would include:

- Earthworks to form the wetlands
- Installation of a drainage network to guide water
- Provision of inlet and outlets to the wetlands
- Provision of landscaping and plant species relevant to the wetlands area.

### **Ventilation facilities**

Ventilation facilities would be constructed at the following locations:

- Rozelle West motorway operations complex (MOC2) (comprising a ventilation supply facility)
- Rozelle East motorway operations complex (MOC3) (comprising a ventilation exhaust facility, including three outlets)
- Iron Cove Link motorway operations complex (comprising a ventilation exhaust facility, including one outlet) (MOC4)
- Campbell Road motorway operations complex (comprising a ventilation supply facility and a ventilation exhaust facility (including four outlets) (MOC5).

The location of the ventilation facilities are shown in **Chapter 5** (Project description). Construction of the ventilation facilities would generally include:

- Excavation, footing and base slab installation
- Erection of precast or in situ poured concrete wall panels for shaft structure stability
- Installation of precast floor or in situ poured elements at the fan room and damper levels
- Installation of roof panels and stair structures for maintenance, access and monitoring of the facilities
- Fixture of façade support structures to shaft walls as per architectural and urban design requirements
- Internal fitout of plant areas, equipment installation and commissioning.

Fitout and installation works would also occur at the Parramatta Road ventilation facility being built as part of the M4 East project to enable use of a section of this facility by the M4-M5 Link project. These works would include installation of mechanical and electrical equipment and testing and commissioning.

### **Electrical substations**

Intake electrical substations (substations that would connect to the Ausgrid network and would manage the intake and distribution of the project's power needs) are anticipated to be constructed above ground at the following locations:

- Rozelle West motorway operations complex (MOC2) at Rozelle
- Campbell Road motorway operations complex (MOC5) at St Peters.

From the intake substations, electricity would be distributed to the project via the tunnels to connect to substations at the Darley Road motorway operations complex (MOC1), the Rozelle East motorway operations complex (MOC3) and the Iron Cove Link motorway operations complex (MOC4). The project would also include a series of underground substations that would be spaced around 1.2 kilometres apart within the tunnels.

The intake substations would be above ground and would be constructed using prefabricated components where possible. The construction methodology for these facilities would typically involve:

- Excavation, footing and base slab installation
- Construction of concrete blockwork and/or precast walls and installation of roofing
- Installation of architectural treatments and façade systems
- Installation of in-ground services
- Internal fitout and commissioning of electrical infrastructure
- Landscaping and installation of fencing and access gates.

The permanent electricity supply for the project is described in more detail in **Chapter 5** (Project description) and **Appendix F** (Utilities Management Strategy).

### **Fire pump rooms**

Fire pump rooms would be constructed at the Rozelle West motorway operations complex (MOC2). The construction methodology for these facilities would typically involve:

- Excavation, footing and base slab installation
- Construction of fire deluge tanks
- Construction of concrete blockwork walls and precast walls for tank enclosure
- Installation of roofing
- Installation of architectural treatments and façade systems

- Installation of in-ground services
- Internal fitout and commissioning of fire pump infrastructure
- Landscaping and installation of fencing and access gates.

The project would also include internal fitout and commissioning of fire pump rooms at the Parramatta Road ventilation facility (being built by M4 East) and St Peters interchange (being built by New M5).

### 6.4.5 Drainage and water management infrastructure

The project would require construction of new drainage infrastructure and alterations to existing drainage infrastructure (refer to **Chapter 5** (Project description), **Chapter 15** (Soil and water quality) and **Chapter 17** (Flooding and drainage). It would also require the construction of water management infrastructure, including water treatment plants for the construction and operational phases of the project (see **section 6.4.4** for a description of the construction methodology for water treatment plants).

Drainage and water management infrastructure works would include (but not be limited to):

- Construction of a tunnel drainage system
- Construction of water treatment plants including:
  - Construction phase water treatment plants at the construction ancillary facilities that would support tunnelling. These would receive water pumped from the low point of each tunnel and temporary sumps would treat the water so that it is suitable for reuse during tunnelling and construction generally, or for appropriate discharge or disposal
  - Operational phase water treatment plants at the Darley Road motorway operations complex (MOC1) and the Rozelle East motorway operations complex (MOC3)
  - New drainage discharge connections for treated water
- Construction of new surface water drains and drainage pits along surface roads, at intersections and pedestrian crossings, and around entry and exit ramps near where they meet surface roads, and connections to existing stormwater drainage infrastructure as required
- Construction of a constructed wetland and bioretention swale at the Rozelle East motorway operations complex (MOC3) to capture and treat runoff and treated tunnel water from the water treatment facility
- Construction of a bioretention facility within King George Park, adjacent to Manning Street at Rozelle. Water collected from the new surface road areas along Victoria Road would be piped to this facility via a new pipe, which is likely to be installed along Byrnes Street at Rozelle. The informal car park at this location would also be upgraded as part of these works, including provision of an equivalent number of car parking spaces
- Construction of new drainage channels within the Rozelle Rail Yards to drain external catchment areas, batter slopes and road surfaces
- Construction of new and upgraded culverts, including:
  - New culverts below road and pedestrian and cyclist crossings of the drainage channels within the Rozelle Rail Yards
  - Upgrades to and widening of the existing culvert between the Rozelle Rail Yards and Rozelle Bay including a section below City West Link
- Upgrades to the existing drainage infrastructure that serves surface roads, including connection to the existing piped drainage network.

Proposed discharge locations, the existing water quality of potential receiving waterways and proposed discharge criteria are described in **Chapter 15** (Soil and water quality). Discharge criteria for the construction and operational phases of the project would be further developed during detailed design and subsequently documented in relevant management plans.

### 6.4.6 Road pavement works

Road pavement works would be carried out along the tunnels, surface roads and bridges following construction of the main structures. Existing road pavements would be modified to integrate with the project where required.

Pavement works would involve the construction of:

- Base and select layers of materials
- Pavement surface layers where required
- Pavement drainage, including kerb and gutter (where required)
- Concrete barriers, medians, fencing and guardrails (where required).

In areas where the project would tie into or modify existing roads, pavements could be widened, reconfigured, milled and resurfaced, or removed and cross-stitched. Pavement surfaces would be selected using relevant guidelines to achieve the desired structural capacity, surface texture, skid resistance, water spray, to avoid or minimise aquaplaning and to meet the noise attenuation requirements of the project.

### 6.4.7 Finishing works

Finishing works would be undertaken towards the completion of construction and would include:

- Line marking of new road surfaces
- Erection of directional and other signage and other roadside furniture such as street lighting
- Erection of toll gantries and other control systems
- Earthworks including cutting, filling and grading to shape the finished surface level in accord with the lands future use
- Landscaping and revegetation works
- Closure and backfill of temporary access tunnels or, where these are to be retained to enable and facilitate routine inspections and maintenance activities, the provision of lighting, ventilation, drainage, power and services to enable these activities
- Site demobilisation and removal of construction ancillary facilities
- Rehabilitation of construction sites.

## 6.5 Construction ancillary facilities

### 6.5.1 Overview

Twelve construction ancillary facilities are described and assessed in this EIS. These are shown in overview in **Figure 6-1** and relative to the project footprint in **Figure 6-2** to **Figure 6-10**. The construction ancillary facilities would be used for a combination of civil surface works, tunnelling and tunnelling support, construction workforce parking and administrative purposes, as summarised in **Table 6-5** and described in more detail in the following sections.

The number, location and layout of construction ancillary facilities would be finalised as part of detailed construction planning during detailed design and would meet the environmental performance outcomes stated in the EIS and the Submissions and Preferred Infrastructure Report and satisfy criteria identified in any relevant conditions of approval. Further, additional ancillary facilities may be proposed by the contractor, once engaged. Prior to the establishment of ancillary facilities that are not identified in this EIS, the contractor would need to satisfy criteria that would be identified in any relevant conditions of approval and in accordance with an Ancillary Facilities Management Plan.

To assist in informing the development of a construction methodology that would manage constructability constraints and the need for construction to occur in a safe and efficient manner, while minimising impacts on local communities, the environment, and users of the surrounding road and other transport networks, two possible combinations of construction ancillary facilities at Haberfield and Ashfield have been assessed in this EIS (see **Table 6-4**). The construction ancillary facilities that comprise these options have been grouped together in this EIS and are denoted by the suffix *a* (for Option A) or *b* (for Option B) eg Wattle Street civil and tunnel site (C1a).

**Table 6-4 Possible construction ancillary facility combinations at Haberfield and Ashfield assessed in this EIS**

| Option A                                  | Option B   |
|---|--|
| Wattle Street civil and tunnel site (C1a) | Parramatta Road West civil and tunnel site (C1b) |
| Haberfield civil and tunnel site (C2a)    | Haberfield civil site (C2b)                      |
| Northcote Street civil site (C3a)         | Parramatta Road East civil site (C3b)            |

The layout and access arrangements for the construction ancillary facilities are based on the concept design only and would be confirmed and refined during detailed design. The final construction site layouts and access arrangements would have regard to the following amenity criteria:

- Where practicable, temporary buildings and structures (such as offices and amenities) would be used to provide a noise barrier between the construction site and adjacent sensitive receivers
- The location of temporary buildings and structures would have regard to overlooking and overshadowing impacts on adjacent sensitive receivers
- Where feasible and reasonable, acoustic sheds would be provided to ensure that noise-generating activities undertaken outside standard construction hours would comply with relevant noise goals
- Lighting would be designed to minimise light spill onto adjoining properties
- Spoil stockpiles would be located away from adjacent sensitive receivers where possible
- Appropriate erosion and sediment controls would be incorporated
- Vehicle access points and internal circulation roads would be located away from adjacent sensitive receivers
- Vehicle access points would have ready access to the arterial road network and would minimise the need for heavy vehicles to travel on local roads through residential areas
- Construction sites would provide sufficient area for the storage of raw materials to minimise, to the greatest extent practical, the number of deliveries required outside standard construction hours.

Site establishment activities would initially be carried out at each construction ancillary facility. This would involve:

- Demolition of buildings and clearing landscaped vegetation, where required
- Utility works including protection and/or adjustment of existing utilities, removal of redundant utilities and installation of new utilities
- Provision of services required for construction, such as power, water, sewer and communications
- Establishment of site compound and ancillary facilities, such as offices, amenities and workshops
- Establishment of vehicle access and egress points
- Establishment of truck wheel wash facilities or rumble grids
- Establishment of internal roads
- Establishment of hardstand areas for storage and car parking
- Establishment of acoustic sheds
- Establishment of site hoardings, noise barriers and/or fencing around the perimeter of the site.

Some of these site establishment activities may be carried out as enabling works (see **section 6.4.1**). During site establishment, all vehicles would enter and exit the sites using existing access points, until the new construction entry and exit points as described below are constructed and operational.

Table 6-5 Proposed construction ancillary facilities and indicative activities

| No. | Site                                       | Temporary facilities |                               |                    |                      |                         |                         |                         |                                    |                    |                             |                      |         | Permanent facilities |                             |            |                                 |   |                                      |                                |
|-----|--|----------------------|-------------------------------|--------------------|----------------------|-------------------------|-------------------------|-------------------------|------------------------------------|--------------------|-----------------------------|----------------------|---------|----------------------|-----------------------------|------------|---------------------------------|---|--------------------------------------|--------------------------------|
|     |  | Site offices         | Staff and workforce amenities | Stores and laydown | Workshop/maintenance | Tunnel launch & support | Tunnel spoil management | Civil and surface works | Construction water treatment plant | Sedimentation pond | Temporary ventilation plant | Temporary substation | Parking | Ventilation facility | Ventilation supply facility | Substation | Motorway operations complex(es) | Workshop facilities/bulky equipment store | Operational water treatment facility | Fire pump room and water tanks |
| C1a | Wattle Street civil and tunnel site        | ✓                    | ✓                             |                    |                      | ✓                       | ✓                       | ✓                       |                                    |                    | ✓                           |                      | ✓       |                      |                             |            |                                 |   |                                      |                                |
| C2a | Haberfield civil and tunnel site*          | ✓                    | ✓                             | ✓                  | ✓                    | ✓                       | ✓                       | ✓                       | ✓                                  | ✓                  | ✓                           | ✓                    | ✓       | ✓                    | ✓                           | ✓          |                                 | ✓   |                                      | ✓                              |
| C3a | Northcote Street civil site                |                      |                               | ✓                  |                      |                         |                         | ✓                       |                                    |                    |                             |                      | ✓       |                      |                             |            |                                 |   |                                      |                                |
| C1b | Parramatta Road West civil and tunnel site | ✓                    | ✓                             | ✓                  | ✓                    | ✓                       | ✓                       | ✓                       | ✓                                  | ✓                  | ✓                           | ✓                    | ✓       |                      |                             |            |                                 |   |                                      |                                |
| C2b | Haberfield civil site*                     | ✓                    | ✓                             | ✓                  | ✓                    |                         |                         | ✓                       |                                    |                    |                             |                      | ✓       | ✓                    | ✓                           | ✓          |                                 | ✓   |                                      | ✓                              |
| C3b | Parramatta Road East civil site            | ✓                    | ✓                             |                    |                      |                         |                         |                         |                                    |                    |                             |                      | ✓       |                      |                             |            |                                 |   |                                      |                                |
| C4  | Darley Road civil and tunnel site          | ✓                    | ✓                             | ✓                  | ✓                    | ✓                       | ✓                       | ✓                       | ✓                                  | ✓                  | ✓                           | ✓                    | ✓       |                      |                             | ✓          | ✓                               |   | ✓                                    | ✓                              |
| C5  | Rozelle civil and tunnel site              | ✓                    | ✓                             | ✓                  | ✓                    | ✓                       | ✓                       | ✓                       | ✓                                  | ✓                  | ✓                           | ✓                    | ✓       | ✓                    | ✓                           | ✓          | ✓                               | ✓   | ✓                                    | ✓                              |
| C6  | The Crescent civil site                    | ✓                    | ✓                             | ✓                  | ✓                    |                         |                         | ✓                       | ✓                                  | ✓                  |                             |                      | ✓       |                      |                             |            |                                 |   |                                      |                                |
| C7  | Victoria Road civil site                   | ✓                    | ✓                             | ✓                  | ✓                    |                         |                         | ✓                       |                                    | ✓                  |                             |                      | ✓       |                      |                             |            |                                 |   |                                      |                                |
| C8  | Iron Cove Link civil site                  | ✓                    | ✓                             | ✓                  | ✓                    |                         | ✓                       | ✓                       | ✓                                  | ✓                  |                             |                      | ✓       | ✓                    |                             | ✓          | ✓                               |   |                                      |                                |
| C9  | Pymont Bridge Road tunnel site             | ✓                    | ✓                             | ✓                  | ✓                    | ✓                       | ✓                       |                         | ✓                                  | ✓                  | ✓                           | ✓                    | ✓       |                      |                             |            |                                 |   |                                      |                                |
| C10 | Campbell Road civil and tunnel site        | ✓                    | ✓                             | ✓                  | ✓                    | ✓                       | ✓                       | ✓                       | ✓                                  | ✓                  | ✓                           | ✓                    | ✓       | ✓                    | ✓                           | ✓          |                                 |   |                                      | ✓                              |

Notes:

\* The permanent facilities being provided at the Haberfield civil and tunnel site, including the Parramatta Road ventilation facility, are being built on the corner of Parramatta Road and Wattle Street at Haberfield as part of WestConnex M4 East. Fitout works to prepare these facilities for use by the M4-M5 Link would be carried out as part of the project.

Temporary and permanent facilities may change when the construction contractor is engaged and detailed construction methodologies are developed.

### 6.5.2 Wattle Street civil and tunnel site (C1a)

The Wattle Street civil and tunnel site would be located above and below ground along Wattle Street at Haberfield between Parramatta Road and Ramsay Street. This construction ancillary facility would use land above ground that is currently being used as a construction zone for the M4 East project. In addition, the entry and exit ramps and cut-and-cover structures being built by the M4 East project would be used to support tunnelling; including stockpiling and loading of spoil and spoil removal.

Prior to being made available for use for construction of the M4-M5 Link project, the construction site for the M4 East project will be demobilised and the area rehabilitated to a condition that is suitable for use for construction of the M4-M5 Link.

An indicative construction site layout for the Wattle Street civil and tunnel site is shown in **Figure 6-14**, and an indicative cross-section showing how spoil would be managed within the entry and exit ramps is shown in **Figure 6-15**. The construction activities program relevant to the site is outlined in **Table 6-6**.

There is also the potential to use this site for tunnelling and tunnel support only, which would mean that the construction area at the surface between the Wattle Street carriageways would not be needed for M4-M5 Link construction purposes. Using the Wattle Street civil and tunnel site in this arrangement would mean that landscaping along Wattle Street would be able to be carried out by the M4 East project at the completion of construction of the M4 East project (estimated to be in 2019). This would be confirmed as part of detailed construction planning during detailed design and would meet the environmental performance outcomes stated in the EIS and the Submissions and Preferred Infrastructure Report and satisfy criteria identified in any relevant conditions of approval.

Key construction activities to be carried out at and supported by the Wattle Street civil and tunnel site would include:

- Establishment of site offices, amenities and temporary infrastructure, including temporary fencing
- Establishment of temporary noise attenuation measures
- Completion of excavation and stabilisation works in the dive structures and cut-and-cover structures (that are being built as part of the M4 East project)
- Delivery, laydown and storage of materials, including precast concrete
- Tunnel excavation, as well as stockpiling of excavated material and spoil haulage
- Excavation of cross-passages, longitudinal egress passages and niches in the tunnels
- Civil tunnel fitout works (including pavement and drainage works)
- Installation of mechanical and electrical services within the tunnel and fitout of the tunnel with additional infrastructure (eg signage)
- Civil works to integrate the tunnels with the surface road network at the Wattle Street interchange
- Finishing works including asphaltting, lighting, line marking and signage installation
- Rehabilitation and landscaping to be consistent with the M4 East Urban Design and Landscape Plan
- Demobilisation.

Roadheaders would be launched from this site to excavate the tunnels that would connect the Wattle Street interchange entry and exit ramps with the M4-M5 Link mainline tunnels. Works at this site would also be supported by the facilities at the Haberfield civil and tunnel site (C2a) and car parking and laydown at the Northcote Street civil site (C3a). Light vehicles would enter and exit the site to and from the eastbound Wattle Street carriageway.

The Wattle Street interchange entry and exit ramps that will be constructed as part of the M4 East project would be used for spoil removal. Heavy vehicles would enter the site via the eastbound entry ramp, be loaded with spoil underground within the tunnels, and then exit the site to Wattle Street via the westbound exit ramp. Details about spoil haulage routes are included in **section 6.6.5** and **Chapter 23** (Resource use and waste minimisation).



Spoil handling at this site would occur 24 hours a day, seven days a week. Where practical, spoil would be removed during the day, outside of peak periods. Acoustic barriers and devices at each portal would be considered and implemented where reasonable and feasible to minimise potential noise impacts associated with out-of-hours works within the tunnels. Feasible and reasonable management strategies would be investigated to minimise the volume of heavy vehicle movements at night. Any spoil removal outside standard construction hours would meet the relevant noise criteria. Excavated spoil from tunnelling would only be stockpiled underground. Further details about construction hours are included in **section 6.7.2**.

**Table 6-6 Wattle Street civil and tunnel site (C1a) indicative construction program**

| Construction activity                     | Indicative construction timeframe |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|---|-----------------------------------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|
|   | 2019                              |  |  |  | 2020 |  |  |  | 2021 |  |  |  | 2022 |  |  |  |
| Initial road works and traffic management |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Site establishment and utility works      |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Below ground site set up                  |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Tunnelling                                |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Civil and mechanical fitout               |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Testing and commissioning                 |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Site rehabilitation and landscaping       |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |

