Part D

Preferred infrastructure report

WestConnex

D Preferred infrastructure report

Contents

D1 Introduction

In accordance with section 115Z(6) of the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act), a preferred infrastructure report (PIR) has been prepared for the M4-M5 Link project (the project). This PIR forms part of the Submissions and preferred infrastructure report for the project.

As outlined in Chapter 5 (Project description) of the Environmental Impact Statement (EIS) for the project, the project description and assessment presented in the EIS is based on a concept design and is subject to refinement during detailed design, once a design and construction contractor(s) has been engaged. This PIR describes the design changes and refinements that are proposed to minimise environmental impacts, further address design and constructability issues and address issues raised during public exhibition of the EIS and the assessment of the project. These include issues relating to:

- Trucks queuing on local roads around construction ancillary facilities and associated amenity impacts such as pedestrian and motorist safety, traffic noise and disruptions to the local road network
- Construction workforce using on-street parking on local roads around construction ancillary facilities thereby reducing the availability of parking for local residents and businesses
- The undetermined Aboriginal Land Claim in the area of the bioretention facility adjacent to Manning Street in King George Park (as described and proposed in Chapter 5 (Project description) of the EIS)
- Temporary impacts on the informal car park within King George Park adjacent to Manning Street during construction of the bioretention facility in the location described and proposed in the EIS.

This PIR provides a description and assessment of the following proposed changes to the project as assessed in the EIS:

- An additional construction ancillary facility at Rozelle near White Bay, to the east of the White Bay Power Station on land owned by the Port Authority of NSW, to support truck marshalling and construction workforce parking for the project and confirm heavy vehicle routes as a result of the improved truck marshalling provisions. This change is further described and assessed in **Chapter D2** (White Bay civil site (C11))
- Relocation of the bioretention facility at Rozelle from within the informal car park adjacent to Manning Street as proposed in the EIS, to around 150 metres north within King George Park adjacent to Victoria Road at the eastern abutment of Iron Cove Bridge, to address the issues raised above. This change is further described and assessed in **Chapter D3** (Relocation of the bioretention facility at Rozelle).

As a result of the relocation of the bioretention facility at Rozelle, the need for the environmental management measure 'to provide a well-articulated, integrated car parking and landscape design for the bioretention facility in Manning Street that is place sensitive, and enhances the interface between the project and both King George Park and adjacent residences' (refer to environmental management measure LV20 in Chapter 29 (Summary of environmental management measures) of the EIS) is no longer required. This environmental management measure has been deleted from **Chapter E1** (Environmental management measures).

A full summary of the environmental management measures proposed for the project, including the additional measures to mitigate potential impacts associated with the changes identified in this report, is provided in **Chapter E1** (Environmental management measures).

D2 White Bay civil site (C11)

D2.1 Overview and justification

Concerns relating to trucks queuing on local roads and limited provision of construction workforce parking were raised in submissions on the EIS and in feedback provided from the NSW Department of Planning and Environment (DP&E) and the NSW Environment Protection Authority (NSW EPA) on other WestConnex projects. There is currently minimal provision proposed for queuing areas for tunnel spoil haulage vehicles at some of the tunnelling support sites identified in the EIS. In addition, some sites such as the Parramatta Road West civil and tunnel site (C1b), Darley Road civil and tunnel site (C4) and the Pyrmont Bridge Road tunnel site (C9) have limited space available for construction workforce parking and laydown/storage within the site areas. This is primarily due to the constrained nature of these sites and the objective of the project to minimise the project footprint during construction. Consequently, there is concern that heavy vehicles accessing these sites during construction of the project would queue or circle on roads around these sites, and that construction workforce personnel would park on local roads reducing the availability of parking for local residents and businesses.

To address the concerns raised as outlined above, an additional construction ancillary facility (the White Bay civil site (C11)) is proposed near White Bay at Rozelle, on land owned by the Port Authority of NSW. The facility would provide a truck marshalling area that would primarily service the mainline tunnel sites, including Parramatta Road West civil and tunnel site (C1b), Darley Road civil and tunnel site (C4) and Pyrmont Bridge Road tunnel site (C9), where space for truck queuing on-site is limited. Construction ancillary facilities supporting construction of the Rozelle interchange are anticipated to have adequate space to marshal heavy trucks and accommodate construction workforce parking. The White Bay civil site would also provide parking for heavy vehicles and light vehicle construction workforce parking and would be accessed via Sommerville Road, James Craig Road and The Crescent/City West Link.

Provision of a truck marshalling facility and additional construction workforce parking would result in several benefits for the community and the project, including:

- Reducing potential queuing and circling on local roads surrounding the project and associated construction ancillary facilities
- Providing additional construction workforce parking spaces which would minimise the need for construction workers parking on local roads
- Minimising disruptions to the road network around construction ancillary facilities and noise and other disturbance to the local community including residential, business and commercial properties
- Improving safety for construction workers, motorists and the general public by providing a controlled area from which project traffic schedulers can manage trucks and direct truck drivers to the construction ancillary facilities as required.

The provision of a truck marshalling facility and additional construction workforce parking would also assist in ameliorating ongoing impacts around the Haberfield and Ashfield areas, where impacts from truck queuing and construction workforce parking have been experienced as a result of the construction of the M4 East project.

Additional heavy vehicles could be catered for at the proposed truck marshalling facility if less light vehicle parking was required, or vice versa, depending on the requirements of the design and construction contractor(s) and the conditions of approval. For the purposes of this assessment, the layout of the site has been assumed to accommodate up to 40 heavy vehicles and around 50 construction workforce parking spaces. The layout and capacity would be confirmed by the design and construction contractor(s) during detailed design and construction planning, depending on the specific needs and best use of the site during different phases of construction.

Consultation with the relevant NSW Government agencies, including the Port Authority of NSW and UrbanGrowth NSW, in relation to the use of land near White Bay, has been ongoing during the development of the project. This has included consideration of future proposed developments in this area, including proposed port related uses, and the planned development of The Bays Precinct. Consultation with relevant agencies would continue during detailed design and construction planning with consideration given to minimising potential cumulative impacts, including impacts on the operation of James Craig Road and Sommerville Road, and the intersection of James Craig Road and The Crescent.

D2.2 Description of change

An additional construction ancillary facility is proposed on a portion of the Port Authority of NSW's land located near White Bay at Rozelle. The facility, referred to as the White Bay civil site, would provide a truck marshalling area for around 40 heavy vehicles transporting tunnel spoil and around 50 parking spaces for the project's construction workforce. The facility would also provide additional space to store construction plant, machinery and materials at the site, . The location and an indicative site layout are shown in **Figure D2-1**.

The site is located east of the White Bay Power Station, Victoria Road and residential areas beyond; west of Sommerville Road, vacant port land and Anzac Bridge; south of Robert Street and mixed commercial/residential areas beyond; and north of vacant port land. The site would be accessed via Sommerville Road and James Craig Road, which connects to The Crescent/City West Link.

This site is part of the larger Glebe Island/White Bay Port Precinct, currently used for dry bulk imports, exports, vessel lay-ups, ad-hoc port and working harbour activities and cruise ships, functioning 24 hours a day, seven days a week. The site is not currently being used, is vacant and comprises poor quality hardstand that would need to be replaced to support the proposed use.

An indicative program for works at the White Bay civil site is provided in **Table D2-1**. Use of the White Bay civil site would commence in early 2019. A licence for the use of the site is currently under negotiation between the Port Authority of NSW and NSW Roads and Maritime Services (Roads and Maritime).

Table D2-1 White Bay civil site (C11) indicative construction program

Construction activity	Indicative construction timeframe																			
	2018				2019				2020				2021				2022			
Site establishment																				
Use of the site for truck marshalling and parking																				

The White Bay civil site would be used 24 hours a day, seven days a week. However, use of the site overnight by heavy vehicles would be limited. It is anticipated that the peak hours of operations for heavy vehicle movements would be at the commencement of the day and evening shifts during tunnelling excavation works (anticipated to be between 5.00 am to 9.00 am and 5.00 pm to 9.00 pm).

Spoil transport vehicles would be managed by protocols that would be developed in accordance with the conditions of approval and documented in the Construction Traffic and Access Management Plan (CTAMP) for the project. These protocols would include mechanisms to stage the release of trucks from the truck marshalling facility to the tunnelling sites as required, having regard to the need for trucks at the tunnelling sites, the limited space that is available for trucks to queue on these sites and to avoid queuing of trucks on local roads or circling around construction sites. These mechanisms would be confirmed during detailed design and would likely include:

- Traffic schedulers that would be responsible for directing truck drivers to the construction sites at an appropriate time
- Fitting trucks with real-time tracking capabilities to allow traffic schedulers to monitor and adjust spacing between trucks

- Ensuring that traffic schedulers and truck drivers are given clear instructions on the times that trucks should arrive on site and the time intervals between trucks arriving and departing construction sites.

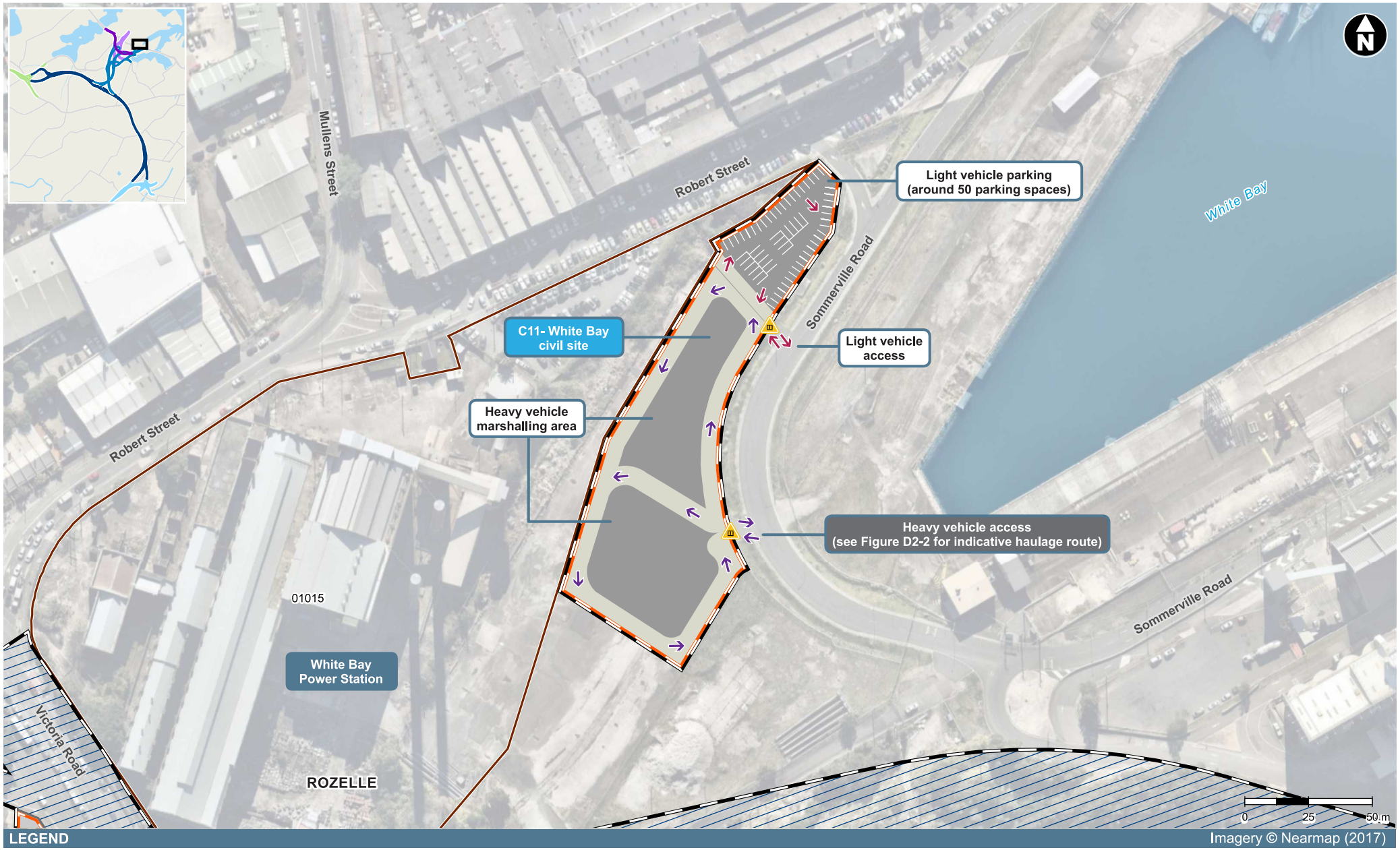


Figure D2-1 Indicative layout for the White Bay civil site (C11)

The indicative layout of the site includes the northern portion being used for light vehicle construction workforce parking, temporary storage of plant equipment that would be used at other construction ancillary facilities (eg a roadheader that is being moved from one tunnel section to another may use this site as a holding area), a gatehouse and office and amenity buildings. The southern portion is proposed to be used for parking and marshalling for heavy vehicles. This layout has been proposed to ensure that the noisiest use (area for heavy vehicles) is furthest away from the residential and commercial receivers to the north of the site. Vehicle maintenance or refuelling activities would not be carried out at the site.

The final layout of the site would be confirmed during detailed design and construction planning, however the site would be used in accordance with the environmental assessment and management measures presented in this PIR.

Site establishment would include:

- Erection of a boundary fence
- Demolition of existing hardstand
- Removal of a small area of exotic vegetation located at the northern end of the site comprising low ground cover weeds/shrubs (however the screening vegetation behind the existing hoarding along Robert Street would be retained)
- Minor earthworks using earthmoving plant, including graders and excavators to level the site as required
- Hardstand construction using compaction equipment
- Installation of a temporary asphalt layer and linemarking
- Installation of site sheds, amenities and lighting
- Construction of a gatehouse to facilitate site access and egress.

On completion of use as an ancillary construction facility, the site would be reinstated and returned to the Port Authority of NSW in accordance with the conditions of the licence.

A summary of the anticipated heavy vehicle movements is provided in **Table D2-2**. Site access locations are shown on **Figure D2-1**. The indicative heavy vehicle route to and from the site would be via The Crescent/ City West Link, James Craig Road and Sommerville Road as shown in **Figure D2-2**.

Use of the site, including access and egress arrangements, would be managed with consideration of cruise ship days (at the White Bay Cruise Terminal) and other existing port related traffic requirements given the potential for interaction with port related and cruise ship traffic on Sommerville Road and James Craig Road. Access and egress to the site, using roads owned by the Port Authority of NSW, may be restricted for defined time periods on cruise ship days in accordance with the conditions of the licence.

Should further mitigation measures be required as a result of consultation between the Ports Authority of NSW and Roads and Maritime during licence negotiation, these will be included in the CTAMP as required.