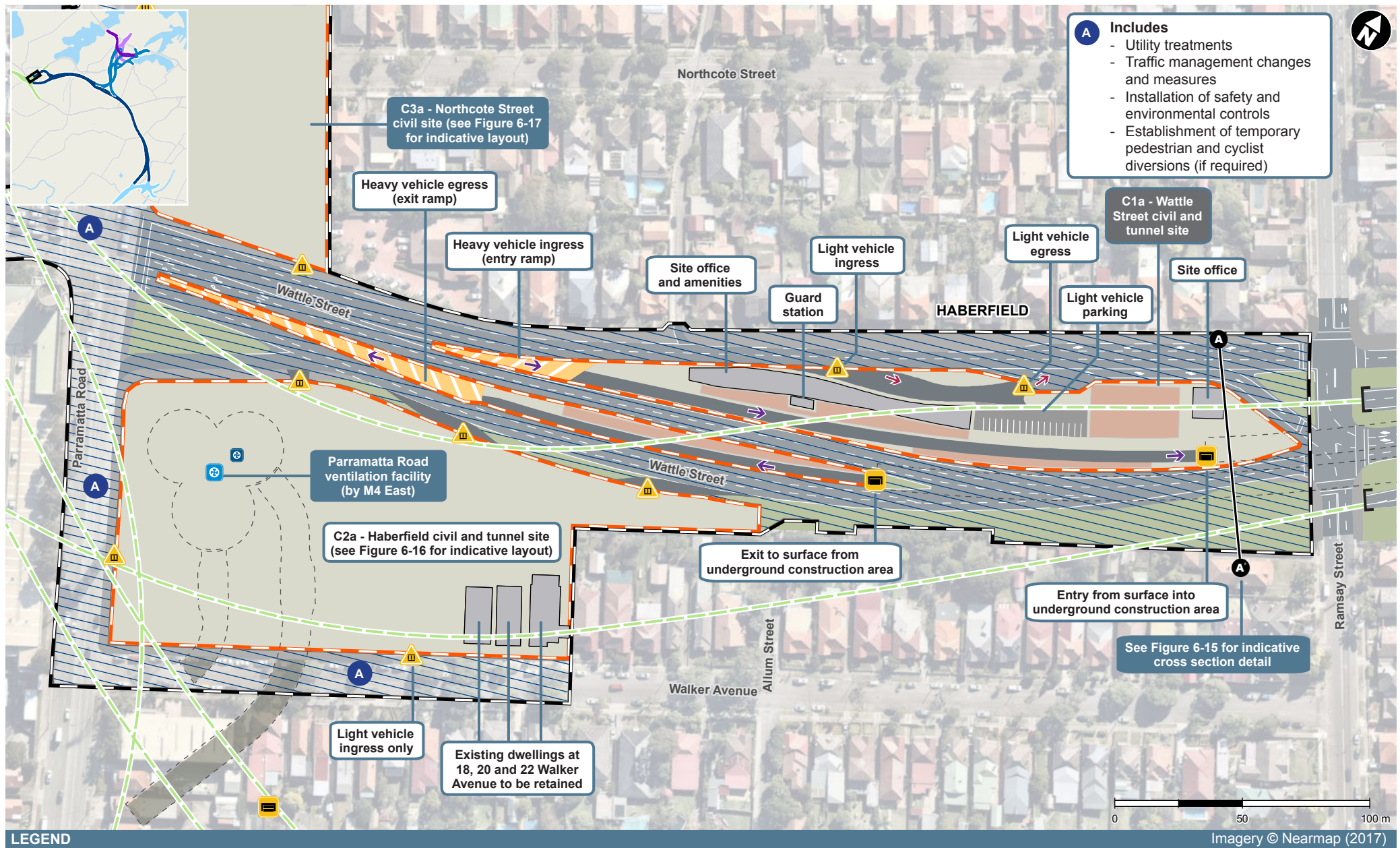


Figure 6-14 Indicative Wattle Street civil and tunnel site (C1a) layout

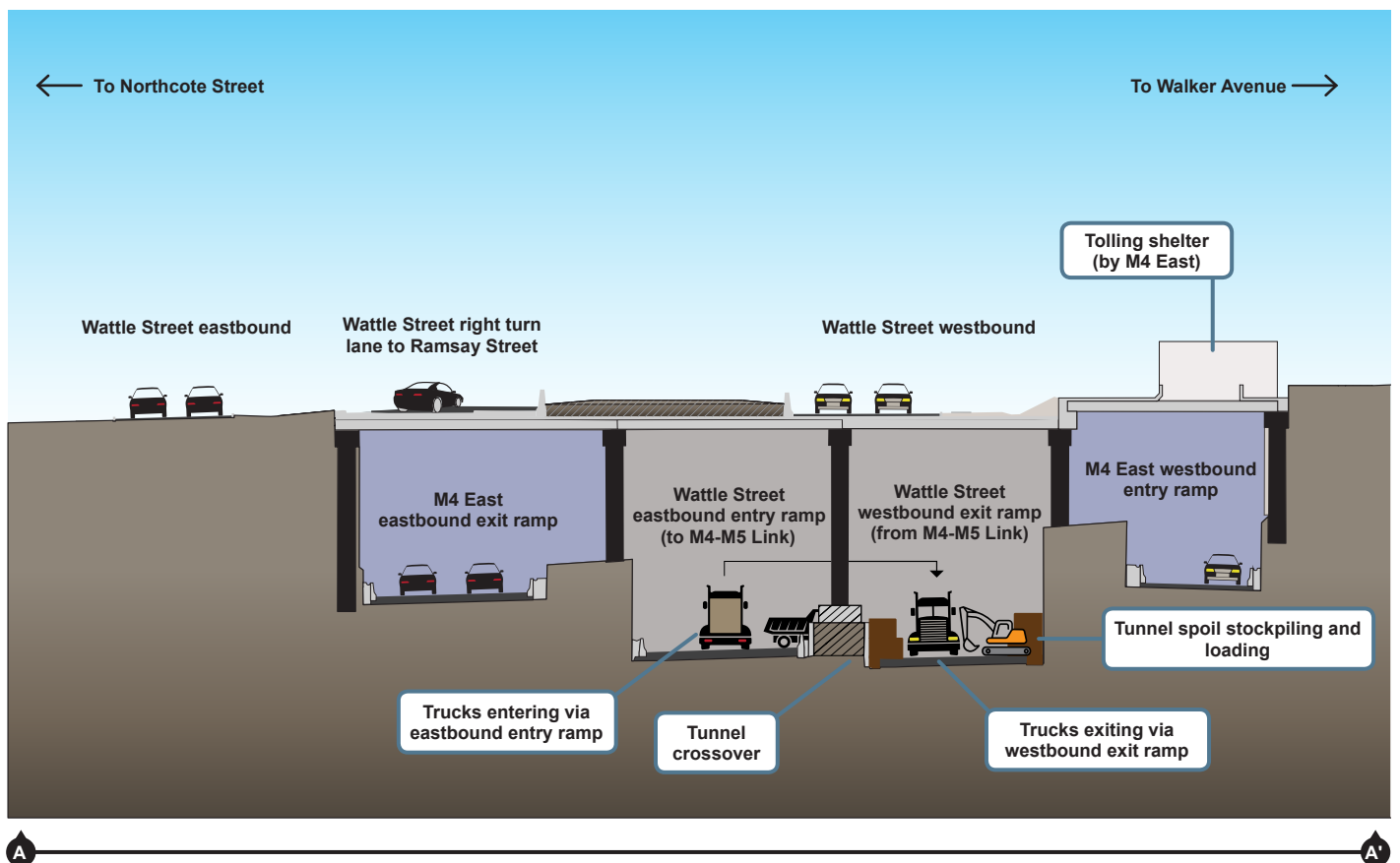
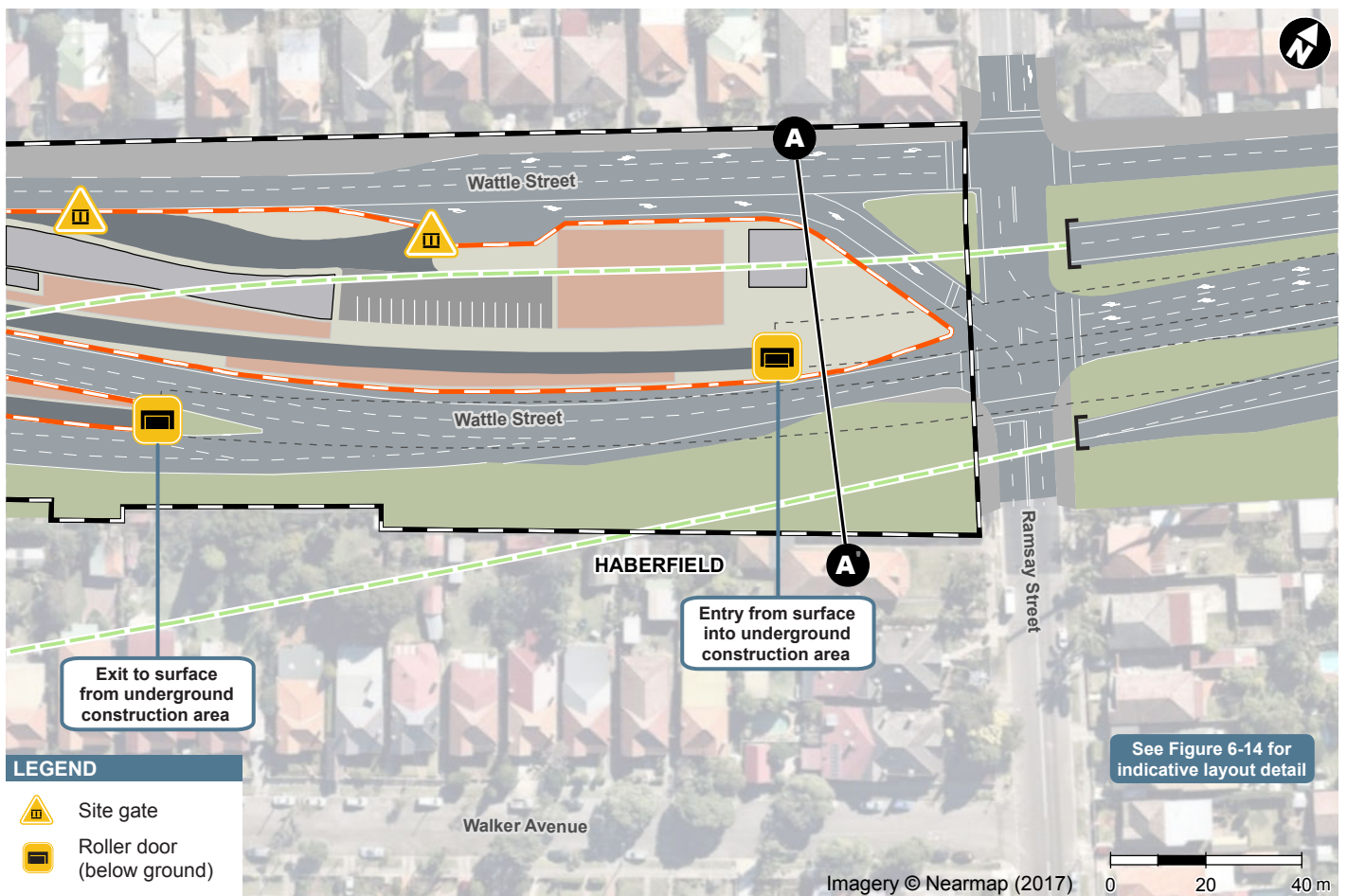


Figure 6-15 Indicative Wattle Street civil and tunnel site (C1a) cross-section

### 6.5.3 Haberfield civil and tunnel site (C2a)

The Haberfield civil and tunnel site (C2a) would be used for tunnelling support and civil construction, and would be located above and below ground around the south-eastern corner of the Parramatta Road and Wattle Street intersection, extending along Parramatta Road between Wattle Street and Walker Avenue at Haberfield.

This construction ancillary facility would use land above ground that is currently being used as a construction ancillary facility for the M4 East project. Prior to being made available for use for construction of the M4-M5 Link project, the construction site for the M4 East project will be demobilised and the area rehabilitated to a condition that is suitable for use for construction of the M4-M5 Link.

Three dwellings at 18, 20 and 22 Walker Avenue are within the Haberfield civil and tunnel site footprint. These dwellings will be retained in accordance with the M4 East conditions of approval, with the future use of these dwellings to be determined in the M4 East Urban Design and Landscape Plan and/or the M4 East Residual Land Management Plan (in accordance with the M4 East conditions of approval).

An indicative construction site layout for the Haberfield civil and tunnel site (C2a) is shown in **Figure 6-16** and a construction activities program relevant to the site is outlined in **Table 6-7**.

Key construction activities to be carried out at and supported by the Haberfield civil and tunnel site (C2a) would include:

- Establishment of site offices, amenities and temporary infrastructure including temporary noise attenuation measures
- Delivery, laydown and storage of materials, including precast concrete
- Tunnel excavation, as well as stockpiling of excavated material and spoil haulage (using the M4 East tunnel stubs being built by the M4 East project)
- Excavation of cross-passages, longitudinal egress passages and niches in the tunnels
- Civil tunnel fitout works (including pavement and drainage works)
- Installation of mechanical and electrical services within the tunnel and fitout of the tunnel with additional infrastructure (eg signage)
- Mechanical and electrical fitout of a section of the Parramatta Road ventilation facility (that will be built as part of the M4 East project)
- Finishing works including asphaltting, lighting, line marking and signage installation
- Rehabilitation and landscaping to be consistent with the M4 East Urban Design and Landscape Plan
- Demobilisation.

The Haberfield civil and tunnel site would support tunnelling of the mainline tunnels from the M4 East stub tunnels being built by the M4 East project. Roadheaders would be launched from this site to excavate the mainline tunnels. Access to the M4 East stub tunnels for construction would be via the M4 East mainline tunnels. During construction, traffic management would be used to manage interactions between the operational sections of the M4 East project and the construction areas in the M4 East stub tunnels and the M4-M5 Link mainline tunnels.

Access to the tunnels for construction personnel, small plant and materials would also occur directly from the Haberfield civil and tunnel site via the ventilation shafts that will be built as part of the M4 East project.

Tunnel spoil would be stockpiled within the M4 East stub tunnels. Trucks would enter the eastbound stub tunnel from the M4 East mainline tunnels, be loaded with spoil, and exit to the westbound M4 East mainline tunnels. No tunnel spoil would be removed to the surface via the Haberfield civil and tunnel site – all spoil would be transported below ground via the M4 East mainline tunnels. Details about spoil haulage routes are included in **section 6.6.5** and **Chapter 23** (Resource use and waste minimisation). Spoil handling below ground would occur 24 hours a day, seven days a week. Further details about construction hours are included in **section 6.7.2**.

Works at the surface that would occur at the Haberfield civil and tunnel site (C2a) would be used to support civil construction, including construction of a substation, and fitout of permanent operational infrastructure including the Parramatta Road ventilation facility (being constructed by the M4 East project). During construction, the site would include temporary site offices, workshop and storage facilities, laydown areas, ingress and egress for heavy and light vehicles, a temporary substation, a temporary ventilation plant, a construction water treatment plant and sediment pond, workforce amenities and car parking.

Heavy vehicles delivering materials and equipment would enter and exit the Haberfield civil and tunnel site (C2a) via the westbound Wattle Street carriageways. Light vehicles would enter and leave the site via Wattle Street, Walker Avenue and Parramatta Road. Workforce car parking for this area would also be located at the Northcote Street civil site (C3).

**Table 6-7 Haberfield civil and tunnel site (C2a) indicative construction program**

| Construction activity  | Indicative construction timeframe |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|--|-----------------------------------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|
|  | 2019                              |  |  |  | 2020 |  |  |  | 2021 |  |  |  | 2022 |  |  |  |
| Initial road works and traffic management                              |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Site establishment and utility works                                   |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Below ground site set up   |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Establish temporary ventilation systems for Wattle Street and mainline |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Fitout of ventilation station and substation                           |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Tunnelling   |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Civil and mechanical fitout  |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Testing and commissioning  |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Site rehabilitation and landscaping                                    |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |



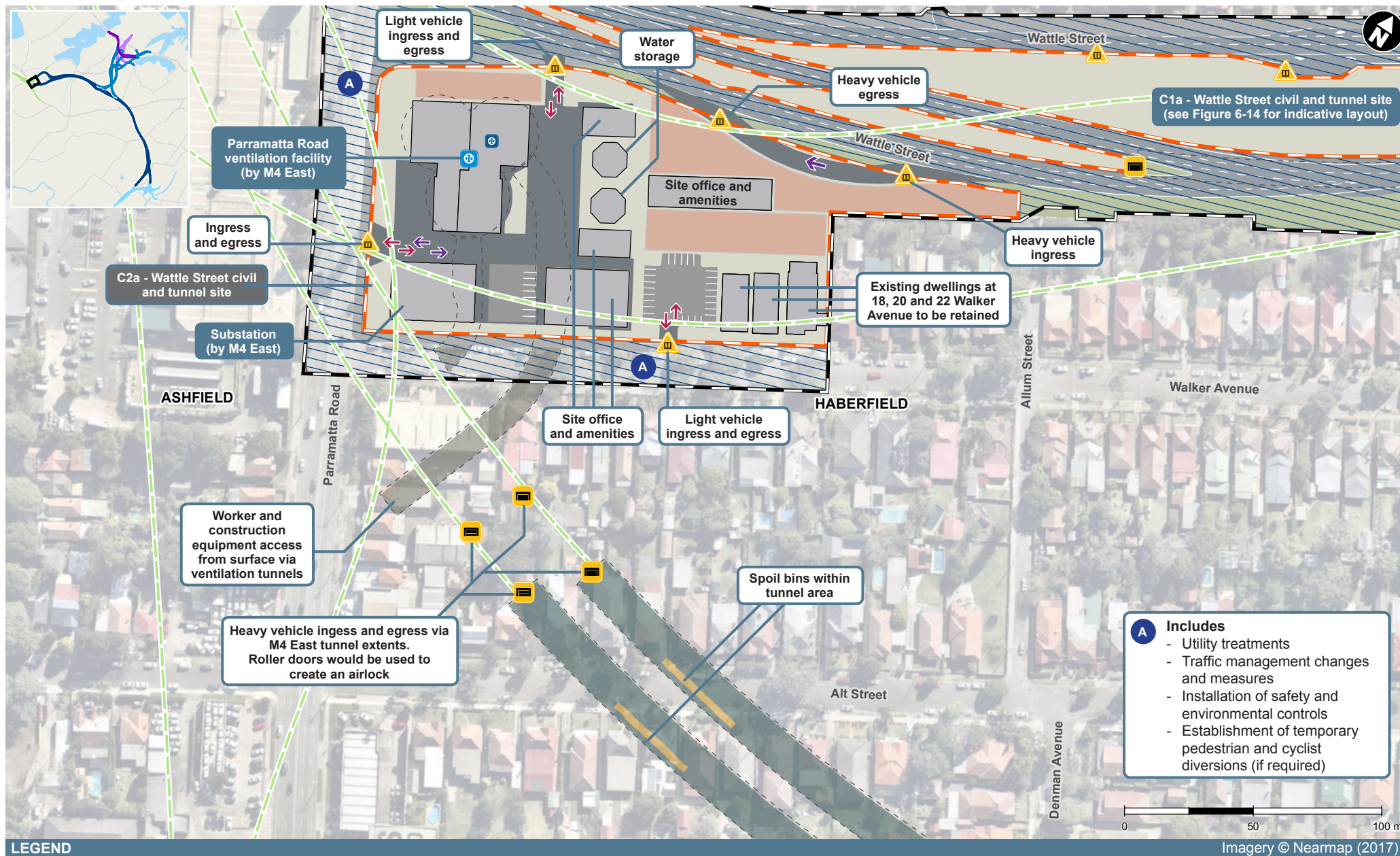


Figure 6-16 Indicative Haberfield civil and tunnel site (C2a) layout

### 6.5.4 Northcote Street civil site (C3a)

The Northcote Street civil site at Haberfield would be located between Wattle Street and Wolseley Street at Haberfield. This construction ancillary facility would use land that is currently being used as a construction ancillary facility for the M4 East project. Prior to being made available for use for construction of the M4-M5 Link project, the construction site for the M4 East project will be demobilised and the area rehabilitated to a condition that is suitable for use for construction of the M4-M5 Link.

The site would be used for construction workforce parking and to support construction activities at the nearby civil and tunnel sites, including laydown and storage of materials. Around 150 car parking spaces would be established on this site. An indicative construction site layout for the Northcote Street civil site is shown in **Figure 6-17** and an indicative program for works to be carried out within the Northcote Street civil site is provided in **Table 6-8**.

Heavy vehicles would enter and exit the site to and from Parramatta Road. Light vehicles would enter the site via Wolseley Street and an egress only point for light vehicles would be provided on to Wattle Street. During construction, Northcote Street would be closed at the intersection with Parramatta Road and the site would occupy around 100 metres of Northcote Street east of Parramatta Road. Northcote Street would be reopened to Parramatta Road when construction is complete.

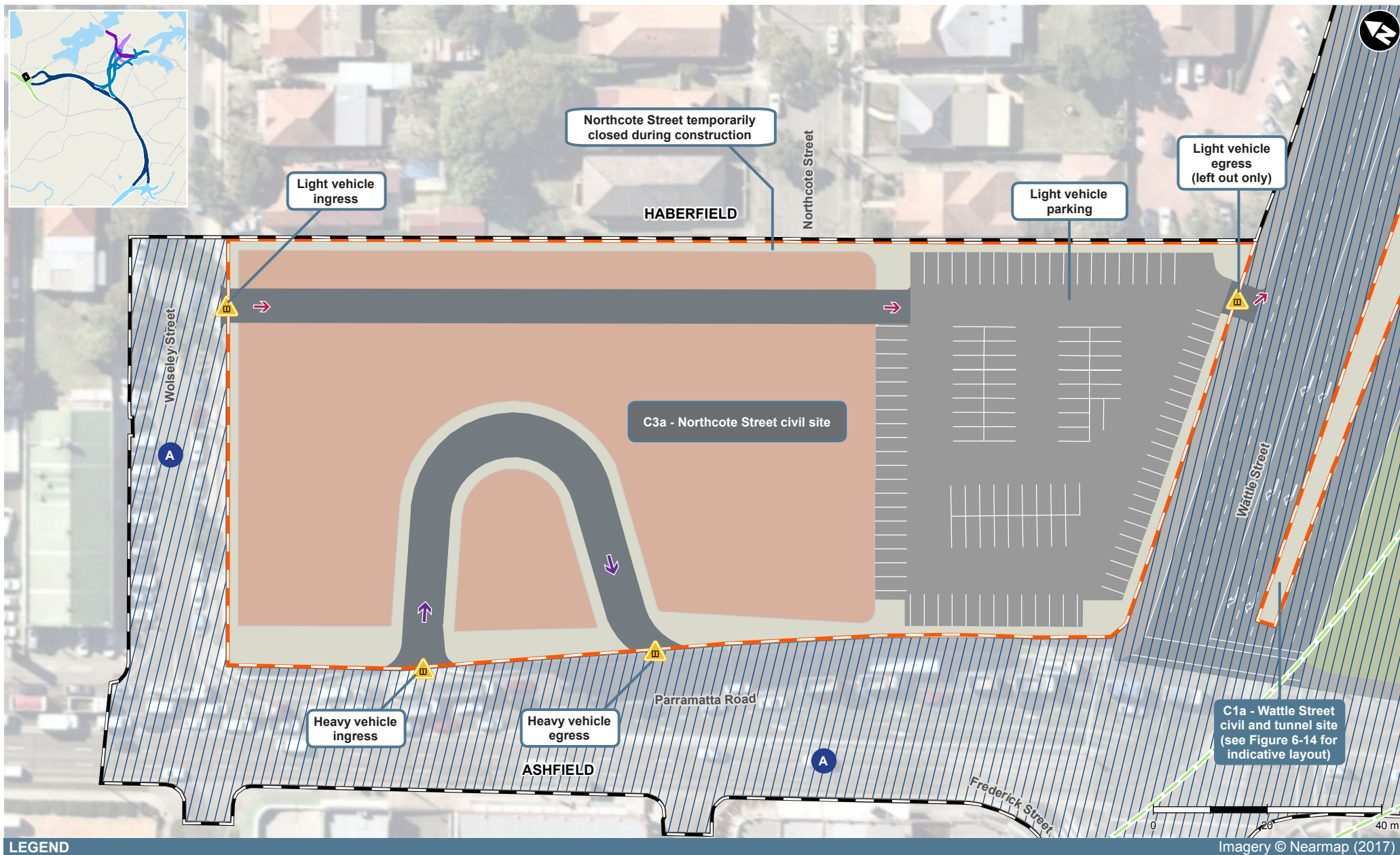
The use of the laydown area and light vehicle parking would occur 24 hours a day, seven days a week. Feasible and reasonable management strategies would be investigated to minimise potential noise impacts associated with out-of-hours construction activities at the site, including minimising the volume of heavy vehicles using the laydown area at night and the provision of temporary barriers along the boundary with adjoining residential properties. Further details about construction hours are included in **section 6.7.2**. Further detail about the construction noise and vibration impacts of the project and proposed management strategies are provided in **Chapter 10** (Noise and vibration).

At the completion of construction, the Northcote Street civil site (C3a) would be rehabilitated in preparation for a future use that would be determined in accordance with the M4 East Residual Land Management Plan.

**Table 6-8 Northcote Street civil site (C3a) indicative construction program**

| Construction activity                  | Indicative construction timeframe |  |  |      |  |  |      |  |  |      |  |  |
|--|-----------------------------------|--|--|------|--|--|------|--|--|------|--|--|
|  | 2019                              |  |  | 2020 |  |  | 2021 |  |  | 2022 |  |  |
| Site establishment and utility works   |                                   |  |  |      |  |  |      |  |  |      |  |  |
| Construct car park                     |                                   |  |  |      |  |  |      |  |  |      |  |  |
| Construct laydown area                 |                                   |  |  |      |  |  |      |  |  |      |  |  |
| Operation of car park and laydown area |                                   |  |  |      |  |  |      |  |  |      |  |  |
| Site rehabilitation and landscaping    |                                   |  |  |      |  |  |      |  |  |      |  |  |





#### LEGEND

| M4 East  | M4-M5 Link   | Surface construction  | Access and egress   | Vehicle movements  |
|--|--|---|---|--|
| <ul style="list-style-type: none"> <li>Tunnel</li> <li>Surface road</li> <li>Land subject to M4 East UDLP</li> </ul> | <ul style="list-style-type: none"> <li>Project footprint</li> <li>Ancillary facility</li> <li>Surface works</li> </ul> | <ul style="list-style-type: none"> <li>Access road</li> <li>Laydown area</li> </ul> | <ul style="list-style-type: none"> <li>Site gate</li> </ul> | <ul style="list-style-type: none"> <li>Light vehicle</li> <li>Heavy vehicle</li> </ul> |

- A Includes**
- Utility treatments
  - Traffic management changes and measures
  - Installation of safety and environmental controls
  - Establishment of temporary pedestrian and cyclist diversions (if required)

Figure 6-17 Indicative Northcote Street civil site (C3a) layout



### 6.5.5 Parramatta Road West civil and tunnel site (C1b)

The Parramatta Road West civil and tunnel site (C1b) would be located west of Parramatta Road, between north of Alt Street and Bland Street at Ashfield. The site is currently occupied by several commercial properties that would be demolished to facilitate construction. Residential properties including single dwellings and apartment blocks are located to the immediate west and north. A construction site for the M4 East project is located to the south on the opposite side of Bland Street. It is expected that adjacent M4 East construction will conclude in early 2019.

The site would be used for tunnelling support during construction and would include temporary site offices, a workshop and storage facilities, a laydown area, entry and exit points for construction traffic, a temporary substation, temporary ventilation for the tunnels, a temporary water treatment plant and sediment pond, workforce amenities and car parking. The location of the construction ancillary facility and an indicative layout of the site are shown in **Figure 6-18**. An indicative program for works to be conducted within the Parramatta Road West civil and tunnel site is provided in **Table 6-9**.

Key construction activities to be carried out at and supported by the Parramatta Road West civil and tunnel site would include:

- Demolition of buildings and structures
- Vegetation clearing and removal
- Establishment of temporary noise attenuation measures
- Utility works including protection and/or adjustment of existing utilities, removal of redundant utilities and installation of new utilities
- Establishment of site offices, amenities and temporary infrastructure
- Laydown and storage of materials
- Delivery of materials, plant and equipment
- Construction of an acoustic shed
- Construction of a temporary access tunnel
- Tunnel excavation using roadheaders, as well as stockpiling of excavated material and spoil haulage
- Excavation of cross-passages, longitudinal egress passages and niches in the tunnels
- Civil tunnel fitout works (including pavement and drainage works)
- Installation of mechanical and electrical services within the tunnel and fitout of the tunnel with additional infrastructure (eg signage)
- Installation of mechanical and electrical services within the tunnels and fitout of the tunnels with additional infrastructure (eg signage)
- Demobilisation including works to prepare the site for a future use in accordance with the Residual Land Management Plan.

An acoustic shed with a roller door would be established on the site to minimise noise from out-of-hours tunnelling and spoil handling. In addition, temporary noise mitigation measures may include noise barriers and other temporary structures such as site buildings, which would be positioned to minimise effects from noise on surrounding properties.

Construction traffic would enter and exit the site to and from the western (northbound) carriageway of Parramatta Road via new driveways. Temporary traffic management measures would be established to enable access and egress arrangements. These would be detailed in a Construction Traffic and Access Management Plan (CTAMP), which would be prepared to manage construction traffic associated with the project. Details about spoil haulage routes are included in **section 6.6.5** and **Chapter 23** (Resource use and waste minimisation). Further details about the construction traffic and transport for the project is provided in **Chapter 8** (Traffic and transport).

Spoil handling on the site would occur 24 hours a day, seven days a week, within an acoustic shed. Excavated spoil from tunnelling would only be stockpiled within the acoustic shed. Heavy vehicle movements associated with the removal of spoil from tunnelling would only occur via access and egress directly to and from Parramatta Road. Spoil removal outside standard construction hours would meet the relevant noise criteria. Further details about construction hours are included in **section 6.7.2**.

All reasonable and feasible work practices to meet the noise affected level, including for works outside recommended standard hours (as identified in the *Interim Construction Noise Guideline* (NSW Department of Environment and Climate Change (DECCW) 2009a) (ICNG)) will be applied. With the exception of emergencies, activities will not take place outside standard daytime construction hours without prior notification of local residents, businesses and the NSW Environment Protection Authority (NSW EPA).

**Table 6-9 Parramatta Road West civil and tunnel site (C1b) indicative construction program**

| Construction activity                   | Indicative construction timeframe |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|---|-----------------------------------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|
|   | 2018                              |  |  |  | 2019 |  |  |  | 2020 |  |  |  | 2021 |  |  |  |
| Site establishment and utility works    |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Construction of temporary access tunnel |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Tunnelling                              |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Civil and mechanical fitout             |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Testing and commissioning               |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Site rehabilitation                     |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |

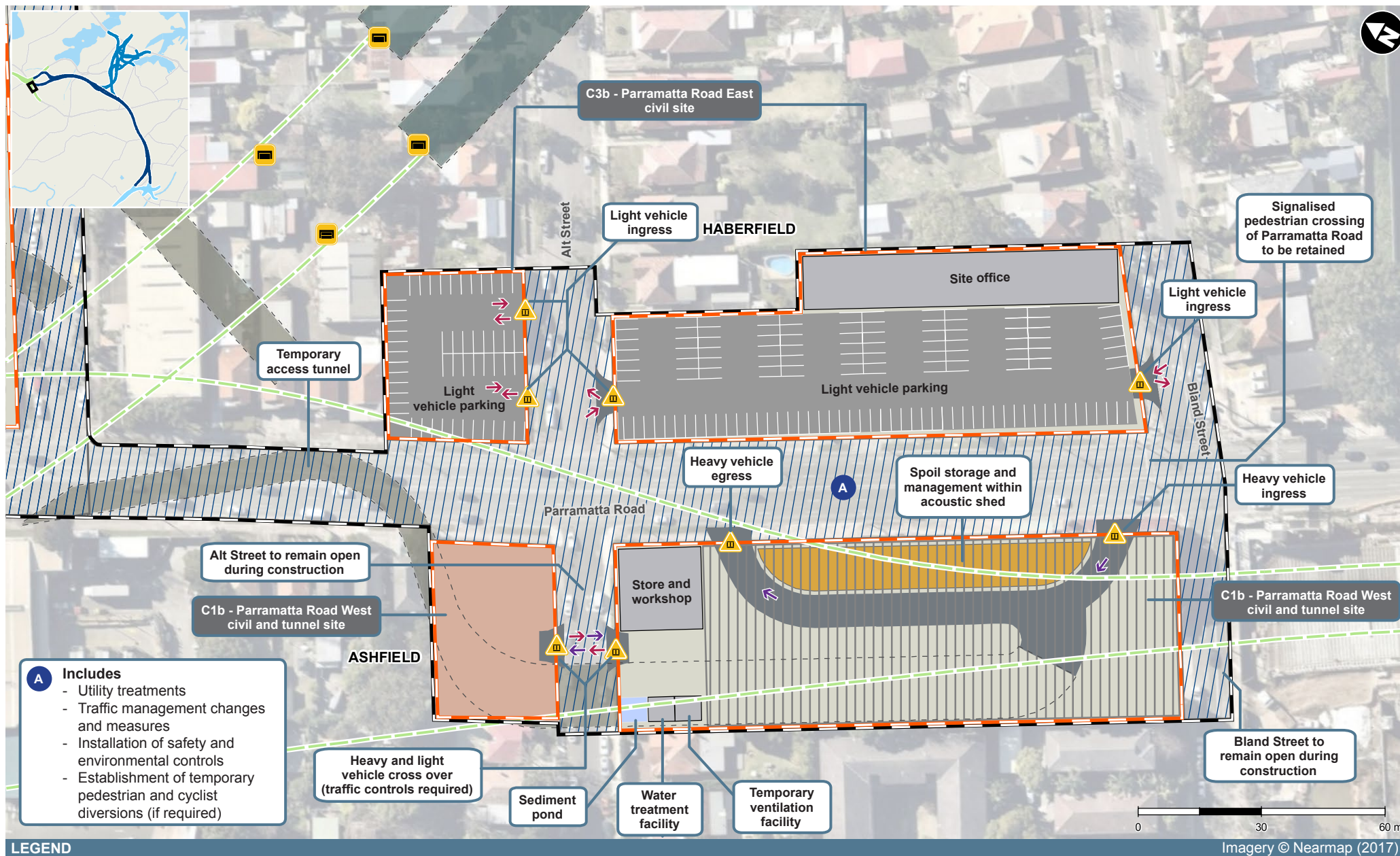


Figure 6-18 Indicative Parramatta Road West civil and tunnel site (C1b) and Parramatta Road East civil site (C3b) layout

### 6.5.6 Haberfield civil site (C2b)

The Haberfield civil site (C2b) is an alternative design to the Haberfield civil and tunnel site (C2a). The main purpose of the Haberfield civil site (C2b) would be to support fitout of a section of the Parramatta Road ventilation facility (which is being built by the M4 East project). This civil site would not be used to support tunnelling. In addition, the Haberfield civil site (C2b) would require less land at the surface when compared to the Haberfield civil and tunnel site (C2a), enabling the M4 East project to carry out landscaping on a section of land east of the Parramatta Road ventilation facility between Wattle Street and Walker Avenue at the completion of their construction (estimated to be in 2019).

The number, location and layout of construction ancillary facilities would be finalised as part of detailed construction planning during detailed design and would meet the environmental performance outcomes stated in the EIS and the Submissions and Preferred Infrastructure Report and satisfy criteria identified in any relevant conditions of approval.

The Haberfield civil site (C2b) would be located around the south-eastern corner of the Parramatta Road and Wattle Street intersection, extending along Parramatta Road between Wattle Street and Walker Avenue at Haberfield. This construction ancillary facility would use land that is currently being used as a construction ancillary facility for the M4 East project. The Haberfield civil site (C2b) would be used to support civil construction of a substation, and fitout of permanent operational infrastructure including the Parramatta Road ventilation facility (being constructed as part of the M4 East project). The site would include temporary site offices, workshop and storage facilities, laydown areas, ingress and egress for heavy and light vehicles, workforce amenities and car parking.

An indicative construction site layout for the Haberfield civil site (C2b) is shown in **Figure 6-19** and a construction activities program relevant to the site is outlined in **Table 6-10**.

Key construction activities to be carried out at and supported by the Haberfield civil site would include:

- Establishment of site offices, amenities and temporary infrastructure including fencing
- Establishment of temporary noise attenuation measures
- Delivery, laydown and storage of materials, including precast concrete
- Mechanical and electrical fitout of a section of the Parramatta Road ventilation facility (that will be built as part of the M4 East project)
- Landscaping to be consistent with the M4 East Urban Design and Landscape Plan
- Demobilisation.

Heavy vehicles delivering materials and equipment would enter and exit the Haberfield civil site (C2b) via the westbound Wattle Street carriageways. Light vehicles would enter and exit the site via Wattle Street and Walker Avenue. It is anticipated that construction activities at the Haberfield civil site (C2b) would occur during standard daytime construction hours. Further details about construction hours are included in **section 6.7.2**.

**Table 6-10 Haberfield civil site (C2b) indicative construction program**

| Construction activity   | Indicative construction timeframe |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|---|-----------------------------------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|
|   | 2019                              |  |  |  | 2020 |  |  |  | 2021 |  |  |  | 2022 |  |  |  |
| Initial road works and traffic management                     |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Site establishment and utility works                          |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Fitout of Parramatta Road ventilation facility and substation |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Civil and mechanical fitout                                   |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Testing and commissioning                                     |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Site rehabilitation and landscaping                           |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |



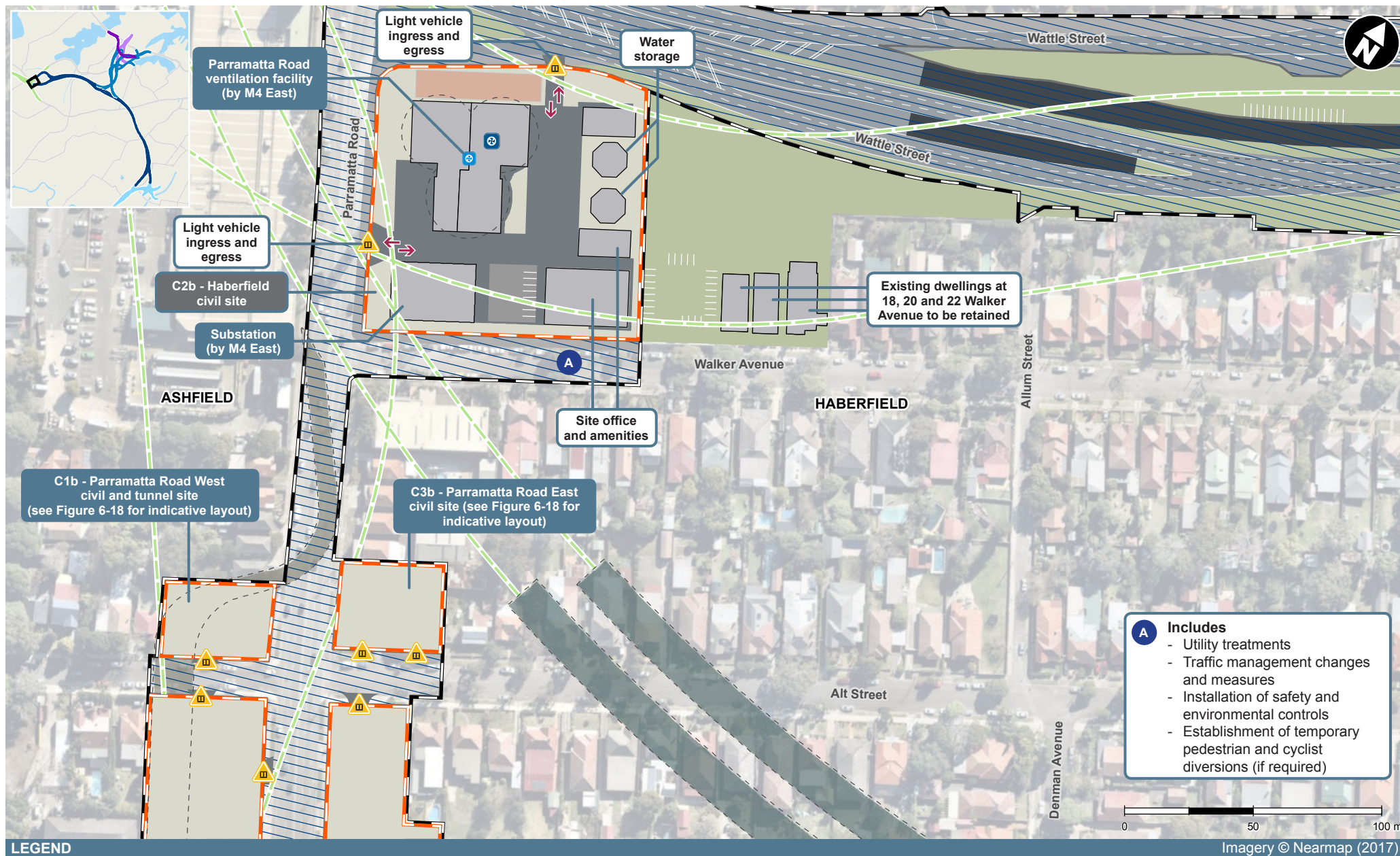


Figure 6-19 Indicative Haberfield civil site (C2b) layout

### 6.5.7 Parramatta Road East civil site (C3b)

The Parramatta Road East civil site (C3b) would be located east of Parramatta Road at Haberfield, between north of Alt Street and Bland Street. The site is occupied by several commercial premises that would be demolished to facilitate construction. Residential properties are located to the immediate east and north. A construction site for the M4 East project is located to the south.

The Parramatta Road East civil site (C3b) would be used to support tunnelling construction activities that would occur at the Parramatta Road West civil and tunnel site (C1b) and to provide construction workforce parking. Around 140 car parking spaces would be established on this site. The site would include temporary site offices, ingress and egress for light vehicles, workforce amenities and car parking.

Key construction activities to be carried out at and supported by the Parramatta Road East civil site would include:

- Demolition of existing buildings and structures
- Vegetation clearing and removal
- Establishment of site offices, amenities and temporary infrastructure including temporary noise attenuation measures and temporary fencing
- Utility works, including protection and/or adjustment of existing utilities, removal of redundant utilities and installation of new utilities
- Establishment of site offices and workforce amenities
- Support for the construction of the mainline tunnels and the Wattle Street interchange entry and exit ramps (no tunnelling would occur from the Parramatta Road East civil site (C3b))
- Demobilisation including works to prepare the site for a future use in accordance with the Residual Land Management Plan that would be prepared for the project.

Temporary traffic management measures would be established to enable access and egress arrangements. These would be detailed in a CTAMP, which would be prepared to manage construction traffic associated with the project. It is anticipated that use of this site would occur up to 24 hours per day, seven days per week. Further details about construction hours are included in **section 6.7.2**.

An indicative construction site layout for the Parramatta Road East civil site (C3b) is shown in **Figure 6-18**. A construction activities program relevant to the site is outlined in **Table 6-11**.

**Table 6-11 Parramatta Road East civil site (C3b) indicative construction program**

| Construction activity                                  | Indicative construction timeframe |  |  |      |  |  |      |  |  |      |  |  |
|--|-----------------------------------|--|--|------|--|--|------|--|--|------|--|--|
|  | 2018                              |  |  | 2019 |  |  | 2020 |  |  | 2021 |  |  |
| Site establishment and utility works                   |                                   |  |  |      |  |  |      |  |  |      |  |  |
| Use of car park and site amenities during construction |                                   |  |  |      |  |  |      |  |  |      |  |  |
| Demobilisation   |                                   |  |  |      |  |  |      |  |  |      |  |  |

### 6.5.8 Darley Road civil and tunnel site (C4)

The Darley Road civil and tunnel site would be located at Leichhardt between the Inner West Light Rail line to the north and Darley Road to the south. The site is currently occupied by a commercial premise, that would be demolished to facilitate construction. Immediately adjacent in the northeast corner of the site is the Leichhardt North light rail stop.

The site would be used for tunnelling support during construction, and for the Darley Road motorway operations complex (MOC1), including a water treatment facility and substation during operation. During construction the site would include temporary site offices, a workshop and storage facilities, a laydown area, entry and exit points for construction traffic, an acoustic shed, a temporary substation, temporary ventilation for the tunnels, a temporary water treatment plant and sediment pond, workforce amenities and car parking. The location of the construction ancillary facility and an indicative layout of the site are shown in **Figure 6-20**.

Key construction activities to be carried out at and supported by the Darley Road civil and tunnel site would include:

- Demolition of existing buildings and structures
- Vegetation clearing and removal
- Establishment of temporary noise attenuation measures (such as acoustic hoarding)
- Utility works including protection and/or adjustment of existing utilities, removal of redundant utilities and installation of new utilities
- Establishment of site offices, amenities and temporary infrastructure including fencing
- Laydown and storage of materials
- Delivery of materials, plant and equipment
- Construction of an acoustic shed
- Construction of a temporary access tunnel
- Tunnel excavation tunnels using roadheaders, as well as stockpiling of excavated material and spoil haulage
- Excavation of cross-passages, longitudinal egress passages and niches in the tunnels
- Civil tunnel fitout works (including pavement and drainage works)
- Installation of mechanical and electrical services within the mainline tunnel and fitout of the tunnel with additional infrastructure (eg signage)
- Construction of the Darley Road motorway operations complex (MOC1) including a substation and water treatment facility
- Finishing works including asphaltting, line marking and signage installation
- Rehabilitation and landscaping adjacent to the motorway operations complex (MOC1) in accordance with the Urban Design and Landscape Plan
- Rehabilitation and works to prepare the remaining project land on the site for a future use in accordance with the Residual Land Management Plan that would be prepared for the project
- Demobilisation.

Roadheaders would be launched from this site and would excavate the temporary access tunnel and the mainline tunnels. Acoustic barriers and devices at the access tunnel entrances would be considered and implemented where reasonable and feasible to minimise potential noise impacts associated with out-of-hours works within the tunnels. In addition, temporary noise mitigation measures may include noise barriers and other temporary structures such as site buildings, which would be provided to minimise noise impacts on surrounding properties.

It is anticipated that the majority of construction traffic would enter the site from the southern (westbound) carriageway of Darley Road via new driveways. Heavy vehicles associated with spoil haulage would travel eastbound on City West Link and turn right into Darley Road. A temporary right turning lane at the intersection of City West Link and Darley Road would be provided for use by construction vehicles. Heavy vehicles would exit the site by turning left onto Darley Road before turning left onto City West Link.

Construction traffic may also access the Darley Road civil and tunnel site (C4) via the westbound lanes of City West Link. Details about spoil haulage routes are included in **section 6.6.5** and **Chapter 23** (Resource use and waste minimisation). Temporary traffic management measures would be established to enable access and egress arrangements. These would be detailed in a CTAMP, which would be prepared to manage construction traffic associated with the project. Further details about the construction traffic and transport for the project is provided in **Chapter 8** (Traffic and transport).

Investigations into alternative access for the Darley Road civil and tunnel site (C4) are also occurring. This could include ingress and egress to and from the westbound lanes of City West Link via Canal Road/Charles Street. If feasible, alternative access to and from the Darley Road civil and tunnel site would be assessed in the Preferred Infrastructure Report and/or in accordance with relevant conditions of approval, and would be documented in an Ancillary Facilities Management Plan.

Temporary changes to Darley Road to enable access to and from the ancillary facility would likely be required. These may include changes to line marking to provide a temporary turning lane for construction traffic and temporary diversions to the pedestrian path on the northern side of Darley Road. These would be confirmed during detailed design following the appointment of a design and construction contractor and in consideration of the safety and function of the road network, maintaining access to the Leichhardt North light rail stop and providing for continued pedestrian and cyclist movement.

Spoil handling associated with tunnelling supported by the Darley Road civil and tunnel site would occur 24 hours a day, seven days a week. Spoil would be handled below ground wherever practicable to reduce the potential for amenity impacts in adjacent areas. Spoil handling at the surface outside standard day time construction hours would occur within an acoustic shed to manage potential amenity impacts. Spoil removal from this site would only occur within standard construction hours, between 7.00 am and 6.00 pm Monday to Friday, and between 8.00 am and 1.00 pm on Saturdays. Further details about construction hours are included in **section 6.7.2**.

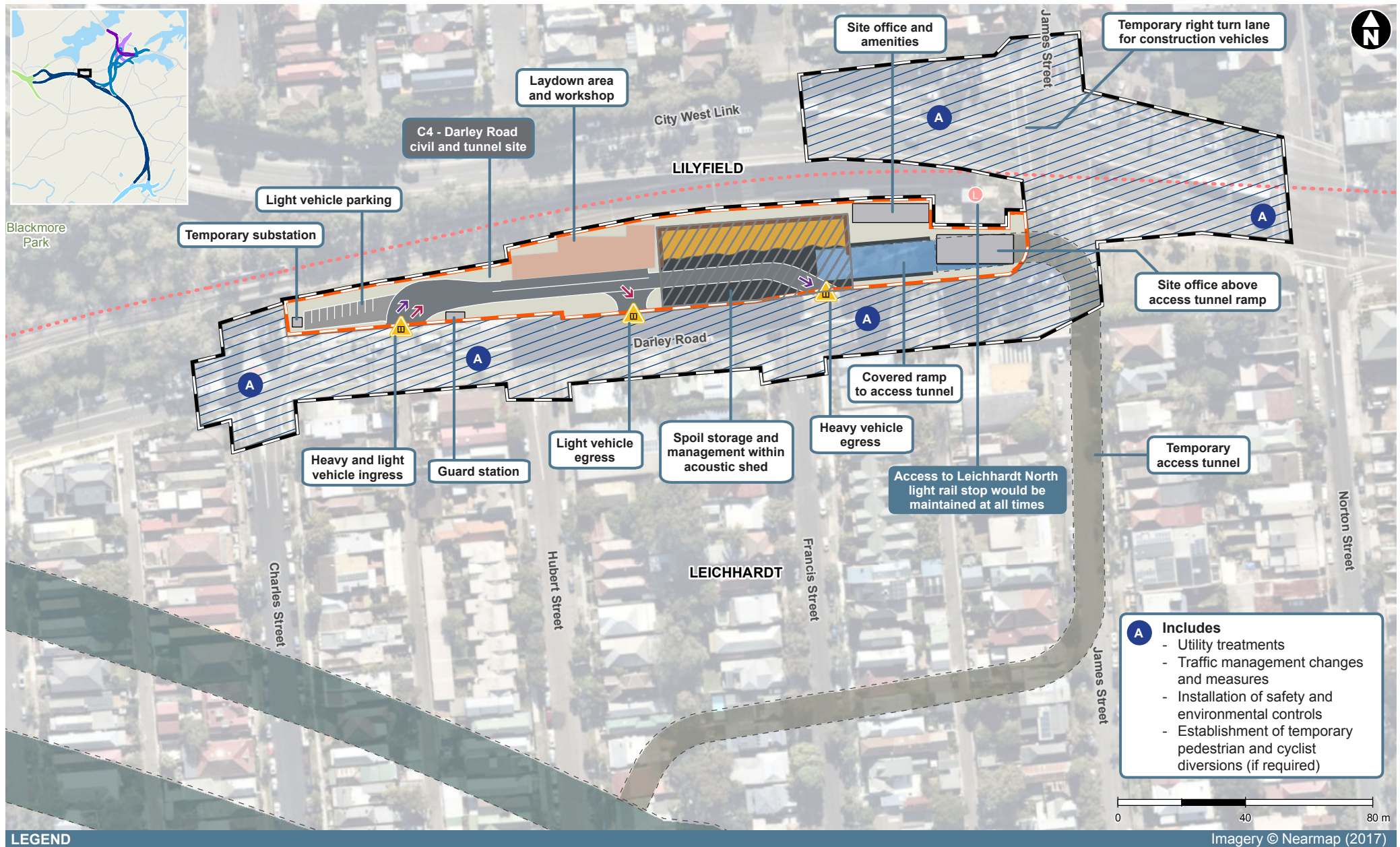
Reasonable and feasible work practices and mitigation measures would be implemented to minimise potential noise impacts due to activities occurring at the Darley Road civil and tunnel site. Local residents, businesses and the NSW EPA would be kept informed about works outside standard day time construction hours at the site.

An indicative program for works to be conducted within the Darley Road civil and tunnel site is provided in **Table 6-12**.



**Table 6-12 Darley Road civil and tunnel site (C4) indicative construction program**

| Construction activity                               | Indicative construction timeframe |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|---|-----------------------------------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|
|   | 2018                              |  |  |  | 2019 |  |  |  | 2020 |  |  |  | 2021 |  |  |  | 2022 |  |  |  |
| Site establishment and utility works                |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Construction of temporary access tunnel             |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Tunnelling  |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Construction of motorway operational infrastructure |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Civil and mechanical fitout                         |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Testing and commissioning                           |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Site rehabilitation and landscaping                 |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |



**Figure 6-20** Indicative Darley Road civil and tunnel site (C4) layout

### 6.5.9 Rozelle civil and tunnel site (C5)

The Rozelle civil and tunnel site would be located between Lilyfield Road to the north, City West Link and The Crescent to the south, Victoria Road to the east and the Sydney CBD and South East Light Rail maintenance depot to the west. The site would be predominantly located on disused land that forms part of the Rozelle Rail Yards.

The site would also use land adjacent to Lilyfield Road and Gordon Street at Rozelle that is currently occupied by commercial and industrial properties. These properties would be acquired for the project and demolished to facilitate construction of the Rozelle interchange (refer to **Chapter 12** (Land use and property) for further details about properties that would be acquired for the project). An informal garden (located on the top of the sandstone cutting at the north-eastern end of the site) would be retained and protected during construction.

An indicative site layout for the Rozelle civil and tunnel site is shown in **Figure 6-21**. The construction activities program relevant to the site is outlined in **Table 6-13**.

Key construction activities to be carried out at and supported by the Rozelle civil and tunnel site would include:

- Site establishment, including construction of temporary intersections on City West Link to enable construction traffic ingress and egress
- Demolition of buildings and structures
- Demolition of hardstand areas and slabs
- Vegetation clearing and removal
- Removal of redundant rail infrastructure
- Utility works including protection and/or adjustment of existing utilities, removal of redundant utilities and installation of new utilities
- Establishment of site offices, amenities and temporary construction hoarding (including acoustic hoarding if required)
- Construction of acoustic sheds
- Temporary stockpiling of fill and pavement materials as well as materials generated from construction activities prior to off-site removal
- Construction of the cut-and-cover structures including piling, concrete works, excavation of dive structures and installation of a precast concrete roof
- Decline and tunnel excavation using roadheaders, as well as stockpiling of material and spoil haulage
- Tunnel excavation of the Rozelle interchange, Iron Cove Link and proposed future Western Harbour Tunnel and Beaches Link tunnels using roadheaders, as well as stockpiling of excavated material and spoil haulage
- Excavation of cross-passages, longitudinal egress passages and niches in the tunnels
- Excavation of the ventilation tunnels
- Construction of the Rozelle West motorway operations complex (MOC2) including a ventilation supply facility
- Construction of the Rozelle East motorway operations complex (MOC3) including a ventilation exhaust facility and three outlets
- Mechanical and electrical fitout of the ventilation facilities
- Construction of new and upgraded drainage infrastructure including drainage channels, a bioretention swale, a constructed wetland and upgrades to the culvert between the Rozelle Rail Yards and Rozelle Bay (below City West Link)
- Civil tunnel fitout works (including pavement and drainage works)

- Finishing works including asphaltting, line marking and signage installation
- Excavating, filling and grading of disturbed areas including works to deliver the finished landform within the Rozelle Rail Yards
- Rehabilitation and landscaping to be consistent with the Urban Design and Landscape Plan including delivery of new open space and construction of pedestrian and cyclist paths and bridges
- Demobilisation.