In consultation with the Port Authority of NSW, further investigation would be undertaken to consider alternative routes or arrangements for access and egress to the site during these periods, where appropriate. Any alternative route into or out of the site would be subject to further assessment and approval by DP&E.

Table D2-2 Estimated heavy vehicle movements for the White Bay civil site

Vehicles	Daily	AM peak hour	PM peak hour
Heavy vehicles	568	42 (21 in and 21 out)	31 (10 in and 21 out)[1]
Light vehicles	200	100 (50 in and 50 out)	100 (50 in and 50 out)

Notes:

1. It has been assumed that the heavy vehicle arrivals at the White Bay civil site will be highest in the morning (up to 21 heavy vehicles per hour arriving between 5.00 am and 9.00 am) with arrivals reducing to a maximum of 10 per hour at other times as more vehicles would travel directly to the relevant construction ancillary facility.

The traffic and transport impact assessment (**Appendix A**) for the White Bay civil site considers the design refinement of the Darley Road civil and tunnel site (C4) heavy vehicle route, which was developed in response to submissions received on the EIS regarding concerns associated with heavy vehicle movements around Darley Road. This change is summarised in **Table D2-5** and further described in **section B11.8.14.**

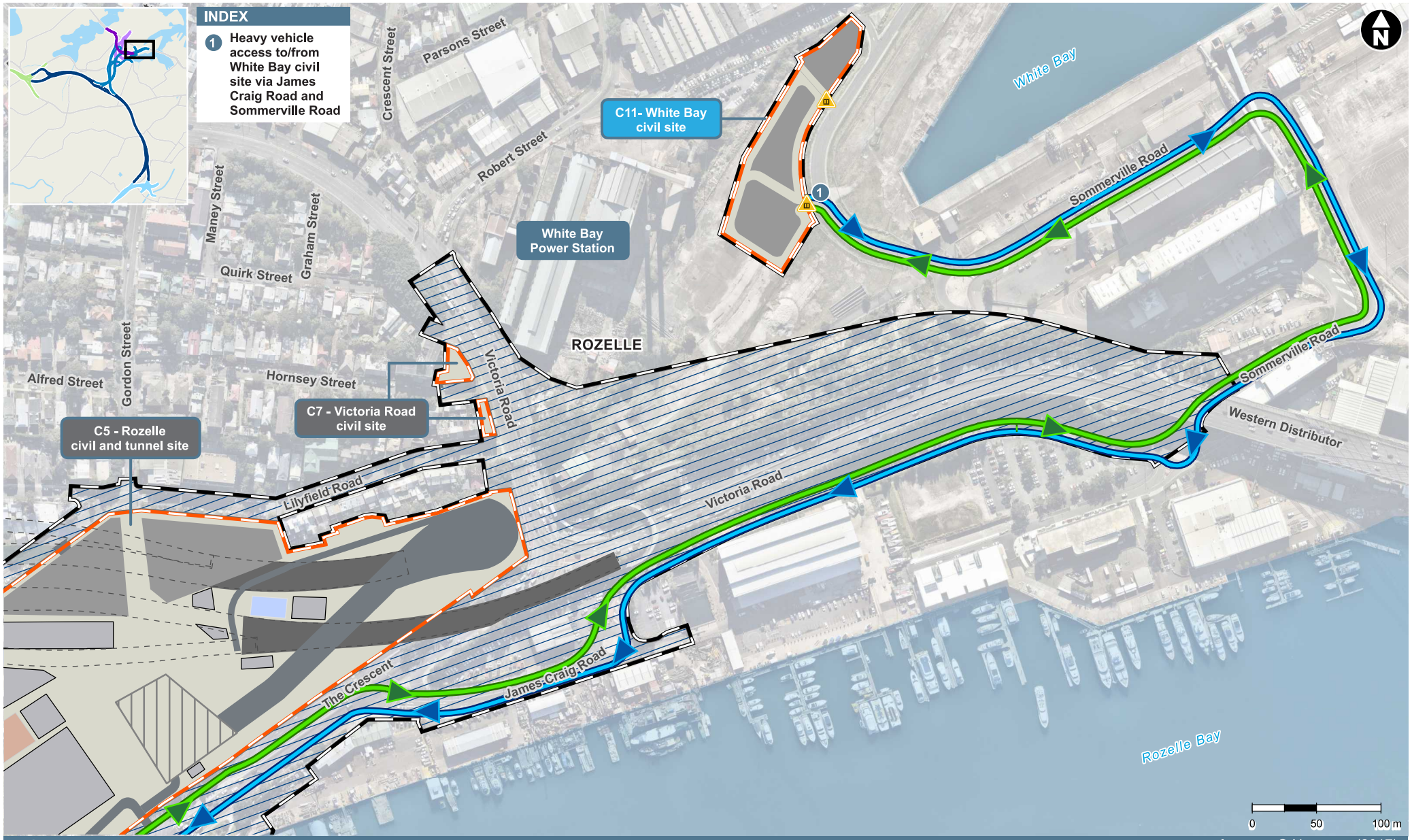


Figure D2-2 Indicative heavy vehicle route for the White Bay civil site (C11)

D2.3 Environmental impact screening

Table D2-3 presents a screening assessment of the potential environmental impacts of the White Bay civil site to support the project. Environmental aspects that require further assessment (compared to the assessment in the EIS) to understand likely environmental impacts have been identified. Where there are no additional impacts anticipated from the use of the site (compared to the assessment in the EIS), an explanation has been provided. Where potential impacts are anticipated, an assessment of these potential impacts is provided in **section D2.4**.

Environmental management measures proposed to manage the potential impacts of this project change are summarised in **section D2.5**. A full summary of the environmental management measures for the project is included in **Chapter E1** (Environmental management measures).

Table D2-3 White Bay civil site (C11) – environmental impact screening

Aspect	Further detailed assessment required? See section D3.4	Description
Traffic and transport	Yes	**Construction vehicle movements** Although the daily and peak period heavy vehicle estimates have not changed from those presented in the EIS, use of the White Bay civil site would change the routes heavy vehicles would use to travel to and from construction ancillary facilities. There would be an increase in vehicle movements for light and heavy vehicles along Sommerville Road, James Craig Road and The Crescent/City West Link at Rozelle from what was presented in the EIS. Use of the site, including access and egress arrangements, would need to be managed with consideration of cruise ship days and other existing port related traffic requirements given the potential for interaction with other traffic using Sommerville Road and James Craig Road. Further assessment of this aspect is provided in **section D2.4.1** and **Appendix A** (Traffic and transport impact assessment).
Air quality	No	**Construction vehicle emissions** As outlined above, use of the site would not add additional construction traffic to the overall road network. However, the routes that construction traffic use to access some of the construction ancillary facilities would change as a result of the truck marshalling facility at the White Bay civil site. The change in total vehicle kilometres travelled by construction vehicles associated with these changed travel routes would be negligible compared to the forecast total construction vehicle kilometres travelled in the EIS and is therefore not expected to change the outcomes of the construction vehicle emissions assessment findings presented in Chapter 22 (Greenhouse gas) of the EIS. **Dust generation** The White Bay civil site would only be used during construction and would not include any operational infrastructure. Dust would be generated during construction from the demolition of existing hardstand and laying of new hardstand during site establishment. However, these impacts would be short-term and can be managed in accordance with the

Aspect	Further detailed assessment required? See section D3.4	Description
		measures outlined in **Chapter E1** (Environmental management measures). Suitable measures to manage dust would be included in the Construction Air Quality Management Plan prepared for the project. During use of the site, the surface of the site would be sealed and therefore dust generation would be negligible. The site is also located in a restricted area which has limited access by the general public and there is a general lack of sensitive receivers in the immediate vicinity, with the closest residential receivers located around 100 metres north and 200 metres to the west of the site (refer to Table 9-17 of the EIS for a description of the criteria for sensitivity to dust impacts which takes into account the distance of a receiver from the source). Further assessment of this aspect is not considered necessary.
Noise and vibration	Yes	**Noise** Noise sources at the site that may affect surrounding receivers would include: • Construction noise associated with site establishment. This work would occur during standard construction hours and would take around two months to complete • Use of the site, including truck movements around the site and noise from the use of brakes, engines idling and car doors, during and outside of standard construction hours. The closest residential receivers to the site are around 100 metres to the north and 200 metres to the west. **Vibration** The White Bay Power Station is a State Heritage Register (SHR) listed item to the west of the White Bay civil site. The power station building and associated features, such as the northern penstock, are partly within the cosmetic damage minimum working distances for vibration associated with the use of construction equipment during the establishment of the site. Further assessment of these aspects are provided in **section D2.4.1** and **Appendix B** (Noise and vibration impact assessment).
Human health risk	No	The White Bay civil site would not result in any additional significant human health impacts during construction with dust impacts and vehicle emissions expected to be minor and managed with the measures outlined in the EIS. Measures to manage potential health risks associated with contamination are described in **section D2.4.5**. An assessment of potential noise impacts on surrounding receivers is included in **section D2.4.1** and **Appendix B** (Noise and vibration impact assessment).
Land use and property	Yes	The White Bay civil site would be located on land outside the project footprint assessed in the EIS. This land is owned by the Port Authority of NSW, is currently disused and vacant, and is zoned Port and Employment under the Sydney Regional Environmental Plan No. 26 City West (SREP 26).

Aspect	Further detailed assessment required? See section D3.4	Description
		The site is also within the White Bay Power Station destination identified in *The Transformation Plan: The Bays Precinct* (UrbanGrowth NSW 2015) (The Bays Precinct Transformation Plan). Further assessment of this aspect is provided in **section D2.4.3**.
Urban design and visual amenity	Yes	The White Bay civil site would temporarily introduce additional visual elements into the environment during construction and use of the site. These impacts would be temporary and minimal as the site is located in a 'visually contained' environment with limited view paths from adjacent areas. The main views of the site are from the east (Sommerville Road and parts of Anzac Bridge) and the north (Robert Street), although the view from the north is largely screened by existing hoarding and vegetation. There are elevated receivers around 150 metres to the north of the site, that because of the topography, are likely to have views down into the site. Given the site would be used for truck marshalling and construction workforce parking 24 hours a day, construction lighting would be used at night to facilitate that use. An assessment of the impacts of night lighting during construction at the site, and a description of how this impact would be managed, is provided in **section D2.4.4**. These impacts would be managed in accordance with the environmental management measures for night lighting (see **Chapter E1** (Environmental management measures)).
Social and economic	No	The use of the White Bay civil site would result in a negligible change to the social and economic impacts assessed in the EIS. While activities at the site would influence construction traffic and noise and may impact the general amenity of the area, this area has limited access by the general public and is reserved for activities associated with port uses. These impacts would be limited to the duration of the sites use as a construction ancillary facility and the site would not contain any operational infrastructure associated with the project.
Soil and water quality	No	**Soil** The potential soil and water quality impacts from the construction and use of the White Bay civil site would result in a minor change of the impacts assessed in the EIS. The site is located within soils identified as disturbed terrain (terrain extensively disturbed by human activity, including complete disturbance, removal or burial of soil). Ground disturbance would lead to an increased risk of erosion and sedimentation during demolition of existing hardstand and creation of new hardstand. However, the existing hardstand which is in poor condition would be replaced, resulting in no net increase in hardstand surface. These works would be of limited duration which would reduce the risk of erosion and/or sedimentation. **Water quality** There is potential for water quality impacts to White Bay as a result of accidental spills or leaks of fuels, oils and greases from vehicles as well as other pollutants typical of pavement runoff. Measures to manage potential impacts to surface water quality during construction will be identified as part of the

Aspect	Further detailed assessment required? See section D3.4	Description
		Construction Soil and Water Management Plan (CSWMP). Measures to reduce the potential for contamination due to accidental spills and leaks would also be implemented (see environmental management measure CM08 in **Chapter E1** (Environmental management measures)). Further assessment of this aspect is not considered necessary.
Contamination	Yes	The use of the White Bay civil site would potentially result in additional contamination impacts to those assessed in the EIS given the site is located outside the project footprint and within an area of previous industrial land use which may be potentially contaminated. Further assessment of this aspect is provided in **section D2.4.5**.
Flooding and drainage	No	The south-western portion of the site lies within the model boundary of the flood modelling undertaken for the EIS. The model indicates that this area would be affected by shallow, low hazard flooding during a 100 year average recurrence interval (ARI) event. The Leichhardt Flood Study (Cardno 2010) shows the majority of the remainder of the site to be flood free during a 100 year ARI event, with only the western and northern extents of the site affected. The entire site would be flood affected during a Probable Maximum Flood (PMF) event (refer to Figure 17-11 in the EIS). It is likely that stormwater flows overland or via an on-site pipe drainage network into an existing culvert that runs easterly through the northern portion of the site, and ultimately into White Bay. As the site levels, grades and extent of impervious surface area would be maintained, impacts to flood behaviour and the existing drainage system are unlikely to occur. Flooding and drainage impacts at the site will be managed in accordance with the existing management measures outlined in **Chapter E1** (Environmental management measures), in particular: • Potential flood impacts will be identified in the Flood Mitigation Strategy (see environmental management measure FD01) • Assessment of flooding and drainage impacts during detailed design (see environmental management measure FD02 and FD11) • Measures developed to manage potential flood impacts, as identified in the Flood Mitigation Strategy, will be incorporated into the design (see environmental management measure FD03 and FD10) • If drainage systems are to be upgraded or replaced, existing systems will be left in place and remain operational during the process, where possible (see environmental management measure FD12) • Runoff generated from the site will be managed to mitigate risk of overloading the receiving drainage system (see environmental management measure FD14). Further assessment of this aspect is not considered

Aspect	Further detailed assessment required? See section D3.4	Description
		necessary.
Biodiversity	No	Minor additional vegetation clearance to that assessed in the EIS would be required for site establishment of the White Bay civil site. This vegetation is located on the northern boundary of the site and comprises overgrown weeds and exotic vegetation (consistent with urban exotic and native cover that comprises the remainder of the project footprint). The established vegetation on the boundary of Robert Street would not be impacted. Threatened flora are unlikely to be present, and it is unlikely that this vegetation provides suitable habitat for threatened fauna. Given that it is unlikely that the vegetation supports significant fauna communities, night lighting is not expected to impact fauna at this location. It is also unlikely that any transient fauna using this area would be impacted, as these species would likely be mobile and move away from construction areas. There is no potential microbat roosting habitat on the White Bay civil site. Microbat species have however been recorded in the surrounding area, and therefore may be present in surrounding areas, and such, indirectly impacted, primarily from noise and night lighting during use of the site. These potential impacts are not expected to be significant, as microbats are highly mobile species. Further assessment of this aspect is not considered necessary.
Groundwater	No	The use of the White Bay civil site would not result in any additional groundwater impacts, as excavation associated with removal and replacement of existing hardstand would be very shallow and would not intercept groundwater or substantially alter infiltration. Further assessment of this aspect is not considered necessary.
Non-Aboriginal heritage	Yes	The White Bay civil site is located directly adjacent to the eastern boundary of the heritage curtilage of the White Bay Power Station, which is a SHR listed item. The footprint of the proposed facility is not within the curtilage of the White Bay Power Station and would be at least 50 metres from the power station building itself. The site is adjacent to the northern penstock which formed part of the cooling system for the White Bay Power Station (see **Figure D2-7**). The penstock is recognised as an item of significance in the White Bay Power Station Conservation Management Plan (CMP) 2013 (Design 5 Architects 2004). There is also potential for excavation for the White Bay civil site to have an impact on any remaining archaeological resources associated with the White Bay Power Station, and for the site to have an indirect impact on the visual setting of the White Bay Power Station. Further assessment of this aspect is provided in **section D2.4.5**.
Aboriginal heritage	No	The White Bay civil site would not alter the impacts on Aboriginal heritage presented in the EIS. The site has been heavily disturbed by previous land use and is unlikely to contain remaining features of Aboriginal heritage value. There are no registered Aboriginal Heritage Information Management System (AHIMS) sites located on or in the immediate vicinity