The site would include temporary site offices, workshops and storage facilities, laydown areas, entry and exit driveways for construction traffic, internal access roads, a temporary substation, temporary ventilation for the tunnels, temporary water treatment plants and sediment ponds, workforce amenities and car parking. Around 400 car parking spaces would be established at the Rozelle civil and tunnel site (C5).

A section of the Rozelle Rail Yards around the proposed future Western Harbour Tunnel and Beaches Link entry and exit ramps would be kept as an area of hardstand, in anticipation of it being used to support construction of the proposed future Western Harbour Tunnel and Beaches Link project. As part of the project, this area would be physically separated from the remainder of the interchange to restrict access. The possible future use of this area would mean that landscaping and revegetation works may need to be staged.

Roadheaders would be launched from this site to excavate the Rozelle interchange, the Iron Cove Link and the entry and exit ramp tunnels for the proposed future Western Harbour Tunnel and Beaches Link. To ensure compliance with relevant noise management levels outside standard day time construction hours, three acoustic sheds would be built at spoil handling locations within the site.

Tunnelling and spoil management would also be carried out within the cut-and-cover sections of the tunnels at the eastern end of the site. Acoustic treatments would be considered for the cut-and-cover sections to minimise noise from out-of-hours tunnelling and spoil handling. Tunnel spoil would be transported to a stockpile within the cut-and-cover structures, with sufficient space for about two heavy vehicles to be loaded with spoil. Following tunnelling activities, civil, mechanical and electrical fitout works would be carried out to prepare the tunnels for use.

Temporary noise mitigation measures would be provided. These could include noise barriers around the site to reduce noise experienced by nearby receivers. Temporary noise mitigation measures would be removed at the end of construction to ensure connections into and out of the new open space to be provided in the Rozelle Rail Yards. Other temporary structures such as site buildings would be located to minimise noise impacts on surrounding properties.

Heavy vehicle access would be via City West Link. It is anticipated that construction vehicles would enter the site from the eastbound carriageway of City West Link via new slip lanes and driveways. A temporary signalised intersection would be built along City West Link and a new northern leg added to the intersection with The Crescent to enable vehicles to exit the site and turn right at both these locations to head westbound on City West Link. Up to five light vehicle access points would be constructed along Lilyfield Road to enable light vehicle access and egress. Temporary traffic management measures would be established to enable access and egress arrangements. These would be detailed in a CTAMP, which would be prepared to manage construction traffic associated with the project.

Spoil handling and haulage would occur 24 hours a day, seven days a week. Heavy vehicle movements associated with the removal of spoil from tunnelling would only occur via access and egress directly to and from City West Link. Spoil removal outside standard construction hours would meet the relevant noise criteria. Further details about construction hours are included in **section 6.7.2**.

**Table 6-13 Rozelle civil and tunnel site (C5) indicative construction program**

| Construction activity                               | Indicative construction timeframe |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|---|-----------------------------------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|
|   | 2018                              |  |  |  | 2019 |  |  |  | 2020 |  |  |  | 2021 |  |  |  | 2022 |  |  |  | 2023 |  |  |  |
| Site establishment and utility works                |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Traffic diversions and intersection works           |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Construction of cut-and-cover and tunnel portals    |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Tunnelling  |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Construction of motorway operational infrastructure |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Civil and mechanical fitout                         |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Site rehabilitation and landscaping                 |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Demobilisation                                      |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Testing and commissioning                           |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |



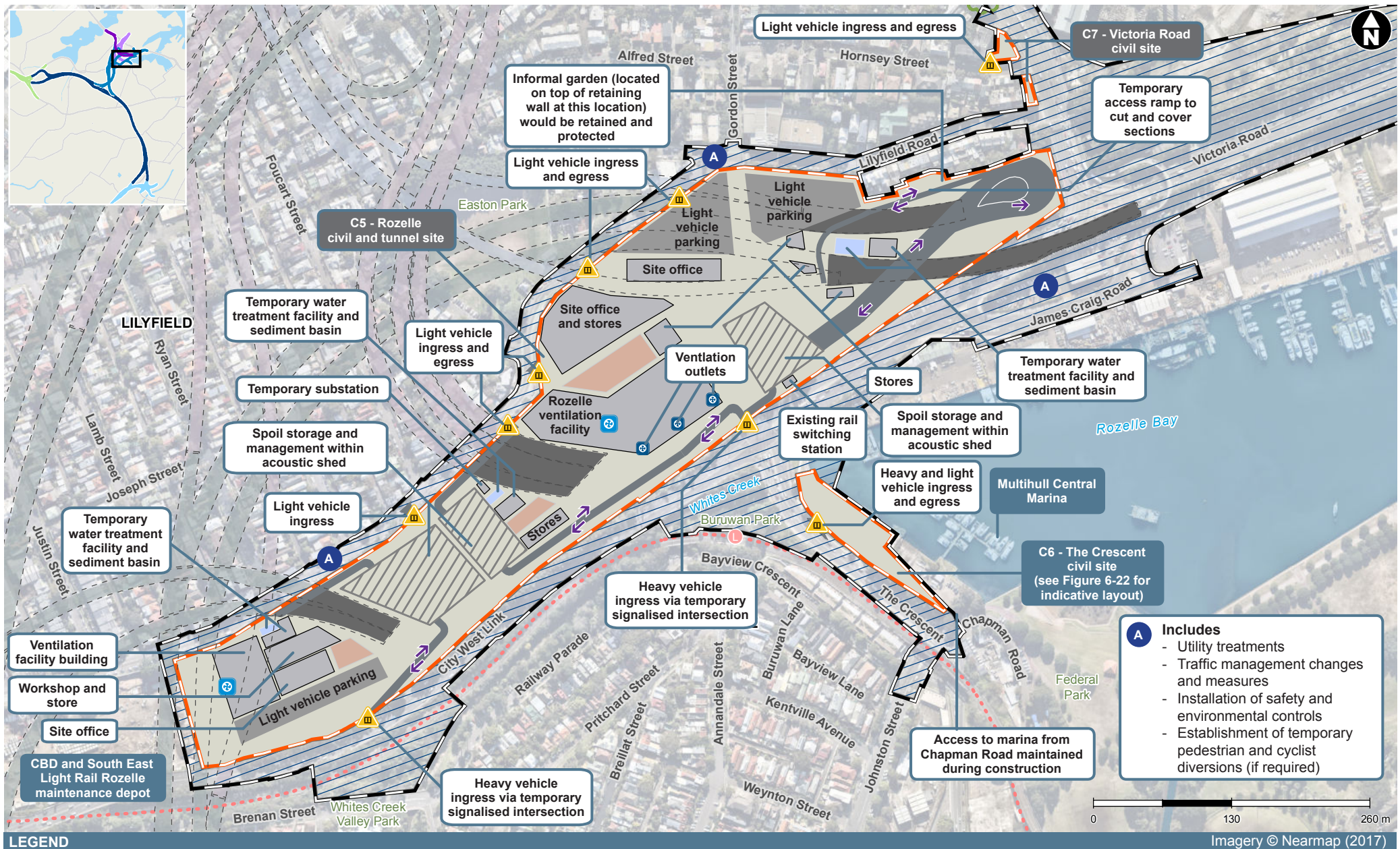


Figure 6-21 Indicative Rozelle civil and tunnel site (C5) and Victoria Road civil site (C7) layout

### 6.5.10 The Crescent civil site (C6)

The Crescent civil site (C6) would be located between The Crescent and Rozelle Bay on land owned by Roads and Maritime. The site would be cleared and a hardstand and laydown area, site offices, workforce amenities and car parking established.

Key construction activities to be carried out at and supported by The Crescent civil site would include:

- Vegetation clearing and removal
- Utility works including protection and/or adjustment of existing utilities, removal of redundant utilities and installation of new utilities
- Site establishment, including establishment of a hardstand and laydown area, erection of temporary fencing and gates and establishment of construction access points
- Establishment of site offices, amenities and temporary construction hoarding (including acoustic hoarding if required)
- Temporary stockpiling of fill and pavement materials as well as materials generated from construction activities prior to off-site removal
- Realignment of The Crescent including construction of a new bridge over Whites Creek
- Widening and improvement works along Whites Creek, including naturalisation of a section of Whites Creek between The Crescent and Rozelle Bay
- Construction of the culvert below City West Link that would convey flows from the Rozelle Rail Yards to Rozelle Bay, including upgrades to the Rozelle Bay outfall
- Finishing works including asphaltting, line marking and signage installation
- Excavating, filling and grading of disturbed areas
- Construction of pedestrian and cyclist paths and bridges
- Rehabilitation and landscaping adjacent to disturbed areas to be consistent with the Urban Design and Landscape Plan
- Demobilisation and rehabilitation of the remainder of the site to generally its pre-construction state.

An indicative site layout for The Crescent civil site is shown in **Figure 6-22**. The construction activities program relevant to the site is outlined in **Table 6-14**. At the completion of construction, a portion of this site would be occupied by operational road infrastructure. The remainder of the site would be rehabilitated.

The Crescent civil site (C6) would be established on land immediately adjacent to Rozelle Bay and Whites Creek and would support construction activities in and adjacent to these waterways. Although the project would be exempt from the controlled activity provisions of the *Water Management Act 2000* (NSW) relating to activities on waterfront land (refer to **Chapter 2** (Assessment process)), consideration would be given to relevant NSW Department of Primary Industries (Water) (DPI-Water) guidelines to minimise effects to water flow, maintain bed and bank stability and minimise harm to the waterfront and in-stream environments. In addition, the proposed waterway crossing at Whites Creek would be designed and constructed to have no greater impact on aquatic habitat than the existing crossing type (bridge).

It is anticipated that construction vehicles would enter the site via a left-in from The Crescent (southbound). They would then travel through the site, turn around and exit back onto The Crescent northbound via a right hand turn. Temporary traffic management measures would be established to enable access and egress arrangements. These would be detailed in a CTAMP, which would be prepared to manage construction traffic associated with the project. Details about spoil haulage routes are included in **section 6.6.5** and **Chapter 23** (Resource use and waste minimisation).

It is anticipated that construction works at The Crescent civil site (C6) would be carried out during standard daytime construction hours. Further details about construction hours are included in **section 6.7.2**.



**Table 6-14 The Crescent civil site (C6) indicative construction program**

| Construction activity   | Indicative construction timeframe |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|---|-----------------------------------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|
|   | 2018                              |  |  |  | 2019 |  |  |  | 2020 |  |  |  | 2021 |  |  |  | 2022 |  |  |  | 2023 |  |  |  |
| Site establishment and utility works  |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Surface road and intersection works   |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Whites Creek widening and improvement works   |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Drainage works including construction of the culvert below City West Link and upgrades to the drainage outfall to Rozelle Bay |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Construction of Whites Creek Bridge and demolition of existing bridge   |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Rehabilitation and landscaping  |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |



### 6.5.11 Victoria Road civil site (C7)

The Victoria Road civil site (C7) would be located on the western side of Victoria Road between Quirk Street and Lilyfield Road. The existing buildings and other structures on the site would be demolished to facilitate establishment of temporary site offices, a laydown area, workforce amenities and car parking. A portion of this site would be occupied by operational road infrastructure during operation with land adjacent to disturbed areas subject to landscaping.

The location of the Victoria Road civil site and an indicative layout of the site are shown in **Figure 6-21**. The construction activities program relevant to the site is outlined in **Table 6-15**.

Key construction activities to be carried out at and supported by at the Victoria Road civil site would include:

- Support for the reconstruction of Victoria Road and the construction of the replacement bridge at the Victoria Road/The Crescent intersection, including:
  - Demolition of existing structures including buildings that have been acquired
  - Vegetation clearing and removal
  - Utility works including protection and/or adjustment of existing utilities, removal of redundant utilities and installation of new utilities
  - Establishment of site offices, amenities and temporary construction hoarding (including acoustic hoarding if required)
  - Removal of the existing pedestrian and cyclist overpass over Victoria Road
  - Finishing works including asphaltting, line marking and signage installation
  - Excavating, filling and grading of disturbed areas
  - Site rehabilitation
  - Rehabilitation and landscaping adjacent to disturbed areas to be consistent with the Urban Design and Landscape Plan, including upgrades to the pedestrian and cyclist paths adjacent to the northbound and southbound carriageways of Victoria Road
  - Demobilisation.

Heavy and light vehicles would enter and exit the site to and from the northbound Victoria Road carriageway. It is anticipated that the Victoria Road civil site (C7) would be used during standard daytime construction hours. The construction activities program relevant to the site is outlined in **Table 6-15**. Further details about construction hours are included in **section 6.7.2**.

**Table 6-15 Victoria Road civil site (C7) indicative construction program**

| Construction activity  | Indicative construction timeframe |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|--|-----------------------------------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|
|  | 2018                              |  |  |  | 2019 |  |  |  | 2020 |  |  |  | 2021 |  |  |  | 2022 |  |  |  |
| Site establishment and utility works   |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Support for the reconstruction of Victoria Road including construction of the new bridge |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Site rehabilitation and landscaping  |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |

### 6.5.12 Iron Cove Link civil site (C8)

The Iron Cove Link civil site (C8) would be located along the southern side of Victoria Road at Rozelle between Byrnes Street and Springside Street. The site would be located on land currently occupied by Victoria Road and residential and commercial properties that are to be acquired and subsequently demolished. Further details about acquisitions that would occur as part of the project are provided in **Chapter 12** (Land use and property).

The site would be used to support construction of the Iron Cove Link surface works, including tunnel entry and exit ramps, upgrades and modifications to the eastbound and westbound carriageways of Victoria Road. There is no provision at this site to operate roadheaders (as tunnel excavation of the Iron Cove Link is anticipated to occur from the Rozelle civil and tunnel site (C5)), however the site may be used to support limited excavation of the initial sections of the Iron Cove Link tunnels.

The site would also be used to support construction of a bioretention facility within an informal car park within King George Park (adjacent to Manning Street) at Rozelle. As part of these works, a section of the car park would be improved including sealing of the car park surface and landscaping.

The site would include temporary site offices, a workshop and storage facilities, sediment basin and construction water treatment plant, a temporary substation, workforce amenities and car parking. During operation, a portion of the site would be occupied by the Iron Cove Link motorway operations complex (MOC4) including the Iron Cove Link ventilation facility. In addition, a ventilation outlet would be constructed between the eastbound and westbound carriageways of Victoria Road at around Springside Street.

The location of the Iron Cove Link civil site (C8) and an indicative layout are shown in **Figure 6-23**. The construction activities program relevant to the site is outlined in **Table 6-16**.

Key construction activities to be carried out at and supported by the Iron Cove Link civil site (C8) would include:

- Demolition of existing structures including residential and commercial buildings that have been acquired
- Vegetation clearing and removal
- Utility works including protection and/or adjustment of existing utilities, removal of redundant utilities and installation of new utilities
- Establishment of site offices, amenities and temporary infrastructure including temporary noise barriers
- Support for the construction of the Iron Cove Link tunnel portals and entry and exit ramps along Victoria Road
- Limited tunnel excavation of the initial sections of the Iron Cove Link using excavators (with rock hammers and rock saws as required), as well as stockpiling of material and spoil haulage. There is no provision at this site to operate road headers
- Support for the construction of surface road network upgrades and modifications to Victoria Road and the local road network including pedestrian and cyclist paths and crossings
- Support for the construction of the bioretention facility and car park improvement works adjacent to Manning Street at Rozelle. This would include support for the installation of drainage infrastructure along Byrnes Street at Rozelle to connect to the bioretention facility
- Construction of the Iron Cove Link motorway operations complex (MOC4) including the Iron Cove Link ventilation facility and one outlet
- Civil tunnel fitout works (which would include pavement and drainage works)
- Mechanical and electrical fitout of the ventilation facility
- Finishing works including asphaltting, line marking and signage installation
- Excavating, filling and grading disturbed areas



- Rehabilitation and landscaping to be consistent with the Urban Design and Landscape Plan including upgrades to pedestrian and cyclist infrastructure
- Demobilisation.

It is anticipated that construction vehicles would enter and exit the site to and from the southern (westbound) Victoria Road carriageway. Details about spoil haulage routes are included in **section 6.6.5** and **Chapter 23** (Resource use and waste minimisation).

Temporary changes to the local road network would be required to enable construction of the permanent design and the operation of the Iron Cove Link civil and tunnel site during construction. The Clubb Street/Victoria Road intersection would be permanently closed before the start of construction.

The Toelle Street and Callan Street intersections with Victoria Road would generally remain open during construction. There would be instances where one of these intersections would be closed temporarily to construct the permanent design, however these works would be short-term and conducted during non-peak times, where practical. Regard would also be given to the peak periods of use of King George Park when considering temporary closures. When construction is complete, these intersections would be reopened in the same arrangement as existing (ie left-in, left-out).

Access to and from Manning Street and the works to construct the bioretention facility would be via Toelle Street or Callan Street at Rozelle. Temporary traffic management measures would be established to enable access and egress arrangements. These would be detailed in a CTAMP, which would be prepared to manage construction traffic associated with the project.

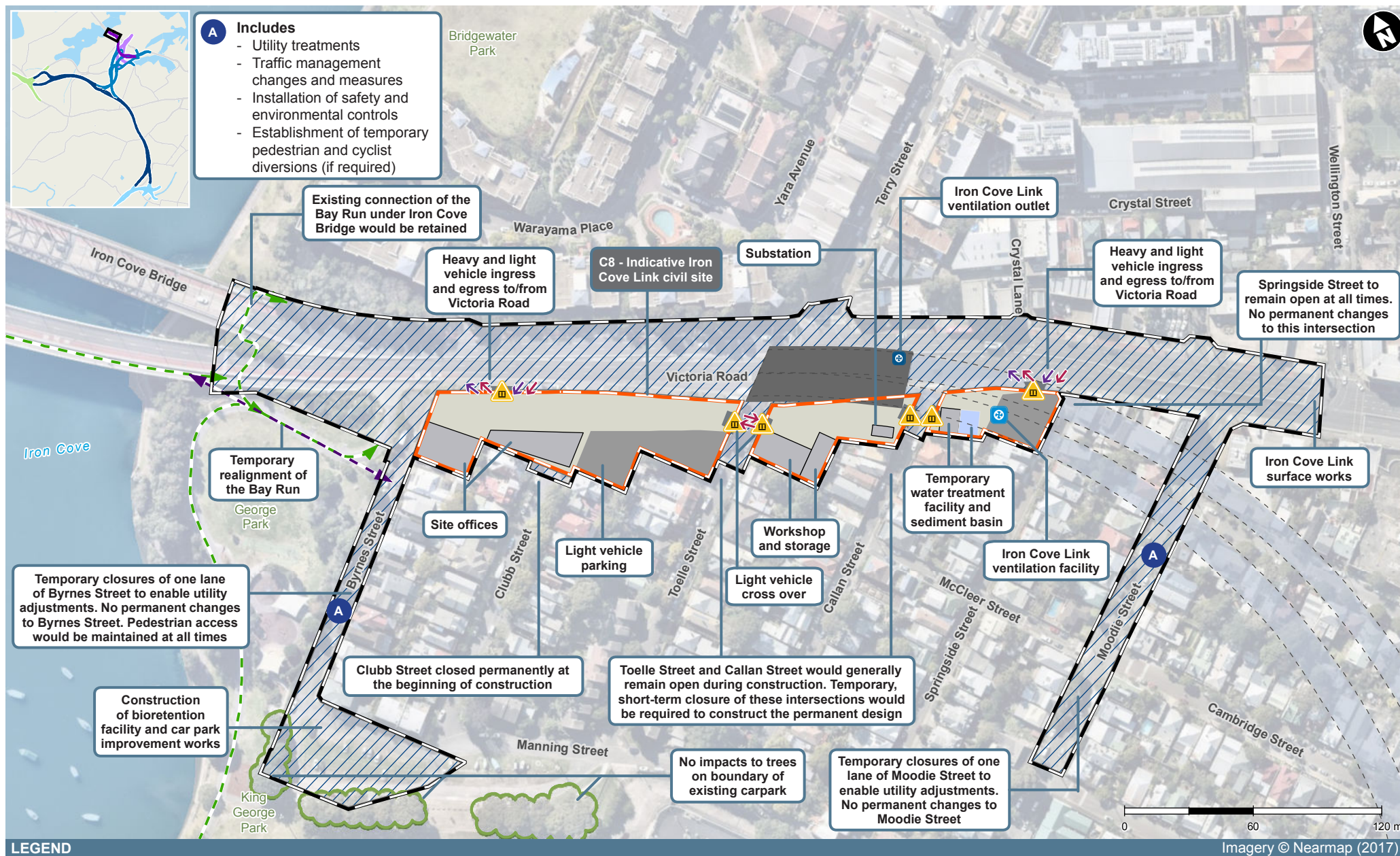
Westbound pedestrian and cyclist routes along Victoria Road would be temporarily diverted via Springside Street, McCleer Street, Callan Street, Manning Street and Byrnes Street during construction. These would connect with the westbound shared path along Victoria Road via the terminus of Byrnes Street. Following the completion of construction, the pedestrian and cyclist network would be reinstated.

During construction, a section of King George Park would be used to support the widening works along Victoria Road. The Bay Run would be temporarily realigned to retain pedestrian and cyclist connectivity with the path over Iron Cove Bridge. The existing arrangement would be reinstated at the completion of construction. Further details about temporary pedestrian and cyclist diversions are provided in **Chapter 8** (Traffic and transport).

It is anticipated that construction activities at the Iron Cove Link civil site (C8) and at the Manning Street bioretention facility would be carried out during standard daytime construction hours. Further details about construction hours are included in **section 6.7.2**.

**Table 6-16 Iron Cove Link civil site (C8) indicative construction program**

| Construction activity                               | Indicative construction timeframe |  |  |      |  |  |      |  |  |      |  |  |      |  |  |      |  |  |  |  |  |  |  |  |  |
|---|-----------------------------------|--|--|------|--|--|------|--|--|------|--|--|------|--|--|------|--|--|--|--|--|--|--|--|--|
|   | 2018                              |  |  | 2019 |  |  | 2020 |  |  | 2021 |  |  | 2022 |  |  | 2023 |  |  |  |  |  |  |  |  |  |
| Site establishment and utility works                |                                   |  |  |      |  |  |      |  |  |      |  |  |      |  |  |      |  |  |  |  |  |  |  |  |  |
| Traffic diversions and intersection works           |                                   |  |  |      |  |  |      |  |  |      |  |  |      |  |  |      |  |  |  |  |  |  |  |  |  |
| Construction of cut-and-cover and tunnel portals    |                                   |  |  |      |  |  |      |  |  |      |  |  |      |  |  |      |  |  |  |  |  |  |  |  |  |
| Construction of motorway operational infrastructure |                                   |  |  |      |  |  |      |  |  |      |  |  |      |  |  |      |  |  |  |  |  |  |  |  |  |
| Site rehabilitation and landscaping                 |                                   |  |  |      |  |  |      |  |  |      |  |  |      |  |  |      |  |  |  |  |  |  |  |  |  |
| Testing and commissioning                           |                                   |  |  |      |  |  |      |  |  |      |  |  |      |  |  |      |  |  |  |  |  |  |  |  |  |



#### LEGEND

##### The Bay Run

- Existing shared path
- Temporary diversion

##### M4-M5 Link

##### Boundaries

- Project footprint
- Ancillary facility
- Surface works

##### Surface construction

- Access road
- Cut and cover

##### Underground construction

- Iron Cove Link tunnel

##### Access and egress

- Site gate

##### Vehicle movements

- Light vehicle
- Heavy vehicle

##### Project features

- Ventilation outlet
- Ventilation facility

Figure 6-23 Indicative Iron Cove Link civil site (C8) layout

### 6.5.13 Pyrmont Bridge Road tunnel site (C9)

The Pyrmont Bridge Road tunnel site (C9) would be located between Parramatta Road and Pyrmont Bridge Road at Annandale on land currently occupied by commercial and light industrial businesses, which are to be acquired and demolished for the project. Further details about acquisitions that would occur as part of the project are provided in **Chapter 12** (Land use and property).

The construction ancillary facility would be used to support tunnelling construction activities. The site would include temporary site offices, a workshop and storage facilities, a laydown area, entry and exit points for construction traffic, a temporary substation, temporary ventilation for the tunnels, a temporary water treatment plant and sediment pond, workforce amenities and car parking.