Aspect	Further detailed assessment required? See section D3.4	Description
		of the White Bay civil site. Any items of unexpected Aboriginal archaeological or cultural heritage significance or human remains discovered during construction will be managed in accordance with the Unexpected Heritage Finds and Humans Remains Procedure developed for the project (see environmental management measure AH1 in **Chapter E1** (Environmental management measures)). Further assessment of this aspect is not considered necessary.
Greenhouse gas	No	The White Bay civil site would result in a minor change to the generation of greenhouse gases given construction vehicles may have to travel slightly further to reach the truck marshalling facility and then return to the tunnelling sites. While there would be additional truck movements and increased travel distances, this would be offset to some extent by avoiding the need for vehicles to circle construction ancillary facilities. It is therefore expected that this change would have a negligible effect on the greenhouse gas assessment outcomes in the EIS. Further assessment of this aspect is not considered necessary.
Resource use and waste minimisation	No	The White Bay civil site would have a negligible effect on the overall volume of waste material for the project with a maximum of around 2,750 cubic metres of waste generated from demolition of hardstand material (asphalt and concrete). Opportunities to limit the amount of waste material generated would be identified during detailed design including the reuse of excavated material dependent on the outcomes of any waste classification (see **section D2.4.5**). This would be managed via waste management measures outlined in **Chapter E1** (Environmental management measures) and further assessment of this aspect is not considered necessary.
Climate change and risk adaptation	No	Given the proposed temporary use of the site, it would not change the climate risk profile of the project beyond the assessment in the EIS. Further assessment of this aspect is not considered necessary.
Hazard and risk	No	The White Bay civil site would not involve any change to the proposed storage and/or use of hazardous substances and dangerous goods beyond that presented in Chapter 25 (Hazard and risk) of the EIS. Truck refuelling or maintenance activities would not be undertaken at the site. The White Bay civil site would improve safety for construction workers, motorists and the general public by providing a controlled area from which project traffic schedulers can manage trucks and direct truck drivers to the construction sites at an appropriate time. Further assessment of this aspect is not considered necessary.
Cumulative impacts	Yes	The White Bay civil site would result in cumulative impacts on Sommerville Road, James Craig Road and the James Craig Road and The Crescent intersection that were not assessed in the EIS. This is associated with site vehicle movements and operations of the cruise terminal and other proposed port land uses. Further assessment of this aspect is provided in **section D2.4.1**.

Aspect	Further detailed assessment required? See section D3.4	Description
		Consecutive impacts on Sommerville Road and James Craig Road associated with truck movements for the site management works currently being undertaken at the Rozelle Rail Yards and truck movements associated with the White Bay civil site would occur. These two project would occur consecutively and site management works would be completed in 2018, before the White Bay civil site is used and therefore there would be no cumulative concurrent impact on the road network. Management and mitigation measures identified in the Rozelle Rail Yards site management works review of environmental factors (2016), **section D2.5** and **Chapter E1** (Environmental managements measures) would manage potential consecutive impacts.

D2.4 Further detailed impact assessment

D2.4.1 Traffic and transport

A traffic and transport impact assessment has been prepared to assess the potential traffic impacts of the White Bay civil site (see **Appendix A** (Traffic and transport impact assessment)). **Appendix A** (Traffic and transport impact assessment) should be read in conjunction with Appendix H (Technical working paper: Traffic and transport) of the EIS which contains detailed descriptions and explanations of the assessment guidelines and methodologies used.

The traffic and transport impact assessment compares the two possible options for construction ancillary facilities around Haberfield and Ashfield as presented in Chapter 6 (Construction work) of the EIS. PIR Option A involves servicing the ancillary facilities around Haberfield and Ashfield denoted as Option A in the EIS (EIS Option A) from the White Bay civil site. PIR Option B involves servicing the ancillary facilities around Haberfield and Ashfield denoted as Option B in the EIS (EIS Option B) from the White Bay civil site.

Construction traffic management changes from the EIS

The traffic and transport impact assessment assesses the potential traffic and transport impacts associated with:

- A new construction ancillary facility – the White Bay civil site that would be used primarily to support truck marshalling and construction workforce parking. For the purposes of this assessment, it has been assumed that heavy vehicles would be dispatched from the White Bay civil site to the following sites:
  - Parramatta Road West civil and tunnel site (C1b)
  - Darley Road civil and tunnel site (C4)
  - Pyrmont Bridge Road tunnel site (C9)
- The change to the heavy vehicle access route for the Darley Road civil and tunnel site (C4), as described in **section C11.8.14**
- An additional heavy vehicle access route for heavy vehicles accessing the Pyrmont Bridge Road tunnel site (C9) from the White Bay civil site along Johnston Street.

Using the three sites listed above allows for a representative assessment of potential traffic and transport impacts along key arterial corridors including City West Link, Johnston Street and Parramatta Road associated with the use of the truck marshalling facility at the White Bay civil site. Notwithstanding this, trucks may travel to other construction ancillary facilities that form part of the project. Spoil haulage routes and designated routes for other project-related heavy vehicles will be confirmed during development of the CTAMP for the project.

Construction traffic generation

Table D2-4 provides details of light and heavy vehicle volumes predicted to arrive and depart from the White Bay civil site during the typical network AM peak hour (7.30-8.30 am), PM peak hour (4.15-5.15 pm) and daily period. The peak hours for the site are slightly different to the surrounding road network peak hours, ie the busiest periods on the general road network and at the site do not coincide, but for a conservative assessment they have been assumed to occur in the modelled road network peak hour. With a shift start time of 7.00 am, the majority of light vehicle arrivals would occur before the road network AM peak hour. The end of the shift is more likely to impact on the road network PM peak hour, and although some vehicles would leave before the modelled road network peak hour, they have been assessed in the PM peak hour.

The heavy vehicle movements introduced at the White Bay civil site are trips previously assumed to go directly to relevant construction sites but which will now be called to the construction site from the proposed truck marshalling area. A conservative assumption of seven heavy vehicles per hour from the White Bay civil site to each of the three representative construction ancillary facilities (described in the section above) has been applied for the AM and PM peak periods.

It has been assumed that the heavy vehicle arrivals at the White Bay civil site will be highest in the morning (up to 21 heavy vehicles per hour arriving between 5 am and 9 am) with arrivals reducing to a maximum of 10 per hour at other times as more vehicles would travel directly to the relevant site. This is a worst case scenario for traffic generation, particularly during off peak periods, as heavy vehicles may travel directly to site when lesser volumes on the road network allow for a more predictable arrival pattern and adequate spacing between vehicles travelling to the various tunnelling sites.

Table D2-4 Indicative daily and peak period construction traffic volumes for White Bay civil site (C11)

Location		Daily vehicles (one way)		AM peak hour (7.30–8.30 am)				PM peak hour (4.15–5.15 pm)			
		Heavy vehicles	Light vehicles	Heavy vehicles		Light vehicles		Heavy vehicles		Light vehicles	
				Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart
C11	White Bay civil site	284	100	21	21	50	50	10	21[1]	50	50

Notes:

1. It has been assumed that the heavy vehicle arrivals at the White Bay civil site will be highest in the morning (up to 21 heavy vehicles per hour arriving between 5 am and 9 am) with arrivals reducing to a maximum of 10 per hour at other times as more vehicles would travel directly to the relevant site.

Access routes

The revised access routes to the construction ancillary facilities are summarised in **Table D2-5**. These routes have been used to inform the assessment of construction traffic impacts and would be confirmed during detailed design and construction planning through the CTAMP.

Table D2-5 Proposed access routes between the White Bay civil site (C11) and construction ancillary facilities

Site	Access and egress points (heavy vehicles)[1]	Access and egress points (light vehicles)
White Bay civil site (C11)	Access from City West Link/The Crescent then James Craig Road and Sommerville Road. Egress follows same route in reverse.	Same as for heavy vehicles.
Parramatta Road West civil and tunnel site (C1b)	Access from White Bay civil site to James Craig Road then City West Link, Parramatta Road (southbound), left into Tebbutt Street, left onto Hathern Street, left onto Brown Street, left onto Cook Street, left onto Old Canterbury Road and left onto Parramatta Road (northbound). Egress is northbound along Parramatta Road. The spoil haulage route as presented in the EIS for this site would be used.	No change from EIS.
Darley Road civil and tunnel site (C4)	Access from City West Link (westbound from James Craig Road / White Bay civil site) to James Street then Darley Road. Egress is from Darley Road to James Street then City West Link westbound.	Same as for heavy vehicles. Local access to Darley Road also via James Street (north of City West Link). Egress from Darley Road via James Street and City West Link.
Pyrmont Bridge Road tunnel site (C9)	Access from White Bay civil site to James Craig Road then The Crescent, Johnston Street and eastbound along Parramatta Road. Egress is via Pyrmont Bridge Road and Parramatta Road (westbound). The spoil haulage route as presented in the EIS for this site would be used.	No change from the EIS.

Construction traffic distribution

Table D2-6 provides estimates of heavy vehicle construction volumes on key roads around the construction ancillary facilities during the AM peak and PM peak hours as presented in the EIS (refer to Chapter 7 of Appendix H (Technical working paper: Traffic and transport) of the EIS) and the scenarios assessed in **Appendix A** (Traffic and transport impact assessment). These estimates are comprised of heavy vehicles travelling to and from the truck marshalling facility at the White Bay civil site as well as to and from the construction ancillary facilities along these roads.

The roads listed in **Table D2-6** are limited to those which are impacted by the changes associated with the use of the White Bay civil site and the change to the spoil haulage route for the Darley Road civil and tunnel site (C4) and the Pyrmont Bridge Road tunnel site (C9). The daily and peak period heavy vehicle estimates have not changed from those presented in the EIS.

Table D2-6 indicates that there will be:

- No change in heavy vehicle volumes on Parramatta Road compared to the EIS
- Small increases (relative to the EIS) forecast on City West Link, west of The Crescent and west of James Street at Leichhardt
- Up to seven heavy vehicles one-way (southbound) along Johnston Street
- Up to 42 heavy vehicles on James Craig Road.

Table D2-6 Indicative peak period distribution of heavy vehicle construction vehicles (two-way)

Road location	EIS (heavy vehicles/hour)		PIR (heavy vehicles/hour)	
	AM peak	PM peak	AM peak	PM peak
Parramatta Road, north of Wattle Street, Haberfield	24	24	24	24
City West Link, west of James Street, Leichhardt	68	68	82	71
City West Link, west of The Crescent, Lilyfield	32	32	60	49
Johnston Street, north of Parramatta Road, Annandale	-[1]	-[1]	7[2]	7[2]
James Craig Road, west of The Crescent, Rozelle	-[1]	-[1]	42	31

Notes:

1. Use of Johnson Street and James Craig Road by construction vehicles was not proposed in the EIS.
2. Heavy vehicles / hour on Johnston Street are one-way, as trucks would travel in the southbound direction only.

Potential construction impacts

Roadway level of service

Updated analysis of the existing roadway level of service (LoS) has been carried out to determine the impact of construction traffic in 2021 (the peak year of M4-M5 Link construction as assessed in the EIS). This has been undertaken at relevant locations impacted by the changes to the project compared to the EIS and/or the 'Without construction' scenario. The assessment also considers the location of potential spoil reuse sites in western Sydney. Theoretical mid-block roadway capacities were based on Austroads *Guide to Traffic Management*. See Annexure A of **Appendix A** (Traffic and transport impact assessment) for a description of LoS.

Minor amendments to traffic volumes reported in Chapter 8 and Appendix H (Technical working paper: Traffic and transport) of the EIS have been made for some locations and directions. These have been made to correct small errors which were identified during the preparation of **Appendix A** (Traffic and transport impact assessment) and are denoted with a footnote in **Table D2-7** to **Table D2-10** where appropriate. These minor amendments to traffic volumes reported in the EIS did not change the LoS reported in the mid-block analysis in the EIS for the 'With construction' (EIS) options and would have a negligible impact on the outcomes of the mid-block analysis for construction traffic as reported in Chapter 8 (Traffic and transport) and section 7 of Appendix H (Technical working paper: Traffic and transport) of the EIS.

For the mid-block analysis of James Craig Road, there was no significant difference between PIR Option A and PIR Option B scenarios results so results for PIR Option A are presented only.

Mid-block traffic LoS impacts are shown in **Table D2-7** to **Table D2-10** and are summarised as follows:

- Haberfield and Ashfield:
  - Limited change in terms of volume over capacity compared to the assessment in Chapter 7 of Appendix H (Technical working paper: Traffic and transport) of the EIS. Relevant mid-blocks will remain within theoretical capacity

- Leichhardt:
  - A small deterioration in performance at each location relative to the 'With construction' scenarios in Chapter 7 of Appendix H (Technical working paper: Traffic and transport) of the EIS with no changes in LoS noted
- Lilyfield and Rozelle:
  - A small deterioration in performance at each location relative to the 'Without construction' and EIS Option A and EIS Option B scenarios in Chapter 7 of Appendix H (Technical working paper: Traffic and transport) of the EIS. There is a LoS band change relative to the EIS Option A and EIS Option B scenarios at one location:
    - AM peak westbound at City West Link west of The Crescent where the LoS changes from LoS D to LoS E for both PIR Option A and PIR Option B
  - For James Craig Road, when comparing the without construction scenario to the PIR Option A scenario the results show a marginal deterioration in performance along James Craig Road with two LoS band changes, comprising:
    - Eastbound performance in the AM peak deteriorates from LoS B to LoS C
    - Westbound performance in the PM peak deteriorates from LoS A to LoS B
- Annandale:
  - A small deterioration in performance at each location relative to the 'Without construction' scenarios in Chapter 7 of Appendix H (Technical working paper: Traffic and transport) of the EIS with no changes in LoS noted. There is no difference in forecast impacts between Option A and Option B.