Key construction activities to be carried out at and supported by the Pyrmont Bridge Road tunnel site would include:

- Demolition of existing structures including buildings
- Utility works including protection and/or adjustment of existing utilities, removal of redundant utilities and installation of new utilities
- Establishment of site offices, amenities and temporary construction hoarding (including acoustic hoarding if required)
- Permanent realignment of Bignell Lane to ensure property owners have ongoing access to properties during construction and operation
- Construction of a driveway along the Parramatta Road frontage to enable access into the site for heavy vehicles
- Provision of a temporary signalised intersection or other temporary traffic control measures along Pyrmont Bridge Road to provide for heavy vehicle egress and light vehicle ingress and egress
- Construction of an acoustic shed
- Construction of a temporary access tunnel for tunnelling works
- Tunnel excavation of the northbound and southbound mainline tunnels
- Spoil handling and haulage
- Excavation of cross-passages, longitudinal egress passages and niches in the tunnels
- Civil tunnel fitout works (including pavement and drainage works)
- Installation of mechanical and electrical services within the mainline tunnels and fitout of the tunnels with additional infrastructure (eg signage)
- Rehabilitation including works to prepare the site for a future use in accordance with the Residual Land Management Plan
- Demobilisation.

Roadheaders would be launched from this site and would initially excavate the temporary access tunnel, and then the eastbound and westbound mainline tunnels. An acoustic shed would be established on the site to ensure that noise levels associated with tunnelling and spoil handling outside standard day time construction hours comply with relevant noise management activities. In addition, temporary noise mitigation measures may be employed, including temporary acoustic hoarding and other temporary structures such as site buildings, which would be located to minimise noise impacts on surrounding properties.

Heavy vehicle access to the site would be from the northern (eastbound) carriageway of Parramatta Road. Vehicles would enter via a new driveway, travel in an anti-clockwise direction via an internal access road, and exit the site onto Pyrmont Bridge Road via a new temporary signalised intersection. Light vehicle ingress and egress would be from Pyrmont Bridge Road. Temporary traffic management measures would be established to enable access and egress arrangements. These would be detailed in a CTAMP, which would be prepared to manage construction traffic associated with the project. Details about spoil haulage routes are included in **section 6.6.5** and **Chapter 23** (Resource use and waste minimisation).

Spoil handling associated with the tunnelling works supported by the site would occur 24 hours a day, seven days a week. Where practical, spoil would be handled below ground and removed during the day, outside of peak periods. Heavy vehicle movements associated with the removal of spoil from tunnelling would only occur via ingress from Parramatta Road and egress to Pyrmont Bridge Road. Feasible and reasonable management strategies would be investigated to minimise the volume of heavy vehicle movements outside standard day time construction hours. Any spoil removal outside standard construction hours would meet the relevant noise criteria. Further details about construction hours are included in **section 6.7.2**.

The location of the Pyrmont Bridge Road tunnel site and an indicative layout of the site are shown in **Figure 6-24**. An indicative program for works to be conducted within the Pyrmont Bridge Road tunnel site is provided in **Table 6-17**.

**Table 6-17 Pyrmont Bridge Road tunnel site (C9) indicative construction program**

| Construction activity                     | Indicative construction timeframe |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|---|-----------------------------------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|
|   | 2018                              |  |  |  | 2019 |  |  |  | 2020 |  |  |  | 2021 |  |  |  | 2022 |  |  |  |
| Initial road works and traffic management |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Site establishment and utility works      |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Construction of temporary access tunnel   |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Tunnelling                                |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Civil and mechanical fitout               |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Testing and commissioning                 |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Site rehabilitation                       |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |



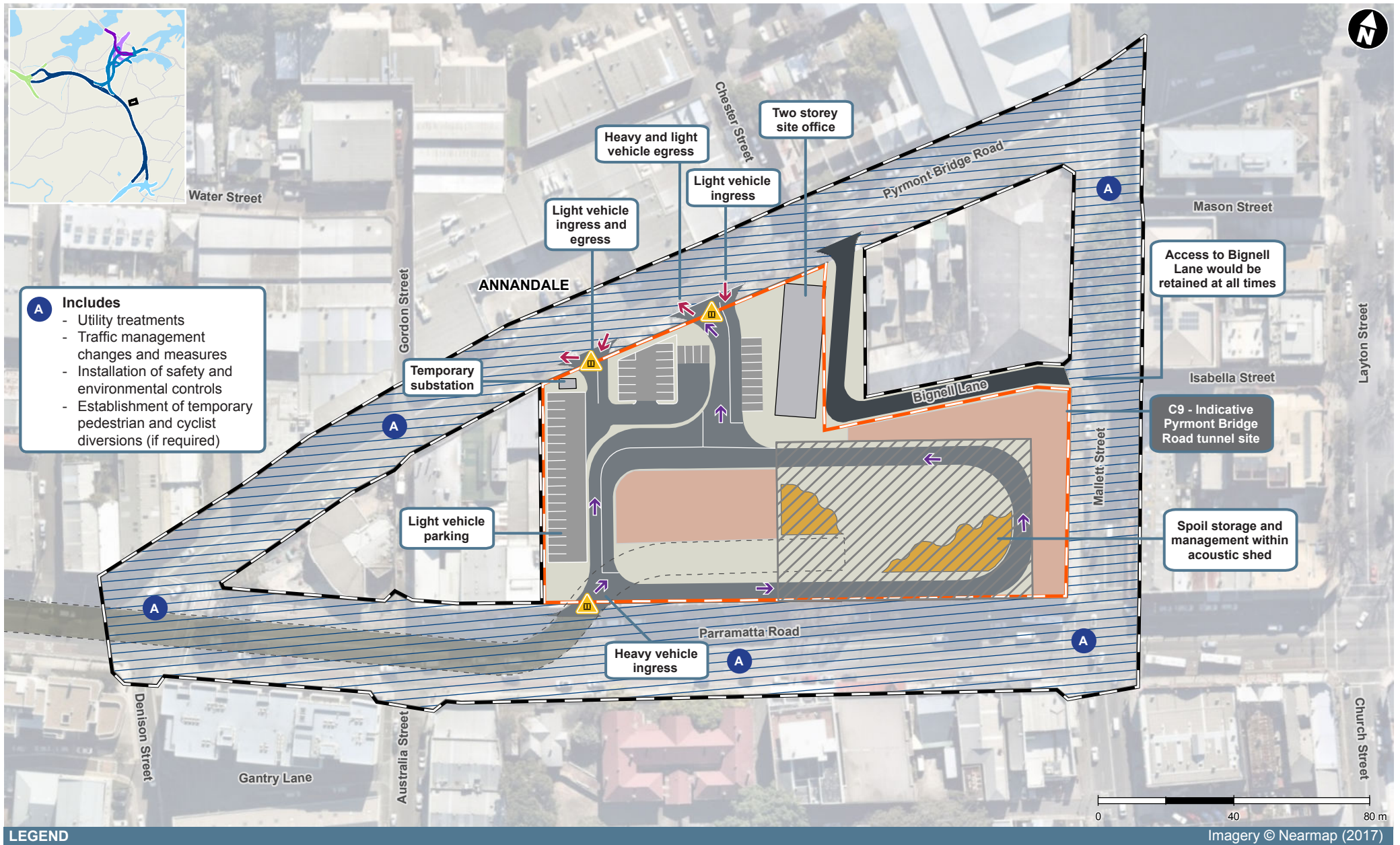


Figure 6-24 Indicative Pymont Bridge Road tunnel site (C9) layout

#### 6.5.14 Campbell Road civil and tunnel site (C10)

The Campbell Road civil and tunnel site (C10) would be located within the St Peters interchange site on the southern side of Albert Street and Campbell Road at St Peters. The Campbell Road civil and tunnel site would use land on the surface that is being used as a construction site for the New M5 project. An additional area at the southern end of the Campbell Road civil and tunnel site would be handed over to the project in 2020. This area would be used for light vehicle parking and as a laydown area. Around 150 car parking spaces would be established at the Campbell Road civil and tunnel site.

Prior to being made available for use for construction of the M4-M5 Link project, the construction site for the New M5 project will be demobilised and the area rehabilitated to a condition that is suitable for use for construction of the M4-M5 Link.

The Campbell Road civil and tunnel site would include temporary site offices, a workshop and storage facilities, a laydown area, entry and exit points for construction traffic, a temporary substation, temporary ventilation for the tunnels, a temporary water treatment plant and sediment pond, workforce amenities and car parking. The location of the construction ancillary facility and an indicative layout of the site are shown in **Figure 6-25**. An indicative program for works to be conducted within the Campbell Road construction ancillary facility is provided in **Table 6-18**.

The site would be used to support tunnelling of the mainline tunnels and the construction of the entry and exit ramps that would connect the St Peters interchange with the M4-M5 Link mainline tunnels. A portion of the site would be used for the Campbell Road motorway operations complex (MOC5) during operation, including the Campbell Road ventilation facility. The remainder of the site would be rehabilitated and landscaped in accordance with the Urban Design and Landscape Plan, and consistent with the conditions of approval (and Urban Design and Landscape Plan) for the New M5 project.

Key construction activities to be carried out at and supported by the Campbell Road civil and tunnel site would include:

- Establishment of site offices, amenities and temporary infrastructure
- Construction of an acoustic shed and other temporary noise attenuation measures
- Excavation of the mainline tunnels and the St Peters interchange entry and exit ramps, as well as stockpiling of excavated material and spoil haulage
- Excavation of cross-passages, longitudinal egress passages and niches in the tunnels
- Civil tunnel fitout works (including pavement and drainage works)
- Installation of mechanical and electrical services within the mainline tunnels and fitout of the tunnels with additional infrastructure (eg signage)
- Excavation of the ventilation tunnels
- Construction of a cut-and-cover structure for the St Peters interchange entry and exit ramps within the St Peters interchange site (south of Campbell Road)
- Construction of the St Peters motorway operations complex (MOC5) including the Campbell Road ventilation facility and four ventilation outlets
- Mechanical and electrical fitout of the ventilation facility
- Civil works at the surface to integrate the tunnels with the surface road network of the St Peters interchange
- Finishing works including asphaltting, line marking and signage installation
- Demobilisation
- Earthworks and finishing works to prepare the site for future landscaping works that will be carried out in accordance with the Urban Design and Landscape Plan.

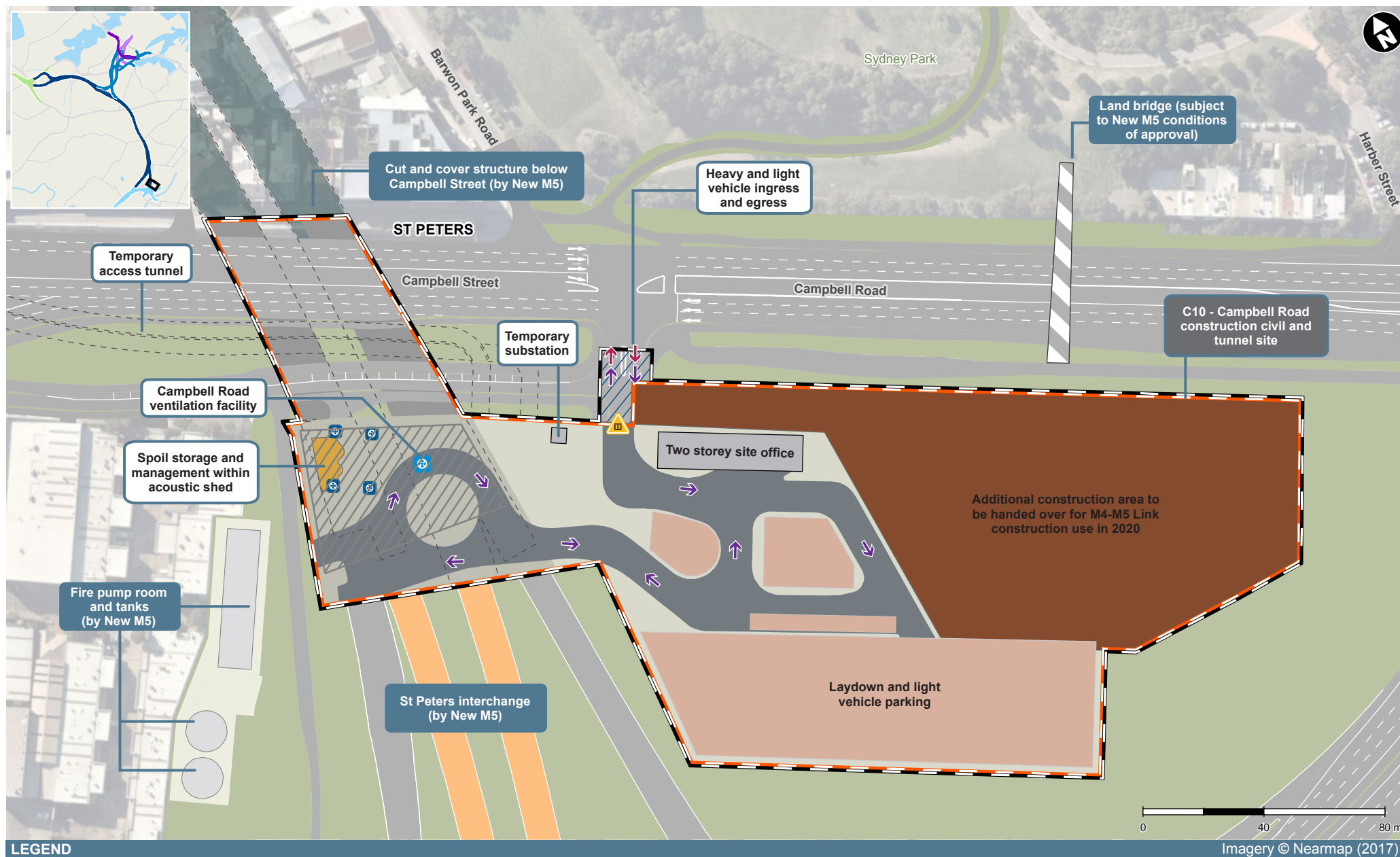
Roadheaders would be launched from this site and would excavate the entry and exit ramps and mainline tunnels. Spoil handling would occur within the cut-and-cover structure below Campbell Road being built as part of New M5 project. An acoustic shed would also be established on the site, to ensure that noise from tunnelling and spoil handling outside standard day time construction hours complies with relevant noise management levels. In addition, temporary noise attenuation measures, such as temporary acoustic hoarding and other structures such as site buildings, would be provided to minimise the effects of construction noise on surrounding properties.

Vehicles would enter and exit the site from Albert Street via the signalised intersection on Campbell Road that is being built as part of the New M5 local road upgrade works. Temporary traffic management measures would be established to enable access and egress arrangements. These would be detailed in a CTAMP, which would be prepared to manage construction traffic associated with the project. Details about spoil haulage routes are included in **section 6.6.5** and **Chapter 23** (Resource use and waste minimisation). Within the site, an access driveway would provide access between Albert Road and the acoustic shed and cut-and-cover structure.

Spoil handling associated with tunnelling work supported by the site would occur 24 hours a day, seven days a week. Where practical, spoil would be handled below ground and removed during the day, outside of peak periods. Heavy vehicle movements associated with the removal of spoil from tunnelling would only occur via access and egress directly to and from Campbell Road. Feasible and reasonable management strategies would be investigated to minimise the volume of heavy vehicle movements at night. Any spoil removal outside standard construction hours would meet the relevant noise criteria. Further details about construction hours are included in **section 6.7.2**.

**Table 6-18 Campbell Road civil and tunnel site (C10) indicative construction program**

| Construction activity                               | Indicative construction timeframe |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|---|-----------------------------------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|
|   | 2018                              |  |  |  | 2019 |  |  |  | 2020 |  |  |  | 2021 |  |  |  | 2022 |  |  |  |
| Initial road works and traffic management           |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Site establishment and utility works                |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Tunnelling  |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Civil and mechanical fitout                         |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Construction of motorway operational infrastructure |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Testing and commissioning                           |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| Site demobilisation and rehabilitation              |                                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |



#### LEGEND

##### New M5

- Land subject to New M5 conditions of approval
- Proposed future Sydney Gateway connections (non-operational as part of M4-M5 Link)

##### M4-M5 Link

##### Boundaries

- Project footprint
- Ancillary facility
- Surface works

##### Surface construction

- Access road
- Laydown area
- Acoustic shed

##### Underground construction

- Mainline tunnel
- Temporary access tunnel

##### Access and egress

- Site gate

##### Vehicle movements

- Light vehicle
- Heavy vehicle

##### Project features

- Ventilation outlet
- Ventilation facility

Figure 6-25 Indicative Campbell Road construction civil and tunnel site (C10) layout



## 6.6 Traffic management and access

This section provides an overview of the traffic management and access provisions that would be put in place during construction of the project, to maintain the functionality of surrounding roads, and to protect the safety of all road users, including pedestrians, cyclists, motorists, public transport users and construction personnel. This section also provides indicative heavy and light vehicle volumes associated with construction, details of parking for the construction workforce, heavy vehicle haulage routes to spoil reuse and disposal sites and the use of alternative routes in the case of 'exceptional circumstances'.

Construction of the project would be subject to careful traffic management to ensure the functionality of surrounding roads is maintained, as well as the safety of members of the public, motorists and construction personnel. Generally, temporary road pavements would be constructed as early as possible within the construction program to separate motorists from construction work zones. However, a number of phases of traffic management and traffic switches would be required at some locations to facilitate construction.

Traffic management measures implemented during construction would be determined during detailed design and documented in a CTAMP that would be prepared as part of the CEMP, and may include:

- Carrying out the works in stages to reduce traffic impacts
- Temporary speed restrictions within construction work zones
- Reduced shoulder widths and erection of traffic barriers along construction work zones
- Scheduling spoil haulage to occur outside of peak periods (where practicable)
- Provision of appropriate warning and advisory signposting
- Provision of temporary access arrangements with private landowners whose property is adjacent to construction activities (where required)
- Provision for public transport and emergency services to ensure disruption is minimised.

At all locations where temporary and/or permanent road closures are required, access to properties would be maintained and signage for road closures or detours would be installed. Further details and the potential impacts of these modifications are provided in **Chapter 8** (Traffic and transport). Roads that would permanently be closed as a result of the project are described in **Chapter 5** (Project description).

### 6.6.1 Changes to the road network during construction

It is anticipated that road network modifications would be required to facilitate construction of the project. These are identified indicatively in **Table 6-19**. A strategy for managing changes to the road network during construction would be provided as part of the CTAMP, which would be prepared during detailed design. Further information about indicative changes to the road network is provided in **Chapter 8** (Traffic and transport) and **Appendix H** (Technical working paper: Traffic and transport).

**Table 6-19 Indicative road network modifications**

| <b>Location</b>  | <b>Indicative road network modifications</b>  | <b>Indicative duration<sup>1</sup></b>  | <b>Road reinstatement</b>  |
|--|---|---|--|
| Wattle Street interchange  | <ul style="list-style-type: none"> <li>Northcote Street would be closed at the intersection with Parramatta Road for the duration of construction. This would be a continuation of the current closure of this section of Northcote Street to facilitate construction of the M4 East project.</li> </ul>  | <ul style="list-style-type: none"> <li>Until completion of tunnel works in 2022.</li> </ul>   | Once construction is complete, the Northcote Street/Parramatta Road intersection would be reinstated.  |
| Parramatta Road West civil and tunnel site (C1b) and Parramatta Road East civil site (C3b) | <ul style="list-style-type: none"> <li>Works would be carried out on Alt Street and Bland Street to facilitate access via new driveways to the Parramatta Road West civil and tunnel site (C1b) and the Parramatta Road East civil site (C3b)</li> <li>Temporary closures of one lane of Alt Street and Bland Street may be required for establishment of construction vehicle access provisions including installation of driveways and associated construction activities. Traffic management, that could include temporary diversions, would be implemented during temporary closures</li> <li>Kerbside parking along a section of Alt Street near the intersection with Parramatta Road would be removed to facilitate driveway access to the construction ancillary facilities.</li> </ul>   | <ul style="list-style-type: none"> <li>Q3 2018 to Q1 2019 to complete road modifications</li> <li>Q3 2018 to Q4 2022 including construction duration and reinstatement of roads.</li> </ul> | <p>Once road modification works are complete, both lanes along Alt Street and/or Bland Street would be reopened in line with temporary design. When construction is complete, the road would be reinstated as per the existing arrangement.</p> <p>Kerbside parking along Alt Street would be reinstated at the end of construction.</p> |
| Darley Road civil and tunnel site (C4)   | <ul style="list-style-type: none"> <li>Works would be carried out to facilitate access to the Darley Road civil and tunnel site (C4) including establishment of a temporary right hand turn lane for construction traffic to access Darley Road from City West Link</li> <li>Temporary diversions along Darley Road may be required during construction (to enable establishment of construction vehicle access provisions)</li> <li>One lane in each direction along Darley Road (between around Francis Street and Charles Street at Leichhardt) would generally be maintained, with temporary closures of one lane required for establishment of construction vehicle access provisions including installation of driveways and associated construction activities. Traffic management, that could include temporary diversions, would be implemented during temporary closures</li> <li>Kerbside parking along the northern (eastbound) carriageway of Darley Road between around Francis Street and Charles Street would be removed (around 20 spaces) during construction.</li> </ul> | <ul style="list-style-type: none"> <li>Q3 2018 to Q1 2019 to complete road modifications</li> <li>Q3 2018 to Q4 2022 including construction duration and reinstatement of roads.</li> </ul> | <p>Once road modification works are complete, Darley Road would be reopened in line with temporary design. When construction is complete, the road would be reinstated as per the existing arrangement.</p> <p>Kerbside parking along Darley Road would be reinstated at the end of construction.</p>                                    |

| Location   | Indicative road network modifications   | Indicative duration <sup>1</sup>   | Road reinstatement  |
|--|---|--|---|
| City West Link and The Crescent at Lilyfield and Rozelle | <ul style="list-style-type: none"> <li>• Works would be carried out to facilitate ingress and egress for the Rozelle civil and tunnel site (C5) including establishment temporary intersections, slip lanes and driveways</li> <li>• Works would be carried out to upgrade and improve the eastbound and westbound carriageways of City West Link and The Crescent</li> <li>• Temporary diversions would be put in place to allow for construction along the existing alignment</li> <li>• Under existing and diverted arrangements, all traffic lanes in each direction would generally be maintained with some short-term lane closures (outside of peak periods where feasible and reasonable) subject to road occupancy licences.</li> </ul>  | <ul style="list-style-type: none"> <li>• Q4 2018 to Q2 2019 to complete road modifications</li> <li>• Q4 2018 to Q3 2023 including construction duration staging, temporary roads and reinstatement of roads.</li> </ul> | When construction is complete, the road would be reinstated as per the permanent design shown in <b>Chapter 5</b> (Project description).  |
| The Crescent at Annandale and Rozelle                    | <ul style="list-style-type: none"> <li>• Works would be carried out to establish a new driveway for ingress and egress for The Crescent civil site (C6)</li> <li>• Works would be carried out to realign The Crescent and reconstruct the intersection with City West Link</li> <li>• The new alignment of The Crescent would be constructed 'offline' (that is, next to the existing alignment). Traffic would be switched onto the new alignment when ready, and the old alignment of The Crescent would be demolished</li> <li>• All traffic lanes in each direction would generally be maintained with some short-term lane closures (outside of peak periods where feasible and reasonable) subject to road occupancy licences</li> <li>• Temporary changes to the intersection of The Crescent/Chapman Road may be required. Access to the commercial premises, including the Multihull Central Marina, that use Chapman Road as well as the Glebe Foreshore Parklands would be protected and maintained at all times</li> <li>• Traffic signal modifications at the intersection with City West Link in line with the temporary and permanent design.</li> </ul> | <ul style="list-style-type: none"> <li>• Q1 2019 to Q2 2019 to complete road modifications</li> <li>• Q1 2019 to Q3 2023 including construction duration staging, temporary roads and reinstatement of roads.</li> </ul> | Once road modification works are complete, the road would be reopened in line with temporary design. When construction is complete, the road would be reinstated as per the permanent design. |

| Location   | Indicative road network modifications  | Indicative duration <sup>1</sup>  | Road reinstatement  |
|--|--|---|---|
| Victoria Road at Rozelle                         | <ul style="list-style-type: none"> <li>All traffic lanes in each direction would generally be maintained with some short-term lane closures (outside of peak periods where feasible and reasonable) subject to road occupancy licences</li> <li>Traffic signal modifications at the intersection with The Crescent in line with the permanent design</li> <li>Temporary diversions would be put in place at the intersection with The Crescent to allow for construction of the new bridge in line with the permanent design. This could include the construction a temporary bridge next to the existing bridge, onto which traffic would be switched during construction of the new bridge. When complete, traffic would be switched onto the new bridge and the temporary bridge would be removed.</li> </ul> | <ul style="list-style-type: none"> <li>Q4 2018 to Q2 2019 to complete road modifications</li> <li>Q4 2018 to Q3 2023 including construction duration staging, temporary roads and reinstatement of roads.</li> </ul>                                    | Once road modification works are complete, the road would be reopened in line with temporary design. When construction is complete, the road would be reinstated as per the permanent design. |
| Gordon Street south of Lilyfield Road at Rozelle | <ul style="list-style-type: none"> <li>Gordon Street between Lilyfield Road and the Rozelle Rail Yards would be permanently closed as part of the project.</li> </ul>  | N/A   | Gordon Street would be permanently closed.  |
| Lilyfield Road at Rozelle                        | <ul style="list-style-type: none"> <li>Temporary closures to one lane would be required for short periods of time to allow for construction of the construction access driveways, utility works and construction of the cut-and-cover structures</li> <li>Access to Lilyfield Road from Victoria Road may be temporarily restricted to allow for integration with the revised Victoria Road alignment. Closures would be outside of peak periods where feasible and reasonable. During these periods, alternative access to Lilyfield Road would be available from Hornsey Street and Gordon Street.</li> </ul>  | <ul style="list-style-type: none"> <li>Q4 2018 to Q2 2019 to complete road modifications</li> <li>Q2 2019 to Q4 2019 for utility relocations</li> <li>Q4 2018 to Q3 2023 including construction duration staging and reinstatement of roads.</li> </ul> | Once works are completed, the road would be reopened in line with permanent design.   |
| Hornsey Street at Rozelle                        | <ul style="list-style-type: none"> <li>One lane in each direction would generally be maintained during construction</li> <li>Access to Hornsey Street from Victoria Road would require full closure for short periods of time during realignment and upgrade works to Victoria Road</li> <li>Alternative access to Hornsey Street would be available from Lilyfield Road and Gordon Street.</li> </ul>   | <ul style="list-style-type: none"> <li>Q4 2018 to Q2 2019 to complete road modification</li> <li>Q4 2018 to Q3 2023 including construction duration staging and reinstatement of roads.</li> </ul>  | Once works during the stage are completed, the road would be reopened in line with permanent design.  |



| Location   | Indicative road network modifications   | Indicative duration <sup>1</sup>  | Road reinstatement  |
|--|---|---|---|
| Quirk Street at Rozelle                          | <ul style="list-style-type: none"> <li>One lane in each direction would generally be maintained during construction</li> <li>Access to Quirk Street from Victoria Road would require full closure for short periods of time during realignment and upgrade works to Victoria Road</li> <li>Alternative access to Quirk Street would be available from Hornsey Street and Gordon Street.</li> </ul>  | <ul style="list-style-type: none"> <li>Q4 2018 to Q2 2019 to complete road modifications</li> <li>Q4 2018 to Q3 2023 including construction duration staging and reinstatement of roads.</li> </ul>   | Once works during the stage are completed, the road would be reopened in line with permanent design.  |
| Iron Cove Link civil site (C8) and Victoria Road | <ul style="list-style-type: none"> <li>Works would be carried out along Victoria Road to facilitate ingress and egress for the Iron Cove Link civil site (C8)</li> <li>All traffic lanes in each direction would generally be maintained with some short-term lanes closures (outside of peak periods where feasible and reasonable) subject to road occupancy licences</li> <li>Temporary diversions would be put in place to allow for construction along the existing alignment.</li> </ul>  | <ul style="list-style-type: none"> <li>Q4 2018 to Q2 2019 to complete road modifications for ingress and egress</li> <li>Q4 2018 to Q3 2023 including construction duration staging, temporary roads and reinstatement of roads.</li> </ul> | Once works are complete, the road would be reopened in line with temporary design. When construction is complete, the road would be reinstated as per the permanent design. |
| Moodie Street at Rozelle                         | <ul style="list-style-type: none"> <li>Short-term, temporary closure of one lane of Moodie Street may be required during construction to facilitate utility works.</li> </ul>   | <ul style="list-style-type: none"> <li>Q4 2018 to Q3 2023.</li> </ul>   | Once construction is completed, Moodie Street would be reopened as per the existing design.   |
| Callan Street at Rozelle                         | <ul style="list-style-type: none"> <li>Access to Callan Street from Victoria Road would generally remain open during construction</li> <li>Temporary closures at the intersection with Victoria Road to allow for integration with the revised Victoria Road alignment may occur. Closures would be outside of peak periods where feasible and reasonable subject to road occupancy licences</li> <li>During these periods, alternative access to Callan Street would be available from Springside Street and McCleer Street at Rozelle.</li> </ul> | <ul style="list-style-type: none"> <li>Q4 2018 to Q3 2023.</li> </ul>   | Once works are completed, the road would be reopened in line with permanent design.   |

| Location                            | Indicative road network modifications  | Indicative duration <sup>1</sup>  | Road reinstatement  |
|-------------------------------------|--|---|---|
| Toelle Street at Rozelle            | <ul style="list-style-type: none"> <li>Access to Toelle Street from Victoria Road would generally remain open during construction</li> <li>Temporary closures at the intersection with Victoria Road to allow for integration with the revised Victoria Road alignment may occur. Closures would be outside of peak periods where feasible and reasonable subject to road occupancy licences</li> <li>During these periods, alternative access to Toelle Street would be available from Springside Street, McCleer Street, Callan Street and Manning Street at Rozelle.</li> </ul> | <ul style="list-style-type: none"> <li>Q4 2018 to Q3 2023.</li> </ul>   | Once works are completed, the road would be reopened in line with permanent design.   |
| Clubb Street at Rozelle             | <ul style="list-style-type: none"> <li>Access between Clubb Street and Victoria Road would be permanently closed and a cul-de-sac established to accommodate the revised alignment of Victoria Road</li> <li>Access to Clubb Street would be available from Springside Street, McCleer Street, Callan Street and Manning Street.</li> </ul>  | <ul style="list-style-type: none"> <li>N/A (closed at the start of construction).</li> </ul>  | Access to Clubb Street from Victoria Road would be permanently closed.  |
| Byrnes Street at Rozelle            | <ul style="list-style-type: none"> <li>Short-term, temporary closure of one lane of Byrnes Street may be required during construction to facilitate utility works</li> <li>Works would also be carried out to move the terminus near Victoria Road south to accommodate the revised design.</li> </ul>   | <ul style="list-style-type: none"> <li>Q1 2019 to Q4 2019.</li> </ul>   | <p>Once utility works are completed, Byrnes Street would be reopened as per the existing layout.</p> <p>Once works on the cul-de-sac of Byrnes Street are complete, this section of the road would be reopened in line with the permanent design.</p> |
| Pymont Bridge Road tunnel site (C9) | <ul style="list-style-type: none"> <li>Works would be carried out along Parramatta Road and Pymont Bridge Road to facilitate ingress and egress for construction traffic</li> <li>Works would be carried out to realign Bignell Lane between Mallett Street and Pymont Bridge Road at Annandale</li> <li>Short-term, temporary closure of Bignell Lane would be required during construction to allow for the realignment works</li> <li>Rear-access to commercial properties along Bignell Lane would be maintained during construction.</li> </ul>                               | <ul style="list-style-type: none"> <li>Q3 2018 to Q4 2018 to complete road modifications</li> <li>Q3 2018 to Q3 2022 including construction duration and reinstatement of roads.</li> </ul> | Once construction is completed, roads would be reopened in line with the permanent design (ie realigned Bignell Lane).  |

<sup>1</sup> Table note: Q refers to quarter, where Q1 is January to March, Q2 is April to June, Q3 is July to September and Q4 is October to December

## Traffic staging approach

The construction of major infrastructure in constrained urban environments requires detailed consideration of the staging of construction works. There are three key areas of the project which will require the preparation of detailed traffic staging plans during construction:

- **Victoria Road/The Crescent/Anzac Bridge approach intersection** – reconstructing the intersection to accommodate existing connectivity, the new M4 East Motorway/Iron Cove Link to Anzac Bridge connections and construction of a new bridge at Victoria Road
- **City West Link/The Crescent intersection** – realigning The Crescent at Annandale to the west, building a new bridge over Whites Creek and modifying the intersection
- **Victoria Road at Iron Cove** – realigning the westbound (southern) carriageway of Victoria Road to create sufficient space to build new tunnel portals and entry and exit ramps for the Iron Cove Link.

These works would be carried out on parts of the arterial road network that are heavily trafficked and provide important network connectivity. The construction of these works would require the implementation of multiple traffic stages that meet the requirements of the construction contractor, Roads and Maritime, Transport Management Centre (TMC) and other key stakeholders.

The traffic staging would likely require the creation of temporary carriageways, intersections and bridges offline from the existing infrastructure to enable the construction of the new works and the switching of traffic.

Temporary infrastructure would be sized to adequately convey the existing traffic through the site. Temporary closure and diversions, outside of peak hours, would likely be required and would be undertaken following consultation with the TMC. Staging arrangements would be confirmed by the construction contractor during detailed design.

In preparing the traffic staging plans during construction the key considerations would include:

- Maintaining traffic and lane capacity on the arterial road network during peak periods
- Minimising delays to motorists utilising this part of the arterial road network
- Undertaking the works efficiently to minimise the duration of traffic impacts
- Maintaining the safety of motorists, members of the public and construction personnel
- Minimising impacts on public transport services and providing alternative arrangements where necessary
- Minimising impacts on key active transport links and providing alternative arrangements where necessary.

### 6.6.2 Changes to pedestrian and cyclist facilities

It is anticipated that some modifications would be needed to be made to pedestrian and cyclist facilities to facilitate construction of the project. An indicative list of these modifications is outlined in **Table 6-20**.

A strategy for the maintenance of pedestrian and cyclist access throughout construction would be provided as part of the CTAMP, which would be prepared during detailed design. Further information about alternative pedestrian and cyclist routes is provided in **Chapter 8** (Traffic and transport) and **Appendix H** (Technical working paper: Traffic and transport).

**Table 6-20 Indicative modifications to pedestrian and cyclist facilities during construction**

| Location   | Indicative modifications to pedestrian and cyclist facilities  |
|--|--|
| Northcote Street civil site (C3a)  | <ul style="list-style-type: none"> <li>• Temporary closure of a section of footpaths on both sides of Northcote Street at Haberfield during construction. This would be a continuation of the current closure of this section of footpaths along Northcote Street to facilitate construction of the M4 East project</li> <li>• Alternative access to Parramatta Road would be provided via Ash Lane and either Wolseley Street or Wattle Street at Haberfield.</li> </ul>  |
| Parramatta Road West civil and tunnel site (C1b) and Parramatta Road East civil site (C3b) | <ul style="list-style-type: none"> <li>• Periodic, short-term closures of footpaths on both sides of Alt Street on the eastern and western sides of Parramatta Road. These would be most likely to occur during site establishment, when access to these sites is being established</li> <li>• Where a footpath is temporarily closed, the corresponding footpath on the other side of the road would remain open</li> <li>• Traffic management measures would be implemented at the entry and exit driveways on Parramatta Road, Alt Street and Bland Street to manage potential interactions between construction traffic and pedestrians and cyclists.</li> </ul>   |
| Darley Road civil and tunnel site (C4)   | <ul style="list-style-type: none"> <li>• Temporary closure of the footpath on the northern side of Darley Road at Leichhardt, between around Canal Road and Darley Road, may be required. This would be most likely to occur during site establishment, when access to the Darley Road civil and tunnel site (C4) is being established</li> <li>• The footpath along the southern side of Darley Road would remain open at all times, and would act as an alternative to the northern footpath during temporary closures</li> <li>• There is an on-road cyclist route on Darley Road at Leichhardt that connects to the Lilyfield Road commuter route via the City West Link/James Street intersection. No diversions would be required</li> <li>• Traffic management measures would be implemented at the entry and exit driveways to manage potential interactions between construction traffic and pedestrians and cyclists</li> <li>• The project would not affect the existing pedestrian path that runs along the southern side of City West Link and connects the Leichhardt North light rail stop with Charles Street at Lilyfield (via the bridge over City West Link).</li> </ul>  |
| Rozelle civil and tunnel site (C5)   | <ul style="list-style-type: none"> <li>• Periodic closures of the footpath on the southern side of Lilyfield Road between around Lamb Street at Lilyfield and Victoria Road at Rozelle. The footpath along the northern side of Lilyfield Road would not be affected by the project</li> <li>• Temporary realignment of a section of the pedestrian path between Anzac Bridge and Victoria Road at Rozelle to minimise interaction with construction activities</li> <li>• Periodic, short-term closures of the footpath on one side of James Craig Road at Rozelle during construction. During these instances, the footpath on the other side of James Craig Road would be used as an alternative route</li> <li>• Permanent closure of two pedestrian and cyclist bridges at Rozelle; one over City West Link and the other over Victoria Road. Alternative routes during construction are described in <b>Chapter 8</b> (Traffic and transport) and would be established before closure of these bridges. New permanent pedestrian and cyclist links that would provide similar or improved connectivity would also be provided as part of the project (refer to <b>Appendix N</b> (Technical working paper: Active transport strategy))</li> <li>• Temporary, periodic closure of the shared paths on the eastern and western sides of Victoria Road at Rozelle. Works would be staged so that the shared path on either the eastern or western side of Victoria Road at Rozelle would remain open at all times.</li> </ul> |



| Location                                    | Indicative modifications to pedestrian and cyclist facilities   |
|---|---|
| The Crescent civil site (C6)                | <ul style="list-style-type: none"> <li>• Periodic, temporary closures of the footpath on the eastern and western side of The Crescent at Annandale between City West Link and Johnston Street at Annandale during construction. Works would be staged so that the shared path on either the eastern or western side of The Crescent would remain open at all times</li> <li>• Permanent closure of the shared path through Buruwan Park connecting The Crescent with Bayview Crescent at Annandale. Alternative access to the Rozelle Bay light rail stop from The Crescent, Johnston Street and Bayview Crescent at Annandale would be provided at all times during construction.</li> </ul> |
| Iron Cove Link civil site (C8)              | <ul style="list-style-type: none"> <li>• Temporary closure of the shared path on the southern side of Victoria Road at Rozelle during construction. A temporary diversion would be provided along Springside Street, McCleer Street, Callan Street, Manning Street and Byrnes Street at Rozelle</li> <li>• Temporary diversion of The Bay Run connection to the shared path along Iron Cove Bridge during construction. Alternative access to Iron Cove Bridge would be provided.</li> </ul>  |
| Pymont Bridge Road tunnel site (C9)         | <ul style="list-style-type: none"> <li>• Temporary diversions around the heavy vehicle ingress and egress points along Parramatta Road and Pymont Bridge Road at Annandale during construction</li> <li>• Traffic management measures would be implemented at the entry and exit driveways on Parramatta Road and Pymont Bridge Road to manage potential interactions between construction traffic and pedestrians and cyclists.</li> </ul>   |
| Campbell Street civil and tunnel site (C10) | <ul style="list-style-type: none"> <li>• As part of the New M5 project, the Campbell Road/Albert Street intersection would be upgraded to a signalised intersection to cater for M4-M5 Link construction traffic entering and leaving the Campbell Road civil and tunnel site (C10)</li> <li>• This signalised intersection would provide signalised crossing for pedestrians and cyclists using the new pedestrian and cyclist paths along the southern side of Campbell Road at St Peters.</li> </ul>   |

### 6.6.3 Changes to the public transport network

It is anticipated that some modifications would be needed to the public transport network to facilitate construction of the project. Where bus stops are relocated, pedestrian access, including disabled facilities would be maintained.

Changes to the public transport network around the project would include:

- The bus stops on The Crescent (northbound and southbound) at Annandale near the intersection with City West Link would be moved south towards Johnston Street to allow for realignment of The Crescent. The northbound bus stop would be permanently moved south to accommodate the new alignment. The southbound bus stop would be reinstated in generally the same location. Alternative access from The Crescent to the Rozelle Bay light rail stop would also be provided during construction
- Three bus stops on Victoria Road at Rozelle (two on the northbound side and one on the southbound side) near the intersection with The Crescent would be relocated north to accommodate the reconstruction of Victoria Road. These bus stops would be reinstated in generally the same location at the completion of construction
- Two bus stops on Victoria Road near Iron Cove Bridge at Rozelle would be temporarily relocated to allow for the widening works along Victoria Road. The bus stop on the eastbound side is currently located between Terry Street and Crystal Lane at Rozelle. The bus stop on the westbound side is currently located between Toelle Street and Callan Street at Rozelle. It is anticipated that these bus stops would be temporarily relocated to the east during construction and would be reinstated in generally the same location at the completion of construction.

Pedestrian access to the Leichhardt North light rail stop at Leichhardt and the Rozelle Bay light rail stop at Annandale would be maintained during construction and operation. The project would also deliver an improved pedestrian connection to the Rozelle Bay light rail stop as part of the permanent design (refer to **Chapter 5** (Project description)). An assessment of the impacts of the project on the public transport network during construction and operation is provided in **Chapter 8** (Traffic and transport).

The proposed modifications would be reviewed during detailed design with the objective of minimising disruptions to public transport services and customers. Any bus stop relocations would be agreed with Transport for NSW and all affected bus operators. Details on the integration of the project with the public transport network are provided in **Chapter 5** (Project description).

## 6.6.4 Access routes and vehicle numbers

The proposed access to the construction sites is summarised in **Table 6-21**. Wherever possible, access is proposed to be gained directly from major arterial roads. Some use of local roads by heavy vehicles delivering materials and/or equipment may also be required, however this would be minimised as far as practicable. **Table 6-22** sets out estimated daily construction vehicle numbers in the 'worst case scenario'. Details about construction hours, including hours during which spoil haulage would occur, are provided in **section 6.7.2**.

Access routes would be documented in the CTAMP. Further information relating to haulage routes, construction traffic impacts and mitigation is provided in **Chapter 8** (Traffic and transport). Indicative access routes to and from construction ancillary facilities would be confirmed during detailed design and documented in the CTAMP that would be prepared for the project.

The use of a marshalling area(s) for spoil trucks would be investigated to further assist in staggering the arrival of vehicles to site. This would be located in a non-residential area and in close proximity to the arterial road network and construction ancillary facilities where tunnelling would occur. This measure would assist in preventing queuing and parking of heavy vehicles on local roads in the vicinity of the project. Marshalling area(s) and provisions for their use would be identified in the CTAMP.

**Table 6-21 Indicative access routes to and from construction ancillary facilities**

| Site   | Access and egress points (heavy vehicles) <sup>1</sup>   | Access and egress points (light vehicles)  |
|--|--|--|
| Wattle Street civil and tunnel site (C1a)        | <ul style="list-style-type: none"> <li>Parramatta Road then Wattle Street via M4-M5 Link entry and exit ramps.</li> </ul>                                    | <ul style="list-style-type: none"> <li>Parramatta Road then Wattle Street northern (eastbound) carriageway (right in, right out).</li> </ul>                                 |
| Haberfield civil and tunnel site (C2a)           | <ul style="list-style-type: none"> <li>Below ground: via the WestConnex M4 East tunnels</li> <li>Above ground: Wattle Street (left-in, left-out).</li> </ul> | <ul style="list-style-type: none"> <li>Wattle Street southern westbound) carriageway (left-in, left-out)</li> <li>Walker Avenue</li> <li>Parramatta Road.</li> </ul>         |
| Northcote Street civil site (C3a)                | <ul style="list-style-type: none"> <li>Parramatta Road (left-in, left-out).</li> </ul>   | <ul style="list-style-type: none"> <li>Wolseley Street</li> <li>Wattle Street (left-out).</li> </ul>   |
| Parramatta Road West civil and tunnel site (C1b) | <ul style="list-style-type: none"> <li>Parramatta Road (left-in, left-out)</li> <li>Alt Street (crossover between sites only).</li> </ul>                    | <ul style="list-style-type: none"> <li>Parramatta Road (left-in, left-out)</li> <li>Alt Street.</li> </ul>   |
| Haberfield civil site (C2b)                      | <ul style="list-style-type: none"> <li>Wattle Street (left-in, left-out)</li> <li>Parramatta Road (left-in, left-out).</li> </ul>                            | <ul style="list-style-type: none"> <li>Wattle Street (left-in, left-out)</li> <li>Parramatta Road (left-in, left-out)</li> <li>Walker Avenue (left-in, left-out).</li> </ul> |
| Parramatta Road East civil site (C3b)            | <ul style="list-style-type: none"> <li>Parramatta Road (left-in, left-out).</li> </ul>   | <ul style="list-style-type: none"> <li>Parramatta Road (left-in, left-out)</li> <li>Alt Street</li> <li>Bland Street.</li> </ul>   |
| Darley Road civil and tunnel site (C4)           | <ul style="list-style-type: none"> <li>City West Link then Darley Road<sup>2</sup></li> </ul>  | <ul style="list-style-type: none"> <li>City West Link then Darley Road.</li> </ul>   |

| Site                                      | Access and egress points<br>(heavy vehicles) <sup>1</sup>  | Access and egress points<br>(light vehicles)   |
|---|--|--|
| Rozelle civil and tunnel site (C5)        | <ul style="list-style-type: none"> <li>City West Link (left-in from eastbound carriageway, right-out to westbound carriageway).</li> </ul> | <ul style="list-style-type: none"> <li>Lilyfield Road.</li> </ul>  |
| The Crescent civil site (C6)              | <ul style="list-style-type: none"> <li>The Crescent (left-in, right-out).</li> </ul>   | <ul style="list-style-type: none"> <li>The Crescent.</li> </ul>  |
| Victoria Road civil site (C7)             | <ul style="list-style-type: none"> <li>Victoria Road (left-in, left-out).</li> </ul>   | <ul style="list-style-type: none"> <li>Victoria Road (left in, left out)</li> <li>Hornsey Street.</li> </ul> |
| Iron Cove Link civil site (C8)            | <ul style="list-style-type: none"> <li>Victoria Road (left-in, left-out).</li> </ul>   | <ul style="list-style-type: none"> <li>Victoria Road (left-in, left-out).</li> </ul>                         |
| Pymont Bridge Road tunnel site (C9)       | <ul style="list-style-type: none"> <li>Parramatta Road (left-in)</li> <li>Pymont Bridge Road (left-out).</li> </ul>                        | <ul style="list-style-type: none"> <li>Pymont Bridge Road.</li> </ul>  |
| Campbell Road civil and tunnel site (C10) | <ul style="list-style-type: none"> <li>Albert Road via Campbell Road and Princes Highway.</li> </ul>                                       | <ul style="list-style-type: none"> <li>Albert Road via Campbell Road.</li> </ul>                             |

Notes:

<sup>1</sup> Some use of local roads by heavy vehicles delivering materials and/or equipment may also be required, however this would be minimised as far as practicable

<sup>2</sup> Spoil haulage vehicles would enter and exit the Darley Road civil and tunnel site (C4) via City West Link. Refer to **Table 6-23** for further details about spoil haulage routes.

**Table 6-22 Indicative construction vehicle numbers**

| Location |   | 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 |
| C1a      | Wattle Street civil and tunnel site <sup>1</sup>        | 133            | 50    | 7              | 7      | 10             | N/A    | 7              | 7      | N/A            | 50     |
| C2a      | Haberfield civil and tunnel site <sup>1</sup>           | 136            | 90    | 7              | 7      | 30             | N/A    | 7              | 7      | N/A            | 90     |
| C3a      | Northcote Street civil site                             | 100            | 150   | 5              | 5      | 50             | N/A    | 5              | 5      | N/A            | 150    |
| C1b      | Parramatta Road West civil and tunnel site <sup>1</sup> | 140            | 10    | 7              | 7      | 10             | N/A    | 7              | 7      | N/A            | 10     |
| C2b      | Haberfield civil site                                   | 10             | 20    | 2              | 2      | 10             | N/A    | 2              | 2      | N/A            | 10     |
| C3b      | Parramatta Road East civil site                         | 30             | 150   | 3              | 3      | 50             | N/A    | 3              | 3      | N/A            | 150    |
| C4       | Darley Road civil and tunnel site                       | 100            | 70    | 7              | 7      | 10             | N/A    | 7              | 7      | N/A            | 70     |
| C5       | Rozelle civil and tunnel site <sup>1</sup>              | 517            | 350   | 23             | 23     | 100            | N/A    | 23             | 23     | N/A            | 350    |
| C6       | The Crescent civil site                                 | 10             | 20    | 2              | 2      | 0              | N/A    | 2              | 2      | N/A            | 5      |
| C7       | Victoria Road civil site                                | 42             | 140   | 2              | 2      | 0              | N/A    | 2              | 2      | N/A            | 0      |
| C8       | Iron Cove Link civil site                               | 42             | 140   | 2              | 2      | 15             | N/A    | 2              | 2      | N/A            | 140    |
| C9       | Pyrmont Bridge Road tunnel site <sup>1</sup>            | 133            | 70    | 7              | 7      | 20             | N/A    | 7              | 7      | N/A            | 70     |
| C10      | Campbell Road civil and tunnel site <sup>1</sup>        | 133            | 70    | 7              | 7      | 20             | N/A    | 7              | 7      | N/A            | 70     |

Notes:

<sup>1</sup> Spoil haulage would occur 24 hours a day, seven days a week.

Indicative construction vehicle numbers (daily and for the AM and PM peak hour) would vary based on the final construction methodology and program.