Table D2-7 Option A – 2021 AM peak mid-block operational performance summary[1]

Location and direction		Mid-block capacity	2021 AM peak hour (veh/hr)								
			Without construction			EIS Option A			PIR Option A		
			Flow	V/C[2]	LoS	Flow	V/C	LoS	Flow	V/C	LoS
Parramatta Road north of Wattle Street – Haberfield	SB	3,300	1,840	0.56	C	1,890	0.57	C	1,890	0.57	C
	NB	3,300	1,310	0.40	C	1,330	0.40	C	1,340	0.41	C
Wattle Street east of Parramatta Road – Haberfield	EB	2,000	740	0.37	B	760	0.38	B	780	0.39	B
	WB	2,000	860	0.43	C	880	0.44	C	890	0.45	C
M4 East ramps at Wattle Street[4]	EB	2,200	1170	0.53	C	1280	0.58	D	1310	0.60	D
	WB	4,500	1260	0.28	B	1330	0.30	B	1340	0.30	B
City West Link west of James Street – Rozelle	EB	2,300	2,120	0.92	E	2,200	0.96	E	2,210	0.98	E
	WB	2,300	1,940	0.84	E	1,990	0.86	E	2,010	0.87	E
Darley Road west of James Street – Haberfield	EB	1,000	680	0.68	D	700[3]	0.70	D	700	0.70	D
	WB	1,000	480	0.48	C	500[3]	0.50	C	500	0.50	C
City West Link west of The Crescent – Rozelle	EB	2,300	2,520	1.10	F	2,540[3]	1.10	F	2,580	1.12	F
	WB	2,300	1,800	0.78	D	1,840[3]	0.80	D	1,860	0.81	E
City West Link east of The Crescent – Rozelle	EB	3,400	3,520	1.04	F	3,530	1.04	F	3,570	1.05	F
	WB	3,400	2,560	0.75	D	2,580	0.76	D	2,620	0.77	D
James Craig Road west of The Crescent – Rozelle	EB	1,000	320	0.32	B				410	0.41	C
	WB	1,000	150	0.15	A				230	0.23	A
Johnston Street south west of The Crescent – Rozelle	EB	1,800	1,020	0.57	D				1,030	0.57	D
	WB	1,800	520	0.29	B				550	0.31	B
Johnston Street north east of Parramatta Road – Annandale	NB	1,800	520	0.29	B				520	0.29	B
	SB	1,800	630	0.35	B				650	0.36	B

Notes:

1. Traffic volume rounded to nearest 10; 2. Volume over capacity ratio; 3. Slight amendment to traffic volume reported in EIS; 4. Freeway LoS is evaluated in passenger car unit (PCU), eastbound (EB) capacity treated as urban road with interrupted flow due to downstream traffic signals.

Table D2-8 Option A – 2021 PM peak mid-block operational performance summary[1]

Location and direction		Mid-block capacity	2021 PM peak hour (veh/hr)								
			Without construction			EIS Option A			PIR Option A		
			Flow	V/C[2]	LoS	Flow	V/C	LoS	Flow	V/C	LoS
Parramatta Road north of Wattle Street – Haberfield	SB	3,300	2,080	0.63	D	2,240	0.68	D	2,260	0.68	D
	NB	3,300	1,310	0.40	C	1,370	0.41	C	1,380	0.42	C
Wattle Street east of Parramatta Road – Haberfield	EB	2,000	1,110	0.55	C	1,260	0.63	D	1,270	0.64	D
	WB	2,000	730	0.37	B	790	0.39	C	800	0.40	C
M4 East ramps at Wattle Street[4]	EB	2,200	910	0.41	C	990	0.45	C	1010	0.46	C
	WB	4,500	1090	0.24	A	1270	0.28	B	1290	0.29	B
City West Link west of James Street– Rozelle	EB	2,300	2,230	0.97	E	2,320	1.01	F	2,350	1.02	F
	WB	2,300	2,110	0.92	E	2,240	0.97	E	2,260	0.98	E
Darley Road west of James Street – Haberfield	EB	1,000	540	0.54	C	630[3]	0.63	D	630	0.63	D
	WB	1,000	660	0.66	D	680[3]	0.68	D	680	0.68	D
City West Link west of The Crescent – Rozelle	EB	2,300	2,440	1.06	F	2,630[3]	1.14	F	2,650	1.15	F
	WB	2,300	1,850	0.80	D	1,890[3]	0.82	E	1,900	0.83	E
City West Link east of The Crescent – Rozelle	EB	3,400	3,210	0.94	E	3,420[3]	1.01	F	3,450	1.01	F
	WB	3,400	3,000	0.88	E	3,010	0.89	E	3,050	0.90	E
James Craig Road west of The Crescent – Rozelle	EB	1,000	80	0.08	A				170	0.17	A
	WB	1,000	230	0.23	A				310	0.31	B
Johnston Street south west of The Crescent – Rozelle	EB	1,800	640	0.36	B				690	0.38	B
	WB	1,800	740	0.41	C				760	0.42	C
Johnston Street north east of Parramatta Road – Annandale	NB	1,800	570	0.32	B				610	0.34	B
	SB	1,800	430	0.24	A				440	0.24	A

Notes:

1. Traffic volume rounded to nearest 10; 2. Volume over capacity ratio; 3. Slight amendment to traffic volume reported in EIS; 4. Freeway LoS is evaluated in PCU, eastbound (EB) capacity treated as urban road with interrupted flow due to downstream traffic signals.

Table D2-9 Option B – 2021 AM peak mid-block operational performance summary[1]

Location and direction		Mid-block capacity	2021 AM peak hour (veh/hr)								
			Without construction			EIS Option B			PIR Option B		
			Flow	V/C[2]	LoS	Flow	V/C	LoS	Flow	V/C	LoS
Parramatta Road north of Wattle Street – Haberfield	SB	3,300	1,840	0.56	C	1,890	0.57	C	1,890	0.57	C
	NB	3,300	1,310	0.40	C	1,330	0.40	C	1,340	0.41	C
Wattle Street east of Parramatta Road – Haberfield	EB	2,000	740	0.37	B	740	0.37	B	740	0.37	B
	WB	2,000	860	0.43	C	870	0.43	C	870	0.43	C
M4 East ramps at Wattle Street[4]	EB	2,200	1170	0.53	C	1280	0.58	D	1310	0.60	D
	WB	4,500	1260	0.28	B	1330	0.30	B	1340	0.30	B
City West Link west of James Street – Rozelle	EB	2,300	2,120	0.92	E	2,200[3]	0.96	E	2,200	0.96	E
	WB	2,300	1,940	0.84	E	1,980	0.86	E	2,020	0.88	E
Darley Road west of James Street – Haberfield	EB	1,000	680	0.68	D	700[3]	0.70	D	700	0.70	D
	WB	1,000	480	0.48	C	500[3]	0.50	C	500	0.50	C
City West Link west of The Crescent – Rozelle	EB	2,300	2,520	1.10	F	2,550	1.11	F	2,580	1.12	F
	WB	2,300	1,800	0.78	D	1,840[3]	0.80	D	1,860	0.81	E
City West Link east of The Crescent – Rozelle	EB	3,400	3,520	1.04	F	3,530	1.04	F	3,570	1.05	F
	WB	3,400	2,560	0.75	D	2,570	0.76	D	2,620	0.77	D
Johnston Street south west of The Crescent – Rozelle	EB	1,800	1,020	0.57	D				1,030	0.57	D
	WB	1,800	520	0.29	B				550	0.31	B
Johnston Street north east of Parramatta Road – Annandale	NB	1,800	520	0.29	B				520	0.29	B
	SB	1,800	630	0.35	B				650	0.36	B

Notes:

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

Table D2-10 Option B – 2021 PM peak mid-block operational performance summary[1]

Location and direction		Mid-block capacity	2021 PM peak hour (veh/hr)								
			Without construction			EIS Option B			PIR Option B		
			Flow	V/C[2]	LoS	Flow	V/C	LoS	Flow	V/C	LoS
Parramatta Road north of Wattle Street – Haberfield	SB	3,300	2,080	0.63	D	2,090	0.63	D	2,090	0.63	D
	NB	3,300	1,310	0.40	C	1,410	0.43	C	1,420	0.43	C
Wattle Street east of Parramatta Road – Haberfield	EB	2,000	1,110	0.55	C	1,110	0.56	C	1,110	0.56	C
	WB	2,000	730	0.37	B	740	0.37	B	740	0.37	C
M4 East ramps at Wattle Street[4]	EB	2,200	910	0.41	C	990	0.45	C	1010	0.46	C
	WB	4,500	1090	0.24	A	1270	0.28	B	1290	0.29	B
City West Link west of James Street – Rozelle	EB	2,300	2,230	0.97	E	2,310[3]	1.00	F	2,330	1.01	F
	WB	2,300	2,110	0.92	E	2,220[3]	0.96	E	2,250	0.95	E
Darley Road west of James Street – Haberfield	EB	1,000	540	0.54	C	630[3]	0.63	D	630	0.63	D
	WB	1,000	660	0.66	D	680[3]	0.68	D	680	0.68	D
City West Link west of The Crescent – Rozelle	EB	2,300	2,440	1.06	F	2,630[3]	1.14	F	2,630	1.14	F
	WB	2,300	1,850	0.80	D	1,890[3]	0.82	E	1,910	0.83	E
City West Link east of The Crescent – Rozelle	EB	3,400	3,210	0.94	E	3,390[3]	1.00	F	3,430	1.01	F
	WB	3,400	3,000	0.88	E	3,010	0.89	E	3,060	0.91	E
Johnston Street south west of The Crescent – Rozelle	EB	1,800	640	0.36	B				690	0.38	B
	WB	1,800	740	0.41	C				760	0.42	C
Johnston Street north east of Parramatta Road – Annandale	NB	1,800	570	0.32	B				610	0.34	B
	SB	1,800	430	0.24	A				440	0.24	A

Notes:

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

Intersection level of service

The construction impact assessment was undertaken where construction traffic is passing through the network in significant volumes. The intersections assessed in Chapter 7 of Appendix H (Technical working paper: Traffic and transport) of the EIS were grouped into six corridors or clusters adjacent to the construction ancillary facilities. Those clusters impacted by the changes identified in the assessment of traffic and transport impacts are listed as follows:

- Cluster 1 in Haberfield and Ashfield
- Cluster 2 in Leichhardt
- Cluster 3 in Lilyfield and Rozelle.

In addition, intersection performance results were also assessed against the 'Without construction' scenario at two locations along Johnston Street to determine the impact of construction heavy vehicles traveling from the White Bay civil site to the Pyrmont Bridge Road tunnel site (C9).

The intersection performance results for the road network under the 2021 'Without construction' scenario and EIS and PIR Options A and B forecast volumes are shown for each relevant location for the AM and PM peak hours in **Table D2-11** to **Table D2-14**.

When comparing the EIS Option A and EIS Option B to PIR Option A and Option B, intersection performance results can be summarised as follows:

- Haberfield and Ashfield:
  - A relatively small increase in the volume of construction traffic to the network, rising by a maximum of around 70 PCU in the PM peak at the intersections east of the M4 East ramps on Wattle Street
  - The change in intersection performance relative to the EIS assessment is limited with changes in the LoS band seen at only two intersections as follows:
    - Deterioration in LoS from LoS B to LoS C at Parramatta Road/Croydon Road/Arlington Street in Option A during the AM peak
    - Improvement in LoS from LoS C to LoS B at Parramatta Road/Harris Road in Option B during the PM peak
    - Improvement in LoS from LoS E to LoS D at Parramatta Road/Croydon Road/Arlington Street in Option B during the PM peak
  - The results show that the LoS at the intersections would generally be maintained for both PIR options compared to the EIS options, with the exception of the Parramatta Road/Croydon Road/Arlington Street intersection for PIR Option A during the AM peak. At this intersection, however, a satisfactory minimum LoS C is maintained in PIR Option A during the AM peak
  - The LoS improvements would result from a slight reduction in forecast traffic as heavy vehicles travelling to the Parramatta Road West civil and tunnel site (C1b) are now assumed to use the M4 East/City West Link route to the truck marshalling facility at the White Bay civil site, rather than using Parramatta Road to travel directly to the site.
- Leichhardt:
  - A small increase in the volume of construction traffic added to the network, from about 190 to 260 PCU in the AM peak, and from 350 PCU to about 400 PCU in the PM peak. All of this increase occurs on City West Link (ie there is no additional impact on Darley Road)
  - No change in LoS in either peak relative to that reported in Chapter 7 of Appendix H (Technical working paper: Traffic and transport) of the EIS
- Lilyfield and Rozelle:
  - An increase in the volume of construction traffic added to the network, from about 80 to 220 PCU in the AM peak, and from 280 PCU to about 370 PCU in the PM peak. This translates to increases of up to 190 PCU at the existing intersections on The Crescent (relative to the EIS scenarios)
  - The change in performance relative to the EIS 'With construction' scenarios are limited with changes in LoS band confined to the following locations during the PM peak:
    - City West Link/The Crescent changes from LoS C to LoS D in Option B

    - The Crescent/James Craig Road performance changes from LoS B to LoS C in both Option A and Option B

- Annandale:
  - A small increase in the volume of construction traffic added to the network, from about 40 to 50 PCU in the AM peak, and about 80 PCU in the PM peak
  - The change in performance relative to the 'Without construction' scenario is limited with changes in LoS band confined to The Crescent/Johnston Street/Chapman Road intersection from LoS C to LoS D in the PM peak.