## 6.6.5 Spoil haulage routes

Excess spoil that cannot be reused within the project would require off-site reuse/disposal. Around 95 per cent of uncontaminated spoil would be beneficially reused in accordance with the project spoil management hierarchy. Further information is provided in **Chapter 23** (Resource use and waste minimisation).

It is anticipated that spoil would be hauled using heavy vehicles to spoil reuse and disposal sites. The indicative spoil haulage routes are described in **Table 6-23** and shown in **Figure 6-26** to **Figure 6-31**.

**Table 6-23 Indicative spoil haulage routes**

| Location |  | Indicative spoil haulage route   |
|----------|--|--|
| C1a      | Wattle Street civil and tunnel site <sup>1</sup> | <ul style="list-style-type: none"> <li>Entry: via the Wattle Street interchange entry ramp</li> <li>Exit: via the Wattle Street interchange exit ramp and onto Parramatta Road, heading west.</li> </ul>   |
| C2a      | Haberfield civil and tunnel site <sup>1</sup>    | <ul style="list-style-type: none"> <li>Entry and exit via the M4 East tunnel connection.</li> </ul>  |
| C3a      | Northcote Street civil site                      | No spoil haulage would occur from this site.   |
| C1b      | Parramatta Road West civil and tunnel site       | <ul style="list-style-type: none"> <li>Entry: eastbound along the M4 Motorway, southbound along Centenary Drive, eastbound along the Hume Highway, then left onto Parramatta Road heading north</li> <li>Exit: northbound along Parramatta Road.</li> </ul>  |
| C2b      | Haberfield civil site                            | No spoil haulage would occur from this site.   |
| C3b      | Parramatta Road East civil site                  | No spoil haulage would occur from this site.   |
| C4       | Darley Road civil and tunnel site                | <ul style="list-style-type: none"> <li>Entry: via City West Link and Darley Road</li> <li>Exit: via Darley Road and then City West Link.</li> </ul>  |
| C5       | Rozelle civil and tunnel site <sup>1</sup>       | <ul style="list-style-type: none"> <li>Entry: eastbound along City West Link and into the site</li> <li>Exit: westbound along City West Link.</li> </ul>   |
| C6       | The Crescent civil site                          | <ul style="list-style-type: none"> <li>Entry: City West Link, then south along The Crescent and into the site</li> <li>Exit: northbound along The Crescent (to be facilitated via construction traffic management measures), then City West Link.</li> </ul> |
| C7       | Victoria Road civil site                         | No spoil haulage would occur from this site.   |
| C8       | Iron Cove Link civil site                        | <ul style="list-style-type: none"> <li>Entry: northbound along Victoria Road and into the site</li> <li>Exit: northbound along Victoria Road.</li> </ul>   |
| C9       | Pymont Bridge Road tunnel site <sup>1</sup>      | <ul style="list-style-type: none"> <li>Entry: eastbound along Parramatta Road and into the site</li> <li>Exit: westbound along Pymont Bridge Road and then Parramatta Road.</li> </ul>   |
| C10      | Campbell Road civil and tunnel site <sup>1</sup> | <ul style="list-style-type: none"> <li>Entry: southbound along Campbell Road and then into the site</li> <li>Exit: northbound along Campbell Road, then south along the Princes Highway.</li> </ul>  |

Note:

<sup>1</sup> Indicative spoil haulage routes may vary based on the final construction methodology and program.

Where spoil haulage is carried out outside of the standard daytime construction hours, reasonable and feasible work practices and mitigation measures, consistent with the requirements of the *Interim Construction Noise Guideline* (DECCW 2009a), would be implemented to manage potential noise impacts, especially late night vehicle movements past sensitive receptors.

Further details regarding spoil generation and management are provided in **Chapter 8** (Traffic and transport). Construction traffic and noise impacts that arise from spoil haulage are assessed in **Chapter 8** (Traffic and transport) and **Chapter 10** (Noise and vibration) respectively.

Other disposal/reuse sites may be used depending on need at the time spoil is generated. In addition, there is the potential that spoil could be removed by barge, subject to further investigations.

The proposed haulage routes would not always meet all of the transport requirements of the project. Therefore, alternative haulage routes would be available for spoil trucks under 'exceptional circumstances', which may include:

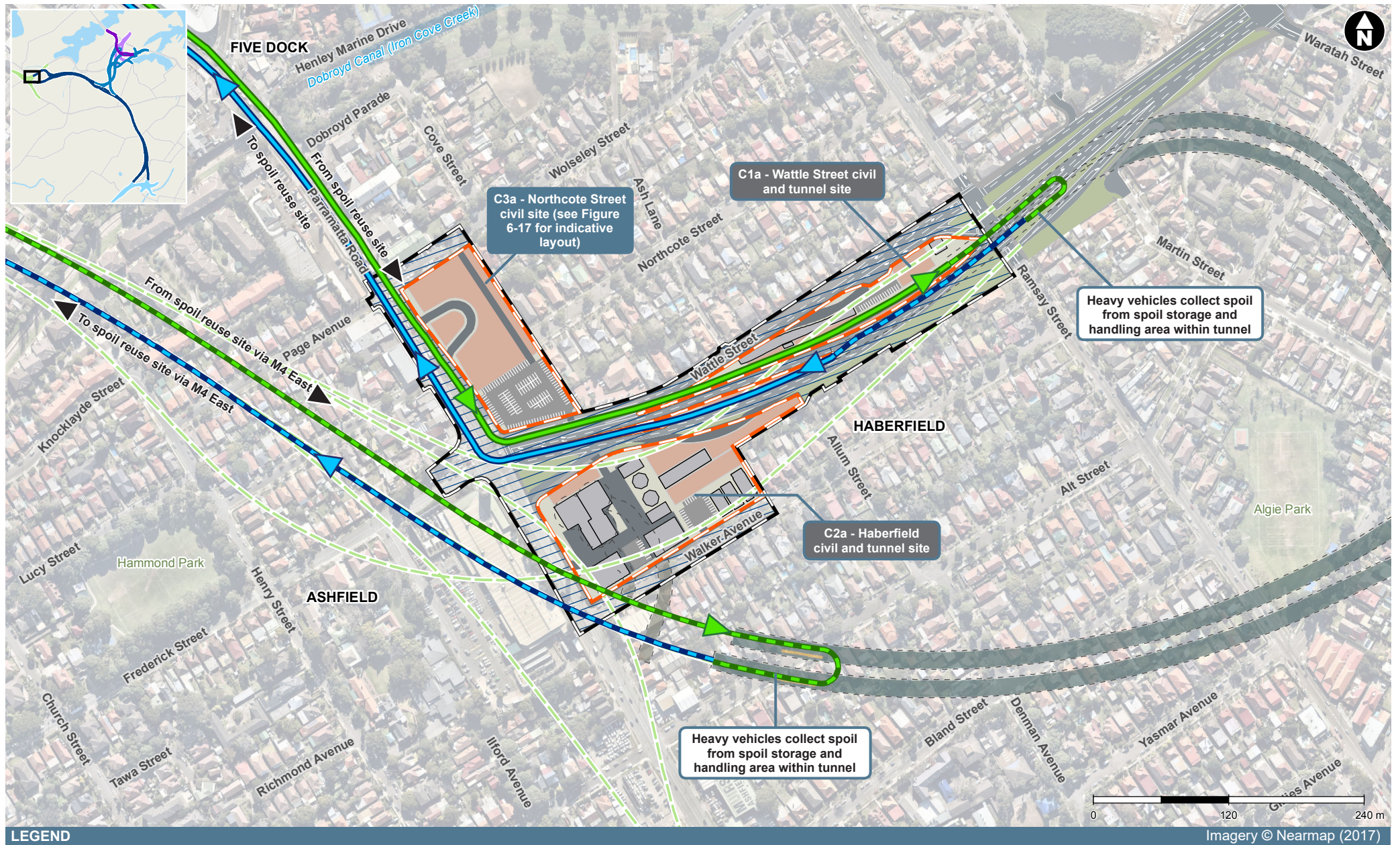
- Queuing of heavy vehicles onsite, requiring other heavy vehicles to temporarily bypass construction ancillary facility sites to prevent possible queuing on public roads while they wait to access the site
- Road works or an accident/incident that prevents heavy vehicles from accessing or travelling on the designated haulage route
- A designated traffic manager for the project determines that a temporary hazard (eg illegally parked vehicle, a lost vehicle load or floodwater) requires a heavy vehicle(s) to bypass an access gate or designated route to avoid causing damage to public and/or private property
- During temporary road closures.

**Table 6-24** identifies alternative routes that may be used during 'exceptional circumstances'. These alternative routes may vary depending on the final construction methodology. Alternative routes would avoid the use of local roads where practicable. The use of alternative routes would be in accordance with relevant conditions of approval.

**Table 6-24 Alternative spoil haulage routes (during exceptional circumstances)**

| Construction ancillary facility                  | Alternative spoil haulage routes (during exceptional circumstances)   |
|--|---|
| Wattle Street civil and tunnel site (C1a)        | <ul style="list-style-type: none"> <li>• East on Wattle Street towards City West Link then Victoria Road (to the north via The Crescent)</li> <li>• East on Wattle Street towards City West Link, then Anzac Bridge and the Western Distributor (via The Crescent and Victoria Road)</li> </ul> |
| Haberfield civil and tunnel site (C2a)           | No alternative route proposed   |
| Parramatta Road West civil and tunnel site (C1b) | <ul style="list-style-type: none"> <li>• Entry: Southbound on Parramatta Road, left into Tebbutt Street, left into Hathern Street, left into Brown Street left into Cook Street, left into Old Canterbury Road and left back onto Parramatta Road towards the site</li> </ul>                   |
| Darley Road civil and tunnel site (C4)           | <ul style="list-style-type: none"> <li>• East on City West Link then Victoria Road (to the north via The Crescent)</li> <li>• East on City West Link, then Anzac Bridge and the Western Distributor</li> </ul>  |
| Rozelle civil and tunnel site (C5)               | <ul style="list-style-type: none"> <li>• East on City West Link then Victoria Road</li> <li>• East on City West Link, then Anzac Bridge and the Western Distributor (via The Crescent and Victoria Road)</li> </ul>   |
| The Crescent civil site (C6)                     | <ul style="list-style-type: none"> <li>• Johnston Street then Parramatta Road</li> <li>• The Crescent, Ross Street and Pyrmont Bridge Road</li> </ul>   |
| Iron Cove Link civil site (C8)                   | No alternative route proposed   |
| Pyrmont Bridge Road tunnel site (C9)             | <ul style="list-style-type: none"> <li>• Pyrmont Bridge Road towards Ross Street, then The Crescent and City West Link</li> <li>• Parramatta Road then Old Canterbury Road</li> </ul>   |
| Campbell Road civil and tunnel site (C10)        | <ul style="list-style-type: none"> <li>• Campbell Street then Princes Highway and Sydney Park Road</li> </ul>   |





**Figure 6-26** Indicative spoil haulage route – Wattle Street and Haberfield civil and tunnel sites (C1a and C2a)





**Figure 6-27** Indicative spoil haulage route – Parramatta Road West civil and tunnel site (C1b)



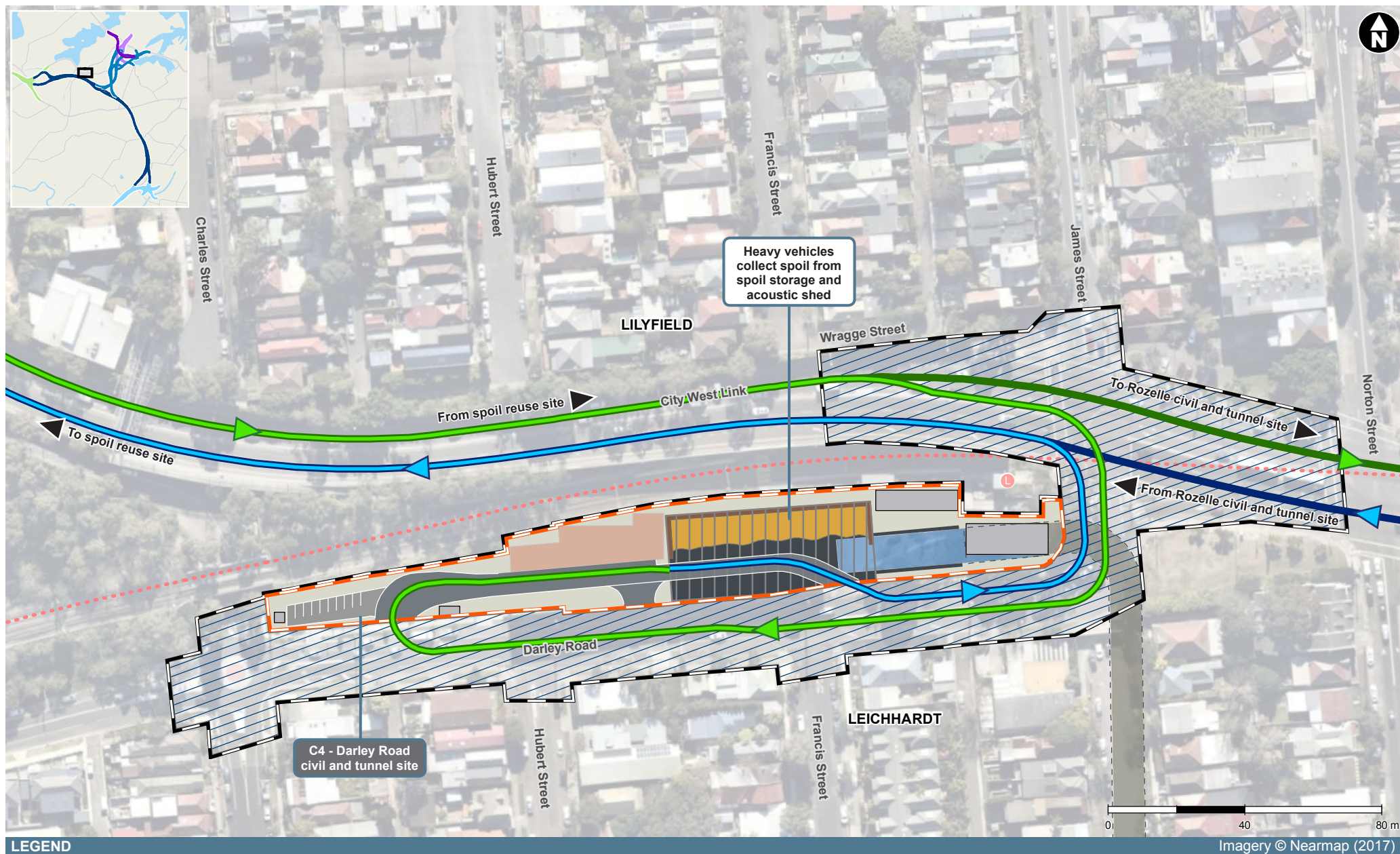


Figure 6-28 Indicative spoil haulage route – Darley Road civil and tunnel site (C4)



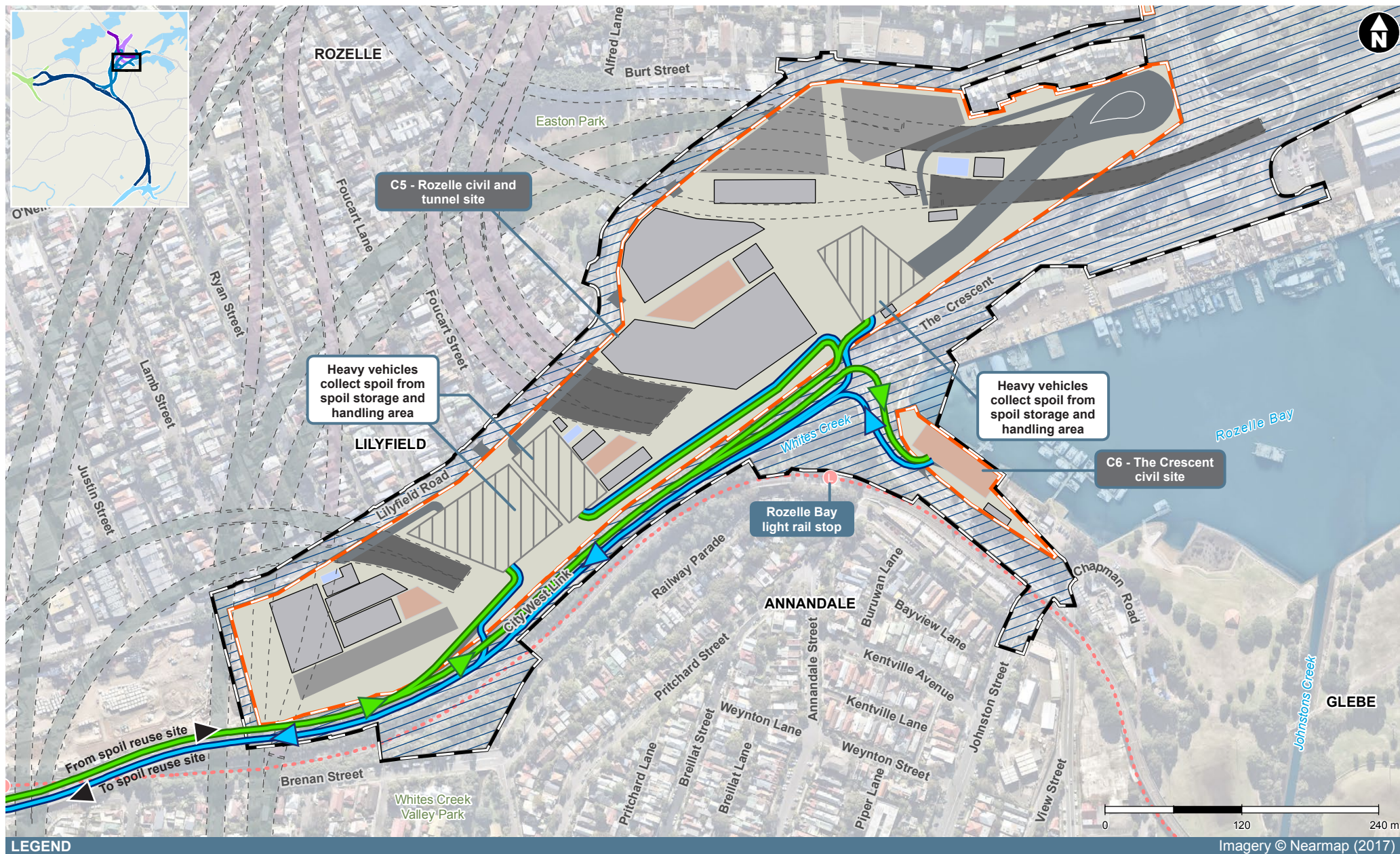
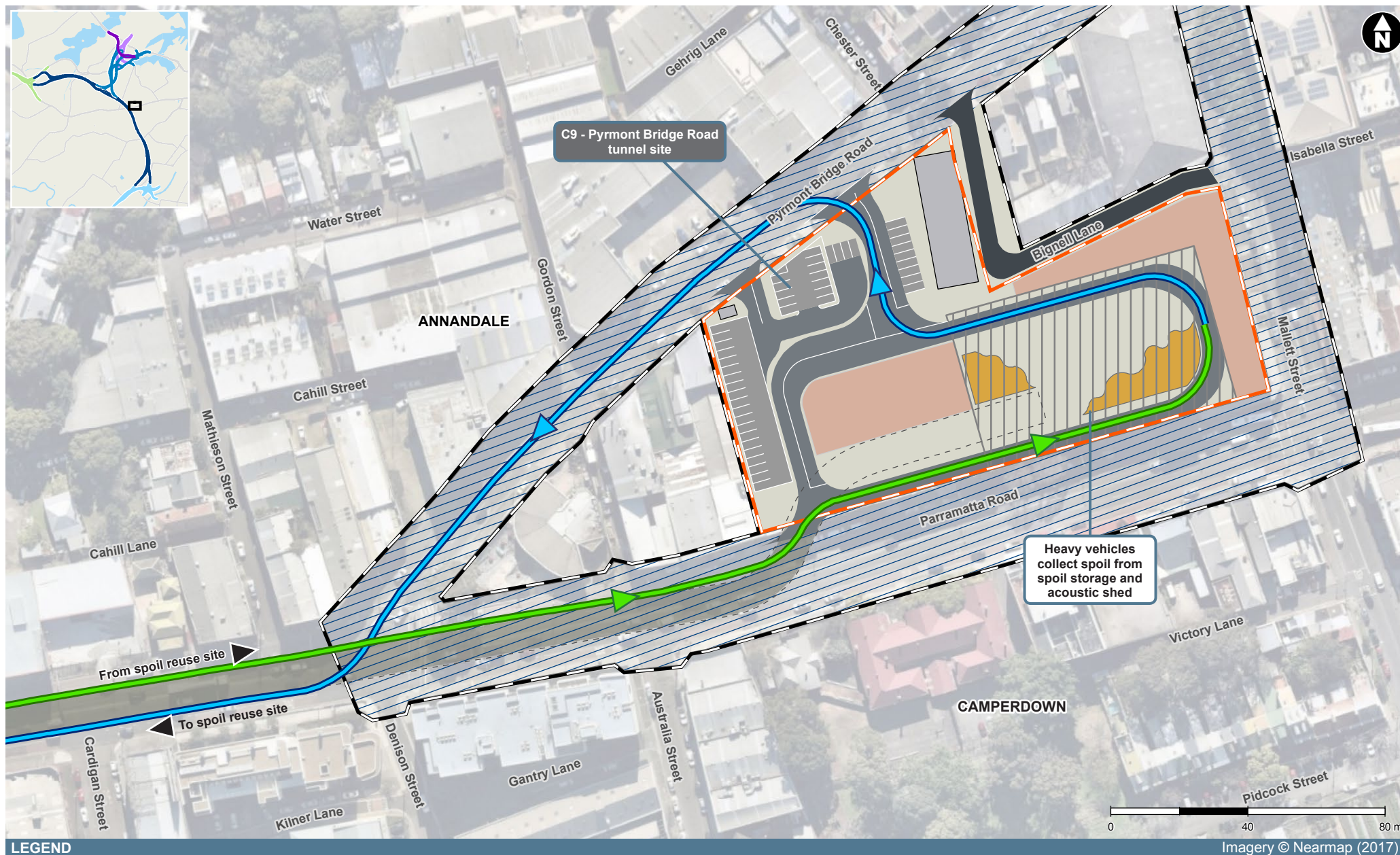


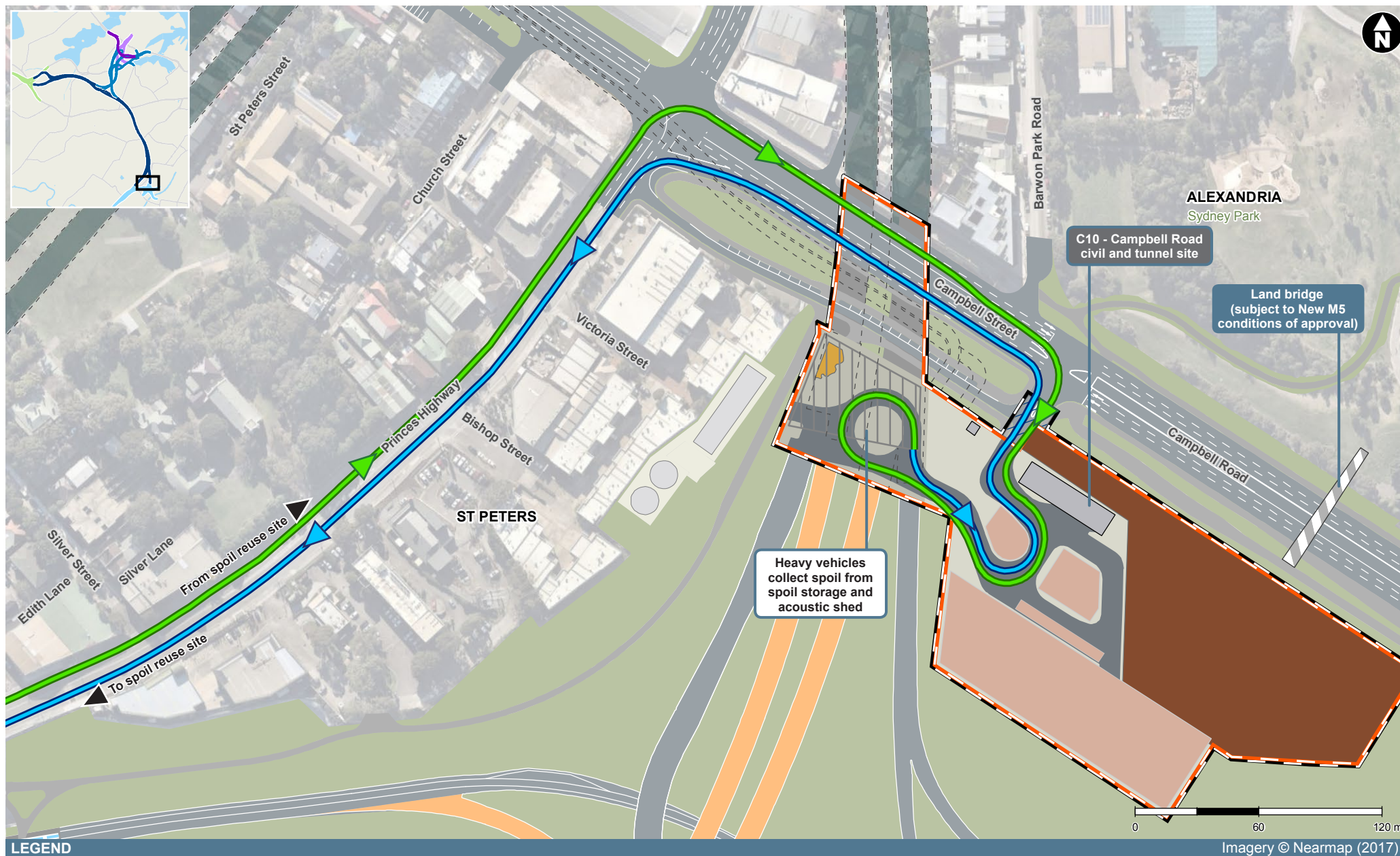
Figure 6-29 Indicative spoil haulage route – Rozelle civil and tunnel site (C5) and The Crescent civil site (C6)





**Figure 6-30** Indicative spoil haulage route – Pyrmont Bridge Road tunnel site (C9)





**Figure 6-31** Indicative spoil haulage route – Campbell Road civil and tunnel site (C10)



### 6.6.6 Construction workforce parking

A number of the project's staff and labour force would be expected to drive to construction sites and would therefore require car parking. The numbers of construction personnel requiring parking would vary over the duration of the construction program.