Table D2-11 Option A – 2021 AM peak hour intersection operational performance summary[1]

Cluster	Intersection	Without construction		EIS Option A		PIR Option A	
		Volume (PCU)	LoS	Volume (PCU)	LoS	Volume (PCU)	LoS
1	Parramatta Road | Harris Road	2,550	B	2,650	C	2,650	C
	Parramatta Road | Croydon Road | Arlington Street	3,280	B	3,370	B	3,370	C
	Parramatta Road | Great North Road	3,810	C	3,940	C	3,940	C
	Parramatta Road | Frederick Street | Wattle Street	4,880	D	4,960	D	4,960	D
	Parramatta Road | Bland Street	2,870	F	2,870	F	2,870	F
	Wattle Street | Ramsay Street	3,260	C	3,280	C	3,280	C
	Dobroyd Parade | Waratah Street	3,470	B	3,650	B	3,710	B
	Dobroyd Parade | Timbrell Drive | Mortley Avenue	5,530	F	5,720	F	5,780	F
2	City West Link | James Street	5,530	F	5,720	F	5,790	F
	City West Link | Norton Street	5,290	C	5,450	C	5,540	C
	Darley Road | C4 site access	–	–	1,200	A	1,200	A
3	The Crescent | James Craig Road	6,730	B	6,760	B	6,940	B
	City West Link | The Crescent	6,800	D	6,880	E	7,010	E
	City West Link | C5 site access[2]	–	–	4,780	A	4,860	A
New cluster	The Crescent | Johnston Street | Chapman Road	2,650	C			2,700	C
	Parramatta Road | Johnston Street | Northumberland Avenue	5,210	E			5,250	E

Notes:

1. Traffic volume rounded to nearest 10.
2. Rozelle civil and tunnel site (C5).

Table D2-12 Option A – 2021 PM peak hour intersection operational performance summary[1]

Cluster	Intersection	Without construction		EIS Option A		PIR Option A	
		Volume (PCU)	LoS	Volume (PCU)	LoS	Volume (PCU)	LoS
1	Parramatta Road | Harris Road	3,040	B	3,240	C	3,240	C
	Parramatta Road | Croydon Road | Arlington Street	3,610	D	3,710	E	3,710	E
	Parramatta Road | Great North Road	3,820	F	3,920	F	3,920	F
	Parramatta Road | Frederick Street | Wattle Street	4,950	E	5,200	E	5,200	E
	Parramatta Road | Bland Street	2,500	B	2,520	B	2,530	B
	Wattle Street | Ramsay Street	3,080	D	3,330	E	3,330	E
	Dobroyd Parade | Waratah Street	2,960	B	3,240	B	3,280	B
	Dobroyd Parade | Timbrell Drive | Mortley Avenue	5,450	F	5,770	F	5,800	F
2	City West Link | James Street	5,640	F	5,990	F	6,030	F
	City West Link | Norton Street	5,700	C	5,970	C	6,030	C
	Darley Road | C4 site access	–	–	1,210	A	1,210	A
3	The Crescent | James Craig Road	6,500	B	6,720	B	6,870	C
	City West Link | The Crescent	6,690	C	6,970	C	7,070	C
	City West Link | C5 site access	–	–	4,740	A	4,800	A
New cluster	The Crescent | Johnston Street | Chapman Road	2,520	C			2,600	D
	Parramatta Road | Johnston Street | Northumberland Avenue	4,900	D			4,980	D

Notes:
1. Traffic volume rounded to nearest 10.

Table D2-13 Option B – 2021 AM peak hour intersection operational performance summary[1]

Cluster	Intersection	Without construction		EIS Option B		PIR Option B	
		Volume (PCU)	LoS	Volume (PCU)	LoS	Volume (PCU)	LoS
1	Parramatta Road | Harris Road	2,550	B	2,640	B	2,620	B
	Parramatta Road | Croydon Road | Arlington Street	3,280	B	3,360	B	3,350	B
	Parramatta Road | Great North Road	3,810	C	3,900	C	3,880	C
	Parramatta Road | Frederick Street | Wattle Street	4,880	D	4,970	D	4,970	D
	Parramatta Road | Bland Street	2,870	F	2,930	F	2,930	F
	Wattle Street | Ramsay Street	3,260	C	3,300	C	3,310	C
	Dobroyd Parade | Waratah Street	3,470	B	3,650	B	3,730	B
	Dobroyd Parade | Timbrell Drive | Mortley Avenue	5,530	F	5,720	F	5,790	F
2	City West Link | James Street	5,530	F	5,720	F	5,800	F
	City West Link | Norton Street	5,290	C	5,440	C	5,550	C
	Darley Road | C4 site access	–	–	1,200	A	1,200	A
3	The Crescent | James Craig Road	6,730	B	6,760	B	6,950	B
	City West Link | The Crescent	6,800	D	6,880	E	7,020	E
	City West Link | C5 site access	–	–	4,770	A	4,870	A
New cluster	The Crescent | Johnston Street | Chapman Road	2,650	C			2,700	C
	Parramatta Road | Johnston Street | Northumberland Avenue	5,210	E			5,250	E

Notes:
1. Traffic volume rounded to nearest 10.

Table D2-14 Option B – 2021 PM peak hour intersection operational performance summary[1]

Cluster	Intersection	Without construction		EIS Option B		PIR Option B	
		Volume (PCU)	LoS	Volume (PCU)	LoS	Volume (PCU)	LoS
1	Parramatta Road | Harris Road	3,040	B	3,180	C	3,170	B
	Parramatta Road | Croydon Road | Arlington Street	3,610	D	3,750	E	3,730	D
	Parramatta Road | Great North Road	3,820	F	3,960	F	3,950	F
	Parramatta Road | Frederick Street | Wattle Street	4,950	E	5,090	E	5,080	E
	Parramatta Road | Bland Street	2,500	B	2,640	B	2,630	B
	Wattle Street | Ramsay Street	3,080	D	3,120	D	3,120	D
	Dobroyd Parade | Waratah Street	2,960	B	3,260	B	3,300	B
	Dobroyd Parade | Timbrell Drive | Mortley Avenue	5,450	F	5,750	F	5,780	F
2	City West Link | James Street	5,640	F	5,960	F	6,020	F
	City West Link | Norton Street	5,700	C	5,940	C	6,020	C
	Darley Road | C4 site access	–	–	1,210	A	1,210	A
3	The Crescent | James Craig Road	6,500	B	6,700	B	6,860	C
	City West Link | The Crescent	6,690	C	6,950	C	7,060	D
	City West Link | C5 site access	–	–	4,710	A	4,790	A
New cluster	The Crescent | Johnston Street | Chapman Road	2,520	C			2,600	D
	Parramatta Road | Johnston Street | Northumberland Avenue	4,900	D			4,980	D

Notes:
1. Traffic volume rounded to nearest 10.

Temporary road network changes, closures and diversions

The White Bay civil site would not result in significant changes to the road network relative to the assessment provided in Chapter 7 of Appendix H (Technical working paper: Traffic and transport) of the EIS. There would be no requirement for temporary road network changes, closures and diversions.

Potential impacts on pedestrians and cyclists

There is an existing pedestrian crossing at Sommerville Road on the western side of the Port Authority of NSW entry gates. This crossing provides a pedestrian connection between the footpath on the northern side of Sommerville Road and the associated connection to the Anzac Bridge pedestrian path, and commercial premises on the southern side of Sommerville Road. This crossing would be predominantly used by pedestrians accessing the adjacent building and is unlikely to be heavily used. The establishment and/or use of the White Bay civil site would not affect this crossing. Heavy and light vehicle drivers using the White Bay civil site will be made aware of the presence of this crossing as part of the protocols to be established for the use of the site and documented in the CTAMP.

The forecast level of additional traffic along Johnston Street would not result in substantial impacts on other road users particularly given the pedestrian crossing facilities available at Annandale Public School and Annandale North Public School and the intermediate intersection at Booth Street. A speed limit of 40 kilometres per hour applies to Johnston Street during the AM and PM peaks on school days.

Potential cumulative impacts

An assessment of potential cumulative impacts on roadway LoS and intersection performance around Lilyfield and Rozelle has been carried out and is presented in section 5.1 of **Appendix A** (Traffic and transport impact assessment). The assessment considers construction traffic generated by:

- The project, including the use of the White Bay civil site
- The proposed future Western Harbour Tunnel. As reported in section 7.6 of Appendix H (Technical working paper: Traffic and transport) of the EIS, the construction of the proposed future Western Harbour Tunnel (subject to separate environmental assessment and approval) may overlap with construction of the project, with construction vehicles travelling through several traffic clusters, including Cluster 3
- Three separate short to medium-term proposals identified in the Port Authority of NSW submission on the EIS (see **Chapter B8** (Port Authority of NSW)), comprising:
  - Multi-user facility at Glebe Island
  - Hanson concrete batching plant at Glebe Island
  - Construction logistics site.

The Multi-user facility is the most advanced of the three proposals with daily traffic forecasts (provided in the Port Authority of NSW's submission on the M4-M5 Link EIS), albeit subject to separate planning approval. High level traffic volumes can also be calculated for the proposed batching plant based on the proposed delivery capacity of one million tonnes of concrete. The construction logistics site proposal is relatively early in the planning process with greater uncertainty as to approvals, opening dates and volume of traffic generation. No specific information is available regarding this proposal at the time of preparing this assessment.

Details about the assumptions applied for each of the identified projects assessed in the cumulative impact assessment are provided in section 3.1.5 of **Appendix A** (Traffic and transport impact assessment). Section 3.1.5 of **Appendix A** (Traffic and transport impact assessment) provides a summary of light and heavy vehicle volumes predicted to arrive and depart from the various sites in this cumulative scenario during the typical network AM peak hour (7.30 am to 8.30 am), PM peak hour (4.15 pm to 5.15 pm) and daily period.

The cumulative traffic analysis has not included a specific allowance for traffic generated by the White Bay cruise ship terminal as the draft licence, currently under negotiation between the Port Authority of NSW and Roads and Maritime may restrict access to the site from Sommerville Road and James Craig Road during defined time periods on days when the cruise ship terminal is operating. Consultation will continue to occur with the Port Authority of NSW, Roads and Maritime, Transport for NSW, Sydney Motorway Corporation and the appointed design and construction contractor(s) to manage cumulative traffic movements along Sommerville Road, James Craig Road and the intersection of James Craig Road and The Crescent.

Roadway level of service

An analysis of the roadway levels of service was undertaken to determine the impact of cumulative construction traffic in 2021 relative to the 'Without construction' and PIR Option A scenarios. There was no significant difference between PIR Option A and PIR Option B results. Therefore, only a single scenario was assessed (PIR Option A).

Theoretical mid-block capacities and assessment results are shown in **Table D2-15** and **Table D2-16** for the AM and PM peaks. A mid-block analysis was also undertaken for James Craig Road given the increase in heavy vehicle traffic assumed under the cumulative scenario. This is also shown in **Table D2-15** and **Table D2-16** for the AM and PM peaks. There is no difference in forecast impact between Option A and Option B so only a single set of results is provided.

The results generally show a marginal deterioration in performance at each location between the 'Without construction' and the the PIR Option A scenario. There are no LoS band changes at the City West Link and The Crescent locations. LoS band changes are listed as follows for the James Craig Road mid-block:

- Westbound performance in the AM peak deteriorates from LoS A to LoS B
- Eastbound performance in the PM peak deteriorates from LoS A to LoS B

- Westbound performance in the PM peak deteriorates from LoS B to LoS C.

The LoS provided on James Craig Road remains satisfactory in all scenarios at a minimum LoS C.

Table D2-15 Option A and cumulative – 2021 AM peak mid-block operational performance summary[1]

Location and direction		Mid-block capacity	2021 AM peak hour (veh/hr)								
			Without construction			PIR Option A			Cumulative		
			Flow	V/C	LoS	Flow	V/C	LoS	Flow	V/C	LoS
City West Link west of The Crescent – Rozelle	EB	2,300	2,520	1.10	F	2,580	1.12	F	2,590	1.13	F
	WB	2,300	1,800	0.78	D	1,860	0.81	E	1,870	0.81	E
City West Link east of The Crescent – Rozelle	EB	3,400	3,520	1.04	F	3,570	1.05	F	3,580	1.05	F
	WB	3,400	2,560	0.75	D	2,620	0.77	D	2,630	0.77	D
James Craig Road west of The Crescent – Rozelle[2]	EB	1,000	320*	0.32	B	410[2]	0.41	C	550[2]	0.55	C
	WB	1,000	150*	0.15	A	230[2]	0.23	A	370[2]	0.37	B

Notes:

1. Traffic volume rounded to nearest 10.
2. Assumed location east of the roundabout. Analysis conservatively undertaken using PCU due to high proportion of heavy vehicles.

Table D2-16 Option A and cumulative – 2021 PM mid-block operational performance summary[1]

Location and direction		Mid-block capacity	2021 PM peak hour (veh/hr)								
			Without construction			PIR Option A			Cumulative		
			Flow	V/C	LoS	Flow	V/C	LoS	Flow	V/C	LoS
City West Link west of The Crescent – Rozelle	EB	2,300	2,440	1.06	F	2,650	1.15	F	2,660	1.16	F
	WB	2,300	1,850	0.80	D	1,900	0.83	E	1,920	0.83	E
City West Link east of The Crescent – Rozelle	EB	3,400	3,210	0.94	E	3,450	1.01	F	3,470	1.02	F
	WB	3,400	3,000	0.88	E	3,050	0.90	E	3,090	0.91	E
James Craig Road west of The Crescent – Rozelle[2]	EB	1,000	80[2]	0.08	A	170[2]	0.17	A	310[2]	0.31	B
	WB	1,000	230[2]	0.23	A	310[2]	0.31	B	450[2]	0.45	C

Notes:

1. Traffic volume rounded to nearest 10.
2. Assumed location east of the roundabout. Analysis conservatively undertaken using PCU due to high proportion of heavy vehicles.

Intersection level of service

The intersection performance results for the road network under the 2021 'Without construction', PIR Option A and cumulative forecast volumes are summarised in **Table D2-17** and **Table D2-18** for the AM and PM peak hours respectively. Results are provided for Cluster 3 as described in section 5.1 of **Appendix A** (Traffic and transport impact assessment). There is no difference in forecast impact between Option A and Option B so only a single set of results is provided.

In the cumulative scenario, there is an increase in the volume of construction traffic added to the network during both peak hours (relative to the PIR Option A scenario) of about 250-300 PCU at the James Craig Road/The Crescent intersection and by a smaller amount of about 70 PCU at The Crescent/City West Link intersection. This reflects the assumption that the majority of the Multi-user facility traffic would serve the city centre and thus travel between Anzac Bridge and James Craig Road.

The changes in LoS band performance relative to the PIR Option A scenarios are confined to the following:

- The Crescent/James Craig Road performance deteriorates from LoS B to LoS C in the AM peak
- The Crescent/James Craig Road performance deteriorates from LoS C to LoS E in the PM peak.

The results demonstrate that the combined impact of the PIR Option A, Western Harbour Tunnel and assessed Port Authority of NSW projects would result in a deterioration to LoS E in the PM peak at the James Craig Road/The Crescent intersection. This deterioration can be attributed primarily to the traffic that would be generated by the Port Authority of NSW proposals.

Queuing on James Craig Road would remain less than 100 metres, though there is potential for an increase in westbound queuing on The Crescent if conservative trip generation assumptions for Port Authority of NSW projects are adopted (see section 3.1.5 of **Appendix A** (Traffic and transport impact assessment).

As noted, Roads and Maritime would continue to consult with the Port Authority of NSW and other stakeholders as appropriate on the use of James Craig Road to ensure coordination of heavy vehicle movements, with a focus on reducing the proportion of vehicle trips (especially inbound from the east) during the PM peak.

Table D2-17 Option A and cumulative – 2021 AM peak hour intersection operational performance summary[1]

Cluster	Intersection	Without construction		PIR Option A		Cumulative	
		Volume (PCU)	LoS	Volume (PCU)	LoS	Volume (PCU)	LoS
3	The Crescent | James Craig Road	6,730	B	6,940	B	7,210	C
	City West Link | The Crescent	6,800	D	7,010	E	7,080	E
	City West Link | C5 site access	–	–	4,860	A	4,960	A

Notes:

1. Traffic volume rounded to nearest 10.

Table D2-18 Option A and cumulative – 2021 PM peak hour intersection operational performance summary[1]

Cluster	Intersection	Without construction		PIR Option A		Cumulative	
		Volume (PCU)	LoS	Volume (PCU)	LoS	Volume (PCU)	LoS
3	The Crescent | James Craig Road	6,500	B	6,870	C	7,150	E
	City West Link | The Crescent	6,690	C	7,070	C	7,150	C
	City West Link | C5 site access	–	–	4,800	A	4,900	A

Notes:

1. Traffic volume rounded to nearest 10.

Environmental management measures

As required by environmental management measure TT01 (see **Chapter E1** (Environmental management measures)), a CTAMP will be prepared as part of the Construction Environmental Management Plan (CEMP) for the project. The CTAMP will include the guidelines, general requirements and principles of traffic management to be implemented during construction, including management of heavy vehicles using the truck marshalling facility at the White Bay civil site. The CTAMP will be prepared in accordance with the *Austroads Guide to Road Design* (with appropriate Roads and Maritime supplements), the *Roads and Traffic Authority Traffic Control at Work Sites Manual* and AS1742.3: Manual of uniform traffic control devices – Part 3: Traffic control for works on roads, and any other relevant standard, guide or manual.

Roads and Maritime will continue to consult with the Port Authority of NSW and other stakeholders as appropriate to ensure coordination between the operation of the White Bay civil site and other relevant projects in the vicinity. Should further specific environmental management measures be agreed between Roads and Maritime and the Port Authority of NSW as negotiation of the licence continues, these measures will be incorporated into the CTAMP as required.

D2.4.2 Noise and vibration

A noise and vibration impact assessment has been prepared to assess the potential noise and vibration impacts of the White Bay civil site (see **Appendix B** (Noise and vibration impact assessment)). **Appendix B** (Noise and vibration impact assessment) should be read in conjunction with Appendix J (Technical working paper: Noise and vibration) of the EIS which contains detailed descriptions and explanations of the assessment guidelines and methodologies used.

Existing environment

Noise catchment areas

As described in section 10.1 of Chapter 10 (Noise and vibration) of the EIS, the study area for the noise and vibration assessment was divided into 56 noise catchment areas (NCAs). The NCAs closest to the White Bay civil site are shown in **Figure D2-3** and described in **Table D2-19**.

Table D2-19 Noise catchment areas and surrounding land uses

NCA ID	Description
NCA25	West of Victoria Road between Gordon Street and Lilyfield Road, including residences on the south side of Lilyfield Road. Land use comprises of a mix of residential receivers, isolated commercial receivers and special use facilities.
NCA26	Catchment area adjoins either side of the western approach to Anzac Bridge, between Victoria Road, Robert Street, White Bay, Johnstons Bay and Rozelle Bay. Land use consists of a mix of commercial and industrial receivers including port facilities.
NCA29	North of Victoria Road between Robert Street and Evans Street. Land use comprises of a mix of residential and commercial receivers and special use facilities.

Sensitive noise receivers

Noise receivers surrounding the site comprise commercial receivers to the north along Robert Street and Mullens Street, with a residential area located further to the north along Mansfield Street and Batty Street. White Bay and commercial port related receivers are located to the east, with Victoria Road, James Craig Road and commercial receivers to the south and White Bay Power Station to the west.

The closest residential receivers are located around 100 metres to the north and 200 metres to the west of the site. The closest residential receiver is a multi-level residential building located at 1 Batty Street, Rozelle. The closest other sensitive receiver is the C3 Church Balmain which is located around 30 metres north of the site on Robert Street.

The NCAs and noise logging locations are shown in **Figure D2-3**.

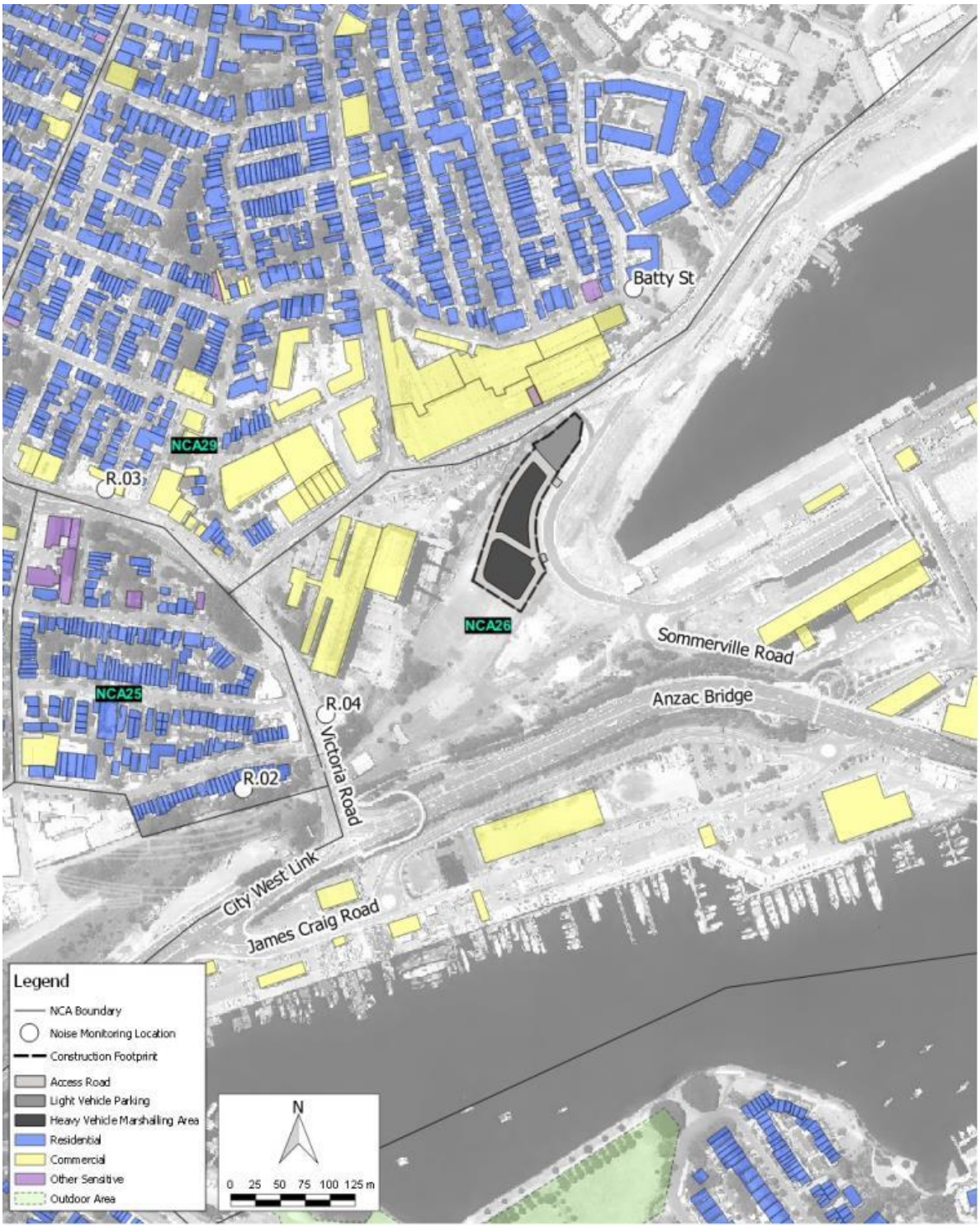


Figure D2-3 Noise catchment areas, logging locations and sensitive receivers around the White Bay civil site

Background noise levels

Noise monitoring was undertaken to understand the background noise levels in the study area that may be impacted by the project (refer to section 3.5 and 2.6 of Appendix J (Technical working paper: Noise and vibration) of the EIS). As the White Bay civil site extends outside the project footprint assessed in the EIS, supplementary noise monitoring has been used to inform the assessment of potential noise and vibration impacts.

To supplement the noise monitoring undertaken for the EIS, background noise monitoring previously undertaken as part of the Noise Impact Assessment for the Interim Exhibition Facility located at Glebe Island has been used (SLR 2012). Noise monitoring was undertaken at the nearest residential receiver to the White Bay civil site, located at 1 Batty Street, Rozelle (see **Figure D2-3**).

Noise monitoring results are detailed in **Table D2-20**. Monitoring data was reviewed to ensure that the data was not influenced by ship activity within White Bay, which therefore represents ambient conditions without ship activity.

Table D2-20 Supplementary background noise data (SLR 2011)– White Bay civil site

Noise monitoring location	Measured noise level (dBA)					
	Rating Background Level (RBL)			L_{Aeq}		
	Daytime	Evening	Night	Daytime	Evening	Night
1 Batty Street	51	49	42	57	53	47

To verify monitoring data collected as part of the Glebe Island Interim Exhibition Facility, attended noise monitoring was undertaken in November 2017 at the same location at 1 Batty Street (see **Figure D2-3**) over three hour periods to quantify the existing ambient noise conditions. Monitoring was undertaken outside ship activity events in White Bay to ensure levels are representative of the ambient conditions without ship activity. Attended noise monitoring results are detailed in **Table D2-21**.

Table D2-21 Existing background and ambient noise levels (dB(A)) – White Bay civil site

Measurement period	Measured noise levels		Background noise description
	L_{Aeq}	L_{A90}	
Daytime period 9.00 am to 12.00 pm 9/11/2017	54	50	Dominated by distant road traffic noise from Anzac Bridge, The Crescent, Victoria Road and planes.
Evening period 7.00 pm to 10.00 pm 9/11/2017	52	49	Dominated by distant road traffic noise from Anzac Bridge, The Crescent, Victoria Road and planes.
Shoulder period 5.00 am to 7.00 am 16/11/2017	51	47	Dominated by distant road traffic noise from Anzac Bridge, The Crescent, Victoria Road and planes.

Attended measurement results indicate a similar noise environment to that measured for the Glebe Island Interim Exhibition Facility (SLR 2012) and therefore the previously monitored data presented in **Table D2-20** is considered to be valid for use in this assessment.

The noise management levels (NMLs) have subsequently been developed for the White Bay civil site and are outlined in **Table D2-22**. The NMLs for other sensitive receivers, such as schools and churches, are outlined in Table 2-6 of **Appendix B** (Noise and vibration impact assessment).

Table D2-22 Residential NMLs for the White Bay civil site

NCA	Noise logging locations	Receiver type	Standard construction NMLs (RBL+10dBA)	Out-of-hours NMLs (RBL[3]+5dBA)[1]				Sleep disturbance screening (RBL+15dBA)
			Daytime	Daytime	Evening	Night	Shoulder period[3]	
NCA20	R.14	Residential	54	49	47	40	45	50
NCA21	R.15	Residential	58	53	53	47	50	57
NCA23	R.09	Residential	59	54	50	41	48	51
NCA24	R.01	Residential	64	59	57	49	54	59
NCA25	R.02	Residential	61	56	56	50	53	60
NCA27	R.16	Residential	59	54	54	47	51	57
NCA28	n/a[2]	Residential	55	50	45	40	45	50
NCA29	1 Batty Street	Residential	61	56	54	47	52	57
NCA30	R.03	Residential	71	66	65	49	58	59

Notes:

1. Out-of-hours construction hours:
   - Daytime (out-of-hours): Saturday 1.00 pm-6.00 pm, Sunday and public holidays 8.00 am-6.00 pm
   - Evening: 6.00 pm-10.00 pm
   - Night: 10.00 pm-7.00 am Sunday to Saturday and 10.00 pm Saturday to 8.00 am Sunday
   - Shoulder period: 5.00 am-7.00 am.
2. No unattended noise monitoring was conducted within this NCA or nearby. Australian Standard 1055 descriptions and measurement of environmental noise – part 2 Application to specific situations has been used to establish a background noise level for screening purposes only. Where the construction noise assessment predicts an exceedance of NMLs for this location, it is recommended that monitoring be conducted during the detailed design stage to confirm the existing environment.
3. Residential NMLs for the morning shoulder have been calculated in accordance with the *Industrial Noise Policy* (INP) using the mid-point between the two points.
4. Shaded NCAs correspond with those closest to the White Bay civil site as shown in **Table D2-19**. NCA26 is not shown as it does not contain any residential receivers.

Potential noise impacts

Construction scenarios

To assess the potential noise impacts from the use of the White Bay civil site, proposed works at the site were divided into the following indicative scenarios to provide an accurate assessment of each stage of works. Scenarios for each construction stage were modelled based on the likely construction equipment (and associated sound power level) that would be used to understand the potential noise impact for each stage (see Table 2-7 in **Appendix B** (Noise and vibration impact assessment)). Scenarios are outlined in **Table D2-23**.

Table D2-23 Construction assessment scenarios for the White Bay civil site

Scenario	Activity	Duration (weeks)[6]	Period of works				
			Standard construction hours[1]	Daytime (OOH)[2]	Evening[3]	Night[4]	Shoulder period[5]
Site establishment	**WBM-01 -** Demolition of existing hardstand and site levelling (with rockbreaker)	4	✓				
	WBM-02 - Demolition of existing hardstand and site levelling (no rockbreaker)	5	✓				
	WBM-03 - Hardstand construction using compaction equipment	8	✓				
	WBM-04 - Asphalt layer and linemarking	1	✓				
	WBM-05 - Construction of gatehouse	1	✓				
Site operation	**WBM-06 -** Peak operations	156	✓				
	WBM-07 - Typical operations	156	✓	✓	✓		✓
	WBM-08 - Night operations	156				✓	
	WBM-09 - Laydown operations	156	✓	✓	✓	✓	✓

Notes:

1. Standard construction hours: 7.00 am-6.00 pm Monday to Friday, 8.00 am-1.00 pm Saturday.
2. Daytime out-of-hours: Saturday 1.00pm-6.00 pm, Sunday and public holidays 8.00 am-6.00 pm.
3. Evening: 6.00 pm-10.00 pm.
4. Night: 10.00 pm-7.00 am Sunday to Saturday and 10.00 pm Saturday to 8.00 am Sunday.
5. Shoulder period: 5.00 am-7.00 am Monday to Friday.
6. Activities may overlap in duration.

Noise management level exceedances

The predicted NML exceedances for the White Bay civil site are summarised in **Table D2-24**. The assessment presented in this table takes into consideration all construction scenarios associated with the project in this area and the number of receivers predicted to experience exceedances of the NMLs during the day, evening and night periods, as appropriate.