It is anticipated that construction workforce parking would be primarily provided at the following sites:

- Northcote Street civil site (C3a) – around 150 car parking spaces (Option A)
- Parramatta Road East civil site (C3b) – around 140 car parking spaces (Option B)
- Rozelle civil and tunnel site (C5) – around 400 car parking spaces
- Campbell Road civil and tunnel site (C10) – around 150 car parking spaces.

These facilities would be used to provide worker parking and shuttle bus transfers to other nearby construction sites.

Due to the generally constrained nature of the other construction sites, only minimal car parking for construction workers would be provided at these locations. Typically, these sites would provide between four to 20 parking spaces intended to be used by engineers and other construction management staff. Some parking of construction-related vehicles in adjacent local roads would occur, particularly during site establishment. The potential impacts on on-street parking in areas adjacent to the project footprint have been considered further in **Appendix H** (Technical working paper: Traffic and transport) and **Chapter 8** (Traffic and transport).

The construction workforce would be encouraged to use public transport. Victoria Road and Parramatta Road are major transport corridors that have multiple bus routes. The Inner West Light Rail line runs along the southern side of City West Link with stops near the Rozelle Rail Yards at Rozelle Bay and Lilyfield; and at the Darley Road civil and tunnel site (Leichhardt North light rail stop). The T3 Bankstown Line stops at St Peters Station around 800 metres north of the Campbell Road civil and tunnel site.

Measures to manage parking impacts in adjacent streets would be addressed in a car parking strategy, included in the CTAMP. This would be developed prior to the commencement of establishment and use of construction ancillary facilities. This would include the identification of areas where there are high levels of existing parking demand around the construction ancillary facilities and works sites and identifying alternative car parking sites for use by the construction workforce.

## 6.7 Construction workforce numbers and work hours

### 6.7.1 Construction workforce

The indicative peak construction workforce at each site is detailed in **Table 6-25**. Peaks at each construction location do not necessarily occur at the same time, so these numbers cannot be added together to give a whole of project peak workforce number.

The construction workforce would comprise trades and construction personnel, subcontract construction personnel and engineering, functional and administrative staff. The size of the workforce would vary across the working day with a reduction in personnel for the evening and night shifts. The total peak workforce is around 1,500 personnel.

**Table 6-25 Peak construction workforce estimates**

| Site name/location                               | Approximate day shift peak construction workforce | Approximate afternoon shift peak construction workforce | Approximate night shift peak construction workforce |
|--|---|---|---|
| Wattle Street civil and tunnel site (C1a)        | 70  | 30  | 70  |
| Haberfield civil and tunnel site (C2a)           | 130   | 45  | 85  |
| Northcote Street civil site (C3a)                | 50  | 30  | 10  |
| Parramatta Road West civil and tunnel site (C1b) | 140   | 40  | 90  |
| Haberfield civil site (C2b)                      | 30  | 10  | 0   |
| Parramatta Road East civil site (C3b)            | 10  | 10  | 10  |
| Darley Road civil and tunnel site (C4)           | 100   | 30  | 0   |
| Rozelle civil and tunnel site (C5)               | 500   | 200   | 200   |
| The Crescent civil site (C6)                     | 50  | 30  | 50  |
| Victoria Road civil site (C7)                    | 200   | 0   | 0   |
| Iron Cove Link civil site (C8)                   | 200   | 0   | 0   |
| Pymont Bridge Road tunnel site (C9)              | 100   | 30  | 100   |
| Campbell Road civil and tunnel site (C10)        | 100   | 30  | 100   |
| <b>Total</b>                                     | <b>1,530</b>                                      | <b>435</b>  | <b>615</b>  |

## 6.7.2 Construction hours

Proposed construction hours are shown in **Table 6-26**. These hours have been developed based on a balanced consideration of reducing the overall length of the construction program and the need to minimise noise and traffic related impacts. Construction activities required for the project would be managed in six broad categories:

- Tunnelling and tunnelling support activities, including spoil handling and haulage, deliveries and underground construction and fitout works. These activities would be carried out up to 24 hours a day and seven days a week
- Out-of-hours construction activities that cannot be conducted during standard construction hours for safety or traffic operational reasons. These activities would include integration works with the M4 East and New M5 projects) and works affecting parts of the surface road network subject to high traffic volumes
- Most other construction activities, which would be carried out within standard construction hours (see below)
- Blasting and rock breaking, which would be conducted within reduced construction hours and subject to provision of respite periods
- Minor or ancillary activities that would not result in noise levels at receivers above acceptable levels, or are otherwise authorised by an environmental protection licence under the *Protection of the Environment Operations Act 1997* (NSW) (POEO Act)
- Activities that are required to be conducted under direction from a relevant authority (such as Police) or are required to prevent an imminent loss of life or environmental damage.

Above ground construction works would be undertaken in accordance with the ICNG. The majority of these would occur during the standard working hours of between:

- 7.00 am and 6.00 pm Monday to Friday
- 8.00 am and 1.00 pm on Saturdays.

**Table 6-26 Construction hours**

| <b>Activity</b>  | <b>Construction hours</b>  | <b>Comments or exception</b>   |
|--|--|--|
| <b>Tunnelling, tunnelling support and underground construction activities</b>                              |  |  |
| Tunnelling and underground excavation  | 24 hours a day, up to seven days a week.   | <ul style="list-style-type: none"> <li>• Activities that support tunnelling works may need to occur 24 hours a day, up to seven days a week.</li> </ul>  |
| Underground construction and tunnel fitout   | 24 hours a day, up to seven days a week.   | <ul style="list-style-type: none"> <li>• Activities that support underground construction and tunnel fitout would occur 24 hours a day, up to seven days a week</li> <li>• Deliveries for underground construction and tunnel fitout would occur 24 hours a day, up to seven days a week.</li> </ul>   |
| <b>Surface construction activities</b>   |  |  |
| Demolition and surface construction activities   | 7.00 am to 6.00 pm on weekdays, 8.00 am to 1.00 pm on Saturdays, no works on Sundays or public holidays. | <ul style="list-style-type: none"> <li>• Aboveground work supporting underground construction activities (eg concrete pumping, truck loading) are expected to be required 24 hours a day, up to seven days per-week where noise mitigation is in place</li> <li>• Non-disruptive preparatory work, repairs or maintenance may be carried out outside standard daytime construction hours</li> <li>• Activities requiring the temporary possession of roads or to accommodate road network requirements may need to be carried out outside the standard daytime construction hours during periods of low traffic volumes to minimise safety impacts and inconvenience to road users.</li> </ul> |
| <b>Construction traffic for material supply and spoil removal</b>  |  |  |
| Construction traffic for material supply to, and spoil removal from, tunnelling and underground excavation | 24 hours a day, up to seven days a week.   | <ul style="list-style-type: none"> <li>• Spoil removal from the Darley Road civil and tunnel site (C4) would only occur during standard daytime construction hours. No spoil would be removed from this site on Sundays or public holidays.</li> </ul>   |
| <b>Blasting and rock breaking</b>  |  |  |
| Blasting   | Between 9.00 am and 5.00 pm, Mondays to Fridays and 9.00 am to 1.00 pm on Saturdays.                     | <ul style="list-style-type: none"> <li>• Blasting would occur up to six days a week (Monday to Saturday). Blasts would be limited to one single detonation in any one day per receiver group, unless otherwise agreed by the Secretary or the NSW EPA.</li> </ul>  |
| Rock breaking (with potential for impulsive or tonal noise impact at a sensitive receiver)                 | Between 8.00 am and 6.00 pm Monday to Friday and 8.00 am to 1.00 pm Saturdays, with respite periods.     | <ul style="list-style-type: none"> <li>• Respite periods would be scheduled to minimise the frequency and duration of extended rock breaking activities with potential for impulsive or tonal noise emissions</li> <li>• Rock breaking and other high impact noise activities could also occur outside these standard day time construction hours if authorised by an environmental protection licence.</li> </ul>   |

| Activity   | Construction hours                                  | Comments or exception   |
|--|---|---|
| <b>Minor or ancillary activities</b>                       |   |   |
| Minor activities   | At any time.  | <ul style="list-style-type: none"> <li>Minor activities would include activities that do not lead to an exceedance of the applicable noise management level at an affected receiver.</li> </ul>   |
| Activities authorised by an environment protection licence | As specified in the environment protection licence. | <ul style="list-style-type: none"> <li>Construction activities would be managed as required by the Environment Protection Licence.</li> </ul>   |
| <b>Emergency or directed activities</b>                    |   |   |
| Emergency or directed activities                           | At any time.  | <ul style="list-style-type: none"> <li>Activities would be carried out as directed by a relevant authority</li> <li>Activities would be carried out if required to prevent an imminent loss of life or environmental damage.</li> </ul> |

A summary of the proposed construction work hours at each construction ancillary facility is provided in **Table 6-27**.

**Table 6-27 Construction work hours at construction ancillary facilities**

| Construction ancillary facility                  | Type of construction activity              | Construction work hours   |
|--|--|---|
| Wattle Street civil and tunnel site (C1a)        | Tunnelling and spoil handling              | <ul style="list-style-type: none"> <li>24 hours a day, seven days a week</li> </ul>   |
|  | Civil construction <sup>1</sup>            | <ul style="list-style-type: none"> <li>7.00 am to 6.00 pm Monday to Friday</li> <li>8.00 am to 1.00 pm Saturdays</li> </ul> |
| Haberfield civil and tunnel site (C2a)           | Tunnelling and spoil handling              | <ul style="list-style-type: none"> <li>24 hours a day, seven days a week</li> </ul>   |
|  | Civil construction <sup>1</sup>            | <ul style="list-style-type: none"> <li>7.00 am to 6.00 pm Monday to Friday</li> <li>8.00 am to 1.00 pm Saturdays</li> </ul> |
| Northcote Street civil site (C3a)                | Civil construction <sup>1</sup>            | <ul style="list-style-type: none"> <li>7.00 am to 6.00 pm Monday to Friday</li> <li>8.00 am to 1.00 pm Saturdays</li> </ul> |
|  | Construction workforce parking             | <ul style="list-style-type: none"> <li>24 hours a day, seven days a week</li> </ul>   |
| Parramatta Road West civil and tunnel site (C1b) | Tunnelling and spoil handling              | <ul style="list-style-type: none"> <li>24 hours a day, seven days a week</li> </ul>   |
|  | Civil construction <sup>1</sup>            | <ul style="list-style-type: none"> <li>7.00 am to 6.00 pm Monday to Friday</li> <li>8.00 am to 1.00 pm Saturdays</li> </ul> |
| Haberfield civil site (C2b)                      | Civil construction <sup>1</sup>            | <ul style="list-style-type: none"> <li>7.00 am to 6.00 pm Monday to Friday</li> <li>8.00 am to 1.00 pm Saturdays</li> </ul> |
| Parramatta Road East civil site (C3b)            | Civil construction <sup>1</sup>            | <ul style="list-style-type: none"> <li>7.00 am to 6.00 pm Monday to Friday</li> <li>8.00 am to 1.00 pm Saturdays</li> </ul> |
|  | Construction workforce parking             | <ul style="list-style-type: none"> <li>24 hours a day, seven days a week</li> </ul>   |
| Darley Road civil and tunnel site (C4)           | Tunnelling and spoil handling <sup>2</sup> | <ul style="list-style-type: none"> <li>24 hours a day, seven days a week</li> </ul>   |
|  | Civil construction <sup>1</sup>            | <ul style="list-style-type: none"> <li>7.00 am to 6.00 pm Monday to Friday</li> <li>8.00 am to 1.00 pm Saturdays</li> </ul> |
| Rozelle civil and tunnel site (C5)               | Tunnelling and spoil handling              | <ul style="list-style-type: none"> <li>24 hours a day, seven days a week</li> </ul>   |
|  | Civil construction <sup>1</sup>            | <ul style="list-style-type: none"> <li>7.00 am to 6.00 pm Monday to Friday</li> <li>8.00 am to 1.00 pm Saturdays</li> </ul> |
| The Crescent civil site (C6)                     | Civil construction <sup>1</sup>            | <ul style="list-style-type: none"> <li>7.00 am to 6.00 pm Monday to Friday</li> <li>8.00 am to 1.00 pm Saturdays</li> </ul> |
| Victoria Road civil site (C7)                    | Civil construction <sup>1</sup>            | <ul style="list-style-type: none"> <li>7.00 am to 6.00 pm Monday to Friday</li> <li>8.00 am to 1.00 pm Saturdays</li> </ul> |
| Iron Cove Link civil site (C8)                   | Civil construction <sup>1</sup>            | <ul style="list-style-type: none"> <li>7.00 am to 6.00 pm Monday to Friday</li> <li>8.00 am to 1.00 pm Saturdays</li> </ul> |



| Construction ancillary facility           | Type of construction activity   | Construction work hours   |
|---|---------------------------------|---|
| Pymont Bridge Road tunnel site (C9)       | Tunnelling and spoil handling   | <ul style="list-style-type: none"> <li>• 24 hours a day, seven days a week</li> </ul>   |
|   | Civil construction <sup>1</sup> | <ul style="list-style-type: none"> <li>• 7.00 am to 6.00 pm Monday to Friday</li> <li>• 8.00 am to 1.00 pm Saturdays</li> </ul> |
| Campbell Road civil and tunnel site (C10) | Tunnelling and spoil handling   | <ul style="list-style-type: none"> <li>• 24 hours a day, seven days a week</li> </ul>   |
|   | Civil construction <sup>1</sup> | <ul style="list-style-type: none"> <li>• 7.00 am to 6.00 pm Monday to Friday</li> <li>• 8.00 am to 1.00 pm Saturdays</li> </ul> |

Notes:

<sup>1</sup> Some works outside of standard construction hours may be required

<sup>2</sup> Spoil haulage from the Darley Road civil and tunnel site (C4) would occur between 7.00 am and 6.00 pm Monday to Friday and 8.00 am and 1.00 pm on Saturdays.

## Works outside of standard construction hours

Other activities that would be carried out outside of the standard daytime construction hours would include:

- Work determined to comply with the relevant noise management level at the nearest sensitive receiver
- The delivery of materials outside approved hours as required by the NSW Police or other authorities (including Roads and Maritime) for safety reasons
- Emergency situations where it is required to avoid the loss of lives and property and/or to prevent environmental harm
- Situations where agreement is reached with affected receivers.

With the exception of emergencies, activities would not take place outside standard daytime construction hours without prior notification of the local community affected.

An assessment of potential noise impacts associated with construction of the project as well as management measures, including for works outside of standard construction hours is included in **Chapter 10** (Noise and vibration). Reasonable and feasible work practices and mitigation measures, consistent with the requirements of the ICNG would be implemented to manage potential noise impacts. These would be identified in a Construction Noise and Vibration Management Plan that will include:

- Identification of nearby residences and other sensitive land uses
- Description of approved work hours
- Description and identification of all construction activities, including work areas, equipment and duration
- Description of the work practices (generic and specific) that will be implemented to minimise noise and vibration
- A complaints handling process
- Noise and vibration monitoring procedures
- Overview of community consultation required for identified high impact works.

In addition, environmental management measures will also be applied for out-of-hours surface works (refer to **Chapter 10** (Noise and vibration)).

## 6.8 Construction noise attenuation

Temporary noise attenuation at construction ancillary facilities may include:

- Temporary acoustic hoarding along the boundaries of construction ancillary facilities at locations that face sensitive receivers
- Acoustic sheds around temporary access tunnels and associated above ground spoil handling areas where out-of-hours works would be undertaken near sensitive receivers, including:
  - Parramatta Road West civil and tunnel site (C1b)
  - Darley Road civil and tunnel site (C4)
  - Rozelle civil and tunnel site (C5)
  - Pyrmont Bridge Road tunnel site (C9)
  - Campbell Road civil and tunnel site (C10).

In addition, spoil stockpiling and management would occur within cut-and-cover tunnel structures at the Wattle Street civil and tunnel site (C1a), at the eastern end of the Rozelle civil and tunnel site (C5) and the Campbell Road civil and tunnel site (C10), and within the M4 East stub tunnels at Haberfield. Acoustic barriers (or similar) and other acoustic treatments would be installed as required to reduce noise propagation to adjacent areas from cut-and-cover tunnel structures.

The construction noise assessment tables which summarise the construction noise impacts predicted from each construction ancillary facility are provided in **Chapter 10** (Noise and vibration).

## 6.9 Construction plant and equipment

The plant and equipment listed in **Table 6-28** is planned to be used during the construction of the project. The actual plant and equipment would be confirmed during detailed design, taking into account any requirements of the environmental planning approval for the project.

Table 6-28 Indicative construction plant and equipment

| Plant/equipment                  | Wattle Street civil and tunnel site (C1a) | Haberfield civil and tunnel site (C2a) | Northcote Street civil site (C3a) | Parramatta Road West civil and tunnel site (C1b) | Haberfield civil site (C2b) | Parramatta Road East civil site (C3b) | Darley Road civil and tunnel site (C4a) | Rozelle civil and tunnel site (C5) | The Crescent civil site (C6) | Victoria Road civil site (C7) | Iron Cove Link civil site (C8) | Pyrmont Bridge Road tunnel site (C9) | Campbell Road civil and tunnel site (C10) |
|----------------------------------|---|--|-----------------------------------|--|-----------------------------|---------------------------------------|---|------------------------------------|------------------------------|-------------------------------|--------------------------------|--------------------------------------|---|
| Articulated dump truck           | ♦   | ♦                                      |                                   | ♦  |                             |                                       | ♦                                       | ♦                                  | ♦                            |                               |                                | ♦                                    | ♦   |
| Asphalt paver                    | ♦   | ♦                                      | ♦                                 | ♦  | ♦                           | ♦                                     | ♦                                       | ♦                                  | ♦                            | ♦                             | ♦                              | ♦                                    | ♦   |
| Bulldozer                        | ♦   | ♦                                      |                                   | ♦  |                             |                                       | ♦                                       | ♦                                  |                              | ♦                             | ♦                              | ♦                                    | ♦   |
| Chainsaw                         |   |  |                                   |  |                             |                                       | ♦                                       | ♦                                  |                              | ♦                             | ♦                              | ♦                                    | ♦   |
| Concrete cutter                  | ♦   | ♦                                      |                                   | ♦  | ♦                           | ♦                                     | ♦                                       | ♦                                  | ♦                            | ♦                             | ♦                              | ♦                                    | ♦   |
| Concrete pump/boom pump          | ♦   | ♦                                      | ♦                                 | ♦  | ♦                           | ♦                                     | ♦                                       | ♦                                  | ♦                            | ♦                             | ♦                              | ♦                                    | ♦   |
| Crawler crane                    | ♦   | ♦                                      |                                   | ♦  |                             |                                       | ♦                                       | ♦                                  | ♦                            | ♦                             | ♦                              | ♦                                    | ♦   |
| Diesel generator                 | ♦   | ♦                                      |                                   | ♦  | ♦                           | ♦                                     | ♦                                       | ♦                                  | ♦                            | ♦                             | ♦                              | ♦                                    | ♦   |
| Drill rig                        | ♦   | ♦                                      |                                   | ♦  |                             |                                       | ♦                                       | ♦                                  |                              | ♦                             | ♦                              | ♦                                    | ♦   |
| Dust scrubber                    | ♦   | ♦                                      |                                   | ♦  |                             |                                       | ♦                                       | ♦                                  |                              | ♦                             | ♦                              | ♦                                    | ♦   |
| Excavator (<25T) c/w attachments | ♦   | ♦                                      |                                   | ♦  | ♦                           | ♦                                     | ♦                                       | ♦                                  | ♦                            |                               | ♦                              | ♦                                    | ♦   |
| Excavator (>25T) c/w attachments | ♦   | ♦                                      |                                   | ♦  |                             |                                       | ♦                                       | ♦                                  | ♦                            | ♦                             | ♦                              | ♦                                    | ♦   |
| Front end loader                 | ♦   | ♦                                      |                                   | ♦  |                             |                                       | ♦                                       | ♦                                  |                              |                               |                                | ♦                                    | ♦   |
| Jumbo drill rig                  | ♦   | ♦                                      |                                   | ♦  |                             |                                       | ♦                                       | ♦                                  | ♦                            |                               |                                | ♦                                    | ♦   |
| Mobile crane (<50T)              | ♦   | ♦                                      | ♦                                 | ♦  | ♦                           |                                       | ♦                                       | ♦                                  | ♦                            | ♦                             | ♦                              | ♦                                    | ♦   |
| Mobile crane (50T to 200T)       |   |  |                                   | ♦  | ♦                           |                                       |   | ♦                                  | ♦                            | ♦                             | ♦                              |                                      |   |
| Mobile crane (>200T)             |   |  |                                   |  |                             |                                       |   |                                    | ♦                            | ♦                             |                                |                                      |   |
| Piling rig                       | ♦   | ♦                                      |                                   | ♦  |                             |                                       | ♦                                       | ♦                                  | ♦                            | ♦                             | ♦                              | ♦                                    | ♦   |
| Roadheader                       | ♦   | ♦                                      |                                   | ♦  |                             |                                       | ♦                                       | ♦                                  |                              |                               |                                | ♦                                    | ♦   |
| Road profiler                    | ♦   | ♦                                      |                                   |  |                             |                                       | ♦                                       | ♦                                  | ♦                            | ♦                             | ♦                              | ♦                                    | ♦   |
| Rockbolting jumbo                | ♦   | ♦                                      |                                   | ♦  |                             |                                       | ♦                                       |                                    | ♦                            |                               |                                | ♦                                    | ♦   |
| Shotcrete rig (diesel)           | ♦   | ♦                                      |                                   | ♦  |                             |                                       | ♦                                       | ♦                                  |                              | ♦                             | ♦                              | ♦                                    | ♦   |
| Shotcrete rig (electric)         | ♦   | ♦                                      |                                   | ♦  |                             |                                       | ♦                                       |                                    |                              |                               |                                | ♦                                    | ♦   |

| Plant/equipment           | Wattle Street civil and tunnel site (C1a) | Haberfield civil and tunnel site (C2a) | Northcote Street civil site (C3a) | Parramatta Road West civil and tunnel site (C1b) | Haberfield civil site (C2b) | Parramatta Road East civil site (C3b) | Darley Road civil and tunnel site (C4a) | Rozelle civil and tunnel site (C5) | The Crescent civil site (C6) | Victoria Road civil site (C7) | Iron Cove Link civil site (C8) | Pymont Bridge Road tunnel site (C9) | Campbell Road civil and tunnel site (C10) |
|---------------------------|---|--|-----------------------------------|--|-----------------------------|---------------------------------------|---|------------------------------------|------------------------------|-------------------------------|--------------------------------|-------------------------------------|---|
| Slipform paver            |   |  |                                   |  |                             |                                       | ♦                                       |                                    |                              |                               |                                |                                     |   |
| Surface miner             | ♦   | ♦                                      |                                   | ♦  |                             |                                       | ♦                                       | ♦                                  |                              | ♦                             |                                | ♦                                   | ♦   |
| Truck and dogs (trailers) | ♦   | ♦                                      |                                   | ♦  | ♦                           | ♦                                     | ♦                                       | ♦                                  |                              | ♦                             | ♦                              | ♦                                   | ♦   |
| Vibratory roller          | ♦   | ♦                                      |                                   | ♦  | ♦                           | ♦                                     | ♦                                       | ♦                                  | ♦                            | ♦                             | ♦                              | ♦                                   | ♦   |



## 6.10 Construction waste management

Details relating to construction waste management are provided in **Chapter 23** (Resource use and waste minimisation).

## 6.11 Construction resource use and management

Details relating to the use of construction materials, construction energy use and construction water use are provided in **Chapter 23** (Resource use and waste minimisation).