Table D2-24 colours the predicted noise levels based on the exceedance of the NML during that period and for that receiver type. A qualitative description of the NML exceedance range is provided below, noting that the impact of these potential exceedances would depend on the period in which they were to occur (ie the night period is typically more sensitive than the daytime or evening for most people):

- Noise levels 1 to 10 dBA above NMLs – impacts would typically be marginal to minor
- Noise levels 11 dBA to 20 dBA above NMLs – impacts would typically be moderate
- Noise levels more than 20 dBA above NMLs – impacts would typically be high.

For most construction activities, the actual construction noise level would generally be lower than the worst case prediction made at the most exposed receiver. This is because noise levels vary with position of machinery and noise sensitive receivers, as well as across different stages of construction. Worst case predictions have also assumed equipment is located at the closest point to the receivers.

A summary of the predicted worst case construction noise levels for each scenario for residential, commercial and other sensitive receivers are presented in Table 2-8 to Table 2-13 of **Appendix B** (Noise and vibration impact assessment). Exceedances of the NMLs are described in detail in the section following **Table D2-24**.

Table D2-24 Overview of NML exceedances for the White Bay civil site

Activity ID	Activity	Weeks[1]	Number of receivers																			
			Total	Highly noise affected[3]	Exceedance above NML[2]																	
					Daytime			Daytime (out-of-hours)			Evening			Night			Shoulder period (5.00 am-7.00 am)			Sleep disturbance		
					1-10 dBA	11-20 dBA	>20 dBA	1-10 dBA	11-20 dBA	>20 dBA	1-10 dBA	11-20 dBA	>20 dBA	1-10 dBA	11-20 dBA	>20 dBA	1-10 dBA	11-20 dBA	>20 dBA	1-10 dBA	11-20 dBA	>20 dBA
WBM-01	Demolition of existing hardstand and site levelling (with rockbreaker)	4	3629	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WBM-02	Demolition of existing hardstand and site levelling (without rockbreaker)	5	3629	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WBM-03	Hardstand construction using compaction equipment	8	3629	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WBM-04	Asphalt layer and linemarking	1	3629	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WBM-05	Construction of gatehouse	1	3629	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WBM-06	Peak operations	156	3629	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WBM-07	Typical operations	156	3629	-	1	-	-	1	-	-	1	-	-	-	-	-	2	-	-	-	-	-
WBM-08	Night operations	156	3629	-	-	-	-	-	-	-	-	-	-	6	-	-	-	-	-	10	-	-
WBM-09	Laydown and storage	156	3629	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

1. Approximate overall duration of the activity in all areas of the site. The duration of these impacts is less than the overall duration and depends on the rate of progress in the works areas.
2. Based on worst case noise works area (closest to receivers).
3. Based on the Interim Construction Noise Guideline ICNG (NSW Environment Protection Authority 2009) definition (ie predicted $L_{Aeq(15minute)}$ noise at residential receiver is 75 dBA or greater).
4. Colouring indicates the range of predicted worst case NML exceedances without any additional mitigation based on nearest receiver (red >20 dBA, orange 11-20 dBA, yellow 1-10 dBA).

Works activity WBM-01 to WBM-05 cover construction activities required for site establishment and are limited to standard daytime hours only. Worst case predicted exceedances of the daytime NMLs are limited to:

- One commercial receiver located to the north of the site on Robert Street, with a maximum exceedance of 2 dBA predicted
- One place of worship (C3 Church Balmain), also located directly to the north of the site, with a maximum NML exceedance of 17 dBA predicted.

These exceedances are due to the use of a rockbreaker during the demolition of the existing hardstand and site levelling works (WBM-01) and would occur during the daytime only. These works are expected to be completed within eight weeks and would be managed via the implementation of the mitigation and management measures outlined in **Chapter E1** (Environmental management measures). Exceedances would significantly decrease when the rockbreaker is not in use as shown in the results for activities WBM-02 to WBM-05.

Works activities WBM-06 to WBM-09 are representative of the ongoing activities associated with the proposed use of the site. These include truck movements and laydown operations which may be conducted outside of standard construction hours. Minor predicted NML exceedances of up to five dBA are limited to the place of worship (C3 Church Balmain) during standard construction hours, day out of hours and the evening period. Night-time exceedances up to 2 dBA are limited to six residential receivers located to the north of the site. These receivers are shown in **Figure D2-4**.

Up to 10 residential receivers have also been identified as potentially exceeding (up to 2 dBA) the screening criteria for sleep disturbance. The dominant noise source causing these exceedances is from the movement of trucks which is considered a typical noise source within the existing ambient environment.

Noise impacts from the White Bay civil site are limited to receivers located within NCA29 and are generally at residential receivers fronting Mansfield Road and Batty Street. The existing ambient noise environment at these receivers includes noise from vehicle movements on Anzac Bridge and The Crescent, ship movements and regular aircraft fly overs. It is considered the use of this site is unlikely to cause a significant adverse noise impact given the minor magnitude of the exceedances and the existing ambient noise sources.

Highly affected receivers

No receivers would be 'highly noise affected receivers' due to the White Bay civil site (ie subject to predicted noise levels of 75 dBA or greater).

Construction traffic noise

Construction vehicles would access and egress the site via City West Link/The Crescent, James Craig Road and Sommerville Road. The noise environment for residential receivers on Lilyfield Road which have line of sight to James Craig Road is dominated by traffic noise from The Crescent, City West Link and Victoria Road given their proximity to these major roads. These receivers are located more than 150 metres from James Craig Road, and given the projected relatively low volume of construction traffic associated with the White Bay civil site and the existing ambient road noise environment, are forecast to experience a negligible change in noise level.

Construction traffic noise impacts from vehicles using the White Bay civil site on The Crescent/City West Link and the wider arterial road network have been assessed in Appendix J (Technical working paper: Noise and vibration) of the EIS. The addition of these vehicle volumes would have a negligible impact on the assessment outcomes presented in the EIS.

The use of Johnston Street at Annandale by heavy vehicles was not assessed in the EIS. Two-way flows on Johnston Street between The Crescent and Parramatta Road are up to around 1,600 vehicles per hour in the peak periods. The addition of seven one-way (southbound) heavy vehicle movements on Johnston Street would result in negligible additional construction traffic noise impacts given the existing traffic flows along this route and the small number of construction vehicles that would be added as a result of the project.

Figure D2-4 Night-time NML exceedances for residential receivers

Potential vibration impacts

The proposed works have been analysed to determine a best estimate of minimum working distances for the vibration intensive mechanical plant proposed for the construction activities. Proposed vibration intensive construction plant are listed in **Table D2-25** and compared to the minimum working distances identified in the EIS in order to determine potential vibration impacts for different types of buildings due to the main construction scenarios. Estimated minimum working distances for the White Bay civil site works are shown in **Figure D2-5**.

Table D2-25 Construction vibration assessment summary for the White Bay civil site

Work scenario	Vibration intensive equipment	NCA	Number of buildings within minimum working distance for highest vibration plant item			
			Cosmetic damage			Human response[1]
			Residential and light commercial	Group 2 (typical)	Group 3 (structurally unsound)	
Site establishment (WBM-01 to WBM-05)	Jackhammer Rockbreaker Vibratory rollers	NCA25	-	-	-	-
		NCA26	-	-	1	1
		NCA29	1	2	-	4

Notes:

1. Criteria referenced from Roads and Maritime CNVG.

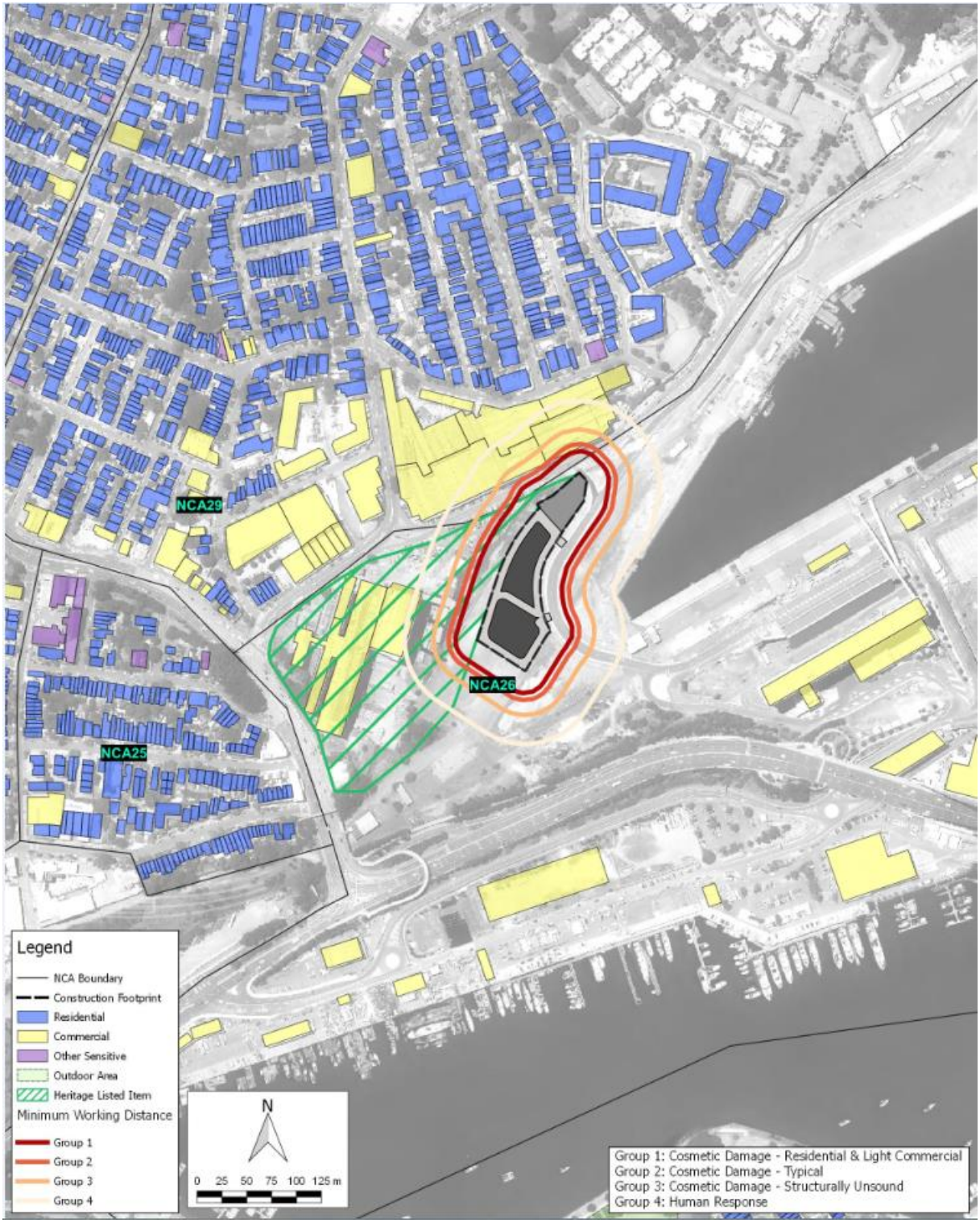


Figure D2-5 Approximate minimum working distances for vibration intensive works at the White Bay civil site

White Bay Power Station

Some structural elements associated with the SHR listed White Bay Power Station, including the northern penstock adjacent to the north of the site, are located within the cosmetic damage minimum working distances for the vibration intensive mechanical plant proposed for the establishment and use of the White Bay civil site. The potential for cosmetic damage to these items is discussed in **section D2.4.5**. The main buildings of the White Bay Power Station, however, are outside the cosmetic damage minimum working distances and would not be affected by vibration.

Cosmetic damage impacts

During site establishment activities for the White Bay civil site, up to three buildings comprising two commercial buildings and a place of worship on the northern side of Robert Street may be within the minimum working distances should a large rockbreaker be used at the outer extents of the site (see **Figure D2-5**).

Human comfort impacts

During site establishment for the White Bay civil site, activities that require a large rockbreaker may result in up to five buildings being within the nominated minimum working distance for human comfort vibration (see Table 2-16 in **Appendix B** (Noise and vibration impact assessment)). The buildings are identified in **Figure D2-5** and comprise four commercial buildings and a place of worship located on Robert Street to the north of the site. Site establishment works requiring a large rockbreaker would occur during standard construction hours over a period of around four weeks (see WBM-01 in **Table D2-23**). In practice, vibration impacts from most construction activities would be intermittent for the duration of site establishment.

For most construction activities, vibration emissions are intermittent in nature and for this reason, higher vibration levels occurring over shorter periods are permitted, as discussed in the *Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting BS 6472-1.*

Environmental management measures

Potential noise and vibration impacts from the White Bay civil site would be managed by the following management measures as outlined in **Chapter E1** (Environmental management measures):

- Environmental management measure NV3 - Detailed noise assessments will be carried out for all ancillary facilities required for construction of the project. The assessment will consider the proposed site layouts and noise generating activities that will occur at the facilities and assess predicted noise levels against the relevant noise management levels determined in accordance with the requirements of the ICNG. The assessments will be used to determine the appropriate noise management measures, consistent with the requirements of the ICNG and Construction Noise and Vibration Guideline (Roads and Maritime 2016)
- Environmental management measure NV4 - Location and activity specific noise and vibration impact assessments will be carried out prior to (as a minimum) activities:
  - With the potential to result in noise levels above 75 dBA at any receiver
  - Required outside standard construction hours likely to result in noise levels greater than the relevant noise management levels
  - With the potential to exceed relevant performance criteria for vibration

  The assessments will clarify predicted impacts at relevant receivers in the vicinity of the activities to assist with the selection of appropriate management measures, consistent with the requirements of ICNG and CNVG that will be implemented during the works
- Environmental management measure NV6 - Monitoring will be carried out at the commencement of new noise and vibration intensive activities and works in new locations to confirm that actual noise and vibration levels are consistent with noise and vibration impact predictions and that the management measures that have been implemented are appropriate.

In addition, a condition assessment of the northern penstock will also be carried out by a heritage specialist and a structural engineer prior to any vibratory works in the vicinity that have the potential to impact on the item. The condition assessment will inform additional management measures to protect the northern penstock, if required. Any conservation works required to limit potential impacts on deteriorated fabric (loose bricks, corroded steel) will be identified and implemented prior to commencement of the relevant vibratory works in the vicinity.

D2.4.3 Land use and property

Existing environment

The White Bay civil site is located at Rozelle on land owned by the Port Authority of NSW and is generally bordered by the White Bay Power Station to the west, Sommerville Road to the east and Robert Street to the north (see **Figure D2-1**). The site is part of the larger Glebe Island/White Bay Port Precinct, currently used for dry bulk imports, exports, vessel lay-ups, ad-hoc port and working harbour activities and cruise ship terminal, functioning 24 hours a day, seven days a week.

The White Bay civil site is currently disused and vacant and comprises poor quality hardstand in need of replacement prior to use by heavy vehicles. There are currently no approved plans to use the site for other purposes during the construction period for the M4-M5 Link project. However, Roads and Maritime is aware of plans to use and/or develop portions of land around the proposed site for port related and other uses including truck marshalling for the Sydney Metro project. These proposed developments and/or uses have been considered in relevant sections of this assessment, where information about these is known and publicly available.

The area on the northern side of Robert Street is predominantly a mixture of commercial and light industrial land uses. The White Bay Power Station, a State listed heritage item registered on the SHR, is located immediately to the west of the site. Residential areas are located to the north of Robert Street and to the west across Victoria Road near Lilyfield Road and Hornsey Street.

The site is zoned as Port and Employment under the SREP 26 and is also covered by the *Glebe Island and White Bay Master Plan 2000* (Sydney Ports Corporation 2000). The objective of the zone is to encourage development that supports the ongoing operation of the port and port uses. The *Glebe Island and White Bay Master Plan* provides for the continued use of Glebe Island and White Bay as a significant commercial port facility and sets out the vision for the future development of Glebe Island and White Bay. The vision for future development set out in the master plan includes to:

- Upgrade existing infrastructure to allow for growth and to improve efficiency
- Improve the public presentation of the port
- Ensure new development is of a high standard of urban design
- Improve management of noise, light spill and traffic.

To the north of the site (north of Robert Street), the land is zoned Light Industrial under the Leichhardt Local Environmental Plan 2013. To the south of the site (south of James Craig Road), the land is zoned Waterfront under the SREP 26.

Land use zones in the vicinity of the White Bay civil site are shown in **Figure D2-6**.

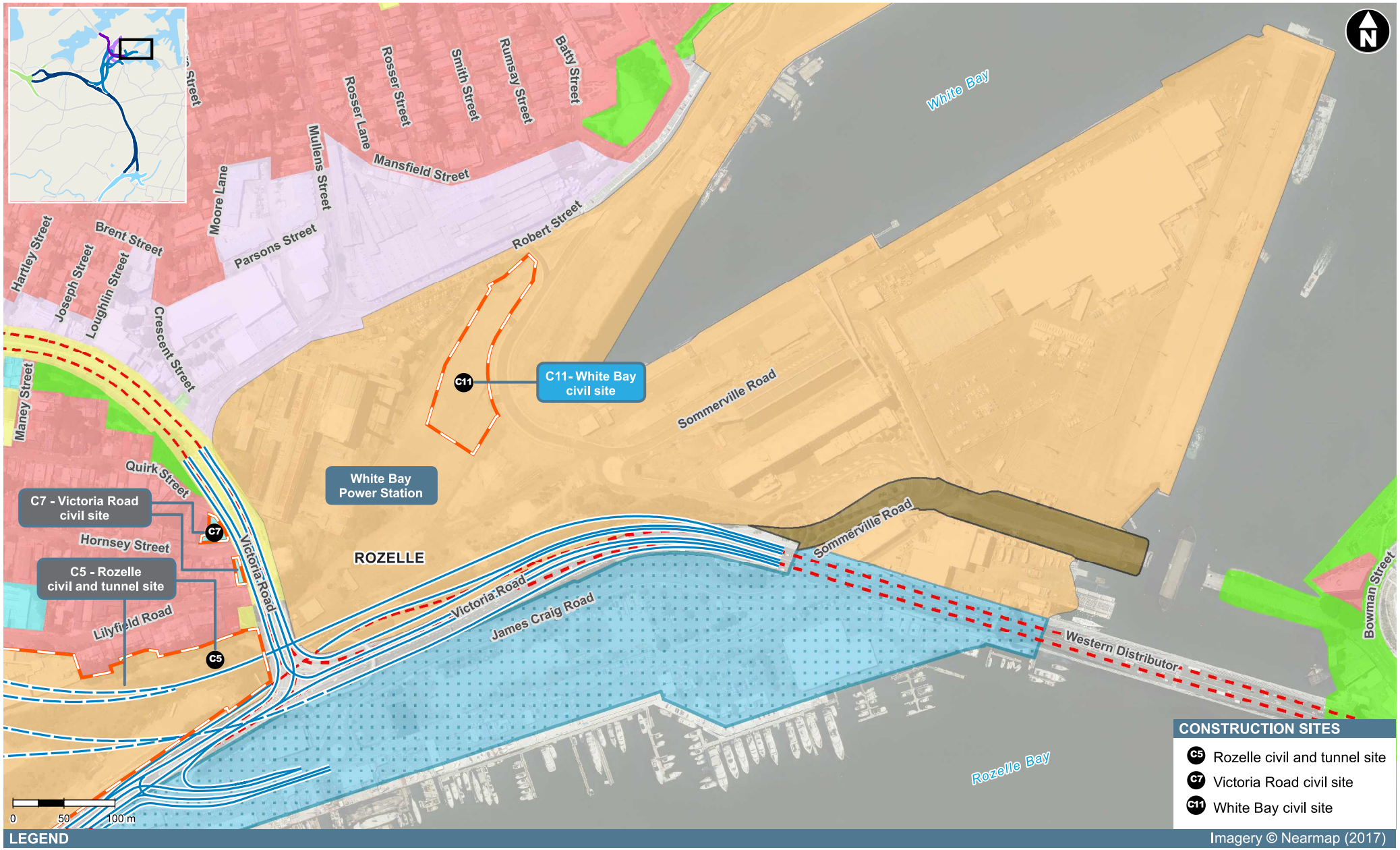


Figure D2-6 Land use zoning around the White Bay civil site (C11)

The site would be located on vacant and unused land, which is strategically located relative to the arterial road network and the M4-M5 Link tunnelling sites. The use of the site as a truck marshalling area is broadly consistent with the range of port uses which operate in this area. The proposed use is temporary and following the use of the site as a construction ancillary facility, the land would be available for future use in accordance with the existing zoning and relevant strategic planning documents.

As the proposed use of the White Bay civil site would form part of the project, which has been designated critical State significant infrastructure under Part 5.1 of the EP&A Act, for which development consent is not required under Part 4 of the EP&A Act, the provisions of environmental planning instruments (including SREP 26) do not apply. Notwithstanding this and consistent with the EIS, the provisions of SREP 26 have been considered against the proposed use for infrastructure purposes (including construction activities that support the development of infrastructure) as good environmental assessment practice.

The land uses and zoning provisions at the site are anticipated to undergo substantial transformation over the coming decades as a result of a number of infrastructure and urban renewal projects, including the future development of The Bays Precinct, in consideration of *The Bays Precinct Transformation Plan*. The site is located within the White Bay Power Station destination under *The Bays Precinct Transformation Plan*, which is identified as an immediate priority destination (2015-2019). Plans for the White Bay Power Station destination under *The Bays Precinct Transformation Plan* include:

- Providing a hub for knowledge-intensive and advanced technological industries
- Adaptively re-using the White Bay Power Station
- Providing housing choices to support and attract talent for a knowledge-intensive destination
- Merging with The Bays Waterfront Promenade in a new activated forecourt that provides access to the water
- Reviewing opportunities for a new ferry service.

The Bays Precinct Transformation Plan anticipates the potential temporary use of adjacent Glebe Island precinct as construction logistics sites for major infrastructure projects.

Potential impacts

The site is located on NSW Government owned land and is only required during construction. The site is a vacant piece of land adjacent to the Glebe Island precinct and would be used to support construction of a major infrastructure project, being the M4-M5 Link. The site would only be used during construction of the M4-M5 Link project and would be reinstated and returned to the Port Authority of NSW in accordance with the conditions of the licence (currently under negotiation), following use of the site as a construction ancillary facility. The site would not preclude the features of *The Bays Precinct Transformation Plan* that are proposed for this precinct.

There is potential that use of the site as a construction ancillary facility may compromise the ability to redevelop the precinct in the short term as identified in *The Bays Precinct Transformation Plan*. However, the site would only comprise a small part of the overall White Bay Power Station destination precinct, would only be used temporarily during construction of the M4-M5 Link project and would not affect any proposal to adaptively re-use the adjacent White Bay Power Station in the longer term in accordance with *The Bays Precinct Transformation Plan*.

Future development of the site is outside the scope of the M4-M5 Link project and would be subject to separate development assessment and approval and the restrictions of the relevant consent authority.

Environmental management measures

Potential land use and property impacts from the use of the White Bay civil site would not require additional management measures to those already outlined in **Chapter E1** (Environmental management measures).

D2.4.4 Urban design and visual amenity

Existing environment

The existing visual and landscape character environment surrounding the White Bay civil site is described in **section D2.2**. The existing night lighting environment at the White Bay civil site is influenced by street lighting associated with Sommerville Road, Robert Street, Victoria Road, Anzac Bridge and associated vehicular traffic (although likely infrequent during the night), light spill from the White Bay Power Station from the west (as the building is vacant, this would primarily be limited to security lighting) and ports use from the east and illuminated windows and signs of commercial properties on Robert Street.

Potential impacts

Lighting at the site would be provided via the use of temporary lighting equipment and would likely be located around the site margins, gatehouse and amenities.

The method for assessing night lighting impacts was undertaken by applying the methodology for assessment of visual impacts adopted in the EIS. Further information regarding this methodology is provided in section 13.2 of Chapter 13 (Urban design and visual amenity) of the EIS.

Table D2-26 presents an assessment of the potential night lighting impact of the use of the White Bay civil site on relevant representative receiver locations.

Table D2-26 Summary of night lighting impacts from the White Bay civil site during use of the site

Receiver		Sensitivity to change	Magnitude of change	Overall impact rating
White Bay civil site (C11)				
C11-1	Residents – Mansfield and Batty streets, Rozelle and Balmain	Moderate	Low	Moderate-low
C11-2	Commercial tenants – Robert Street, Rozelle	Low	Negligible	Negligible

The night lighting impacts of the White Bay civil site would have a moderate to low impact on residents on Mansfield and Batty streets that are elevated and have views down into the site. These receivers would already experience lighting impacts at night from other activities associated with ports uses and would only be impacted for the duration of use of the site. The commercial receivers along Robert Street are unlikely to be present at night and would be less sensitive to potential lighting impacts if they are present.

While there is no potential microbat roosting habitat on the White Bay civil site, microbat species have however been recorded in the surrounding area, and therefore may be present in surrounding areas, and such, indirectly impacted, from night lighting during use of the site. These potential impacts are not expected to be significant, as microbats are highly mobile species.

Environmental management measures

At the White Bay civil site, lighting would be designed in accordance with standards outlined in the EIS to minimise light spillage to surrounding properties and would be generally consistent with the requirements of AS 4282-1997 Control of the obtrusive effects of outdoor lighting (see environmental management measure LV2 in **Chapter E1** (Environmental management measures)). The impact of lighting from the use of the site on pedestrians has not been further assessed due to the relatively low number of pedestrians walking at night for recreation in this area and given that the general public has limited access to the site and surrounding area.

D2.4.5 Contamination

Existing environment

The White Bay civil site is located outside the project footprint as assessed in the EIS and within an area of previous industrial land use which may be potentially contaminated.

Previous contamination investigations undertaken as part of The Bays Precinct Urban Transformation Program, including the area of White Bay, identified a potential risk of contamination within this area given the extent of historic reclamation and previous industrial land use (JBS&G 2015). Potential contaminants of concern identified include heavy metals, total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAHs) and asbestos. These potential contaminants of concern were identified from the ground surface to a depth of around two metres.

Potential impacts

Excavation required at this site would be relatively shallow for the demolition and replacement of hardstand surface, to a depth of up to around 500 millimetres. Potential contaminants of concern may therefore be intercepted.

It is likely that contaminated material would be classified and transported off-site to be disposed of appropriately. However, if on-site treatment is determined to be the preferred option during detailed design/construction, given the limited depth of excavation it is not expected that significant volumes of soils would need to be treated on-site and therefore the site would have sufficient area to allow this to occur.

The site is also located in an area mapped as Class 1 acid sulfate soils where acid sulfate soils are likely to be found on and below the natural ground surface and where any works would trigger the requirement for assessment and may require management.

Environmental management measures

Potential contamination impacts would be managed in accordance with the management measures outlined in the EIS, including investigation and management of potentially contaminated areas directly affected by the project in accordance with the *Contaminated Land Management Act 1997* (NSW). This includes the preparation of a Remediation Action Plan if construction works in areas of potential contamination pose a risk to human or ecological receptors (see environmental management measure CM01 in **Chapter E1** (Environmental management measures)). Potential contamination would also be managed in accordance with environmental management measure CM02 (Asbestos Management Plan), environmental management measure CM06 (Unidentified contamination protocols) and environmental management measure CM07 (Construction Soil and Water Management Plan) in **Chapter E1** (Environmental management measures).

Potential acid sulfate soils at this site would be managed in line with procedures prepared in accordance with the requirements of the Acid Sulfate Soil Manual (Acid Sulfate Soil Management Advisory Committee 1998), as outlined in the CSWMP (see environmental management measures SW11 and CM07 in **Chapter E1** (Environmental management measures)).

D2.4.6 Non-Aboriginal heritage

Existing environment

A historical overview, description of the historical archaeology and detailed description associated with the White Bay Power Station and immediate surrounds is provided in detail in section 4.4.4, section 5.5 and section 6.7.4 of Appendix U (Technical working paper: Non-Aboriginal heritage) of the EIS respectively.

White Bay Power Station is a listed heritage item of State significance on the SHR (#01015), with associated significant archaeological components known to exist both within and outside the SHR curtilage. The item is also listed on the SREP 26 Sch. 4, Part 3 (#11) and the Ausgrid Heritage and Conservation Register (#74) under section 170 of the *Heritage Act 1977* (NSW). The heritage curtilage of the White Bay Power Station is shown in **Figure D2-1**.

The White Bay civil site is located outside the project footprint as assessed in the EIS and directly adjacent to the eastern boundary of the curtilage of the White Bay Power Station. The White Bay Power Station CMP identifies the area directly adjacent to the west of the White Bay civil site as the historical coal yards associated with the power station, and assesses this area as having little/neutral heritage significance (Grade 4) (see hatched area in **Figure D2-7**).

The northern penstock is also located in the northern part of the White Bay Power Station heritage curtilage. The White Bay Power Station CMP identifies the northern penstock as being of high significance (Grade 2) as an element of the cooling system for the White Bay Power Station, which is still substantially intact (see **Figure D2-7**).

Surviving archaeological elements associated with the White Bay Power Station include water channels associated with the northern and southern penstocks, the specific location of which are unknown. Aerial photography from 1943 shows an open channel running east from the northern penstock to White Bay to the north of the site. It is likely that this channel would have continued a westerly alignment to the White Bay Power Station and therefore it is considered unlikely that there are archaeological remains beneath the White Bay civil site. The northern penstock is located adjacent to the northern end of the White Bay civil site (see **Figure D2-7**) and the southern penstock is located within the Rozelle Rail Yards some distance to the south west of the White Bay civil site.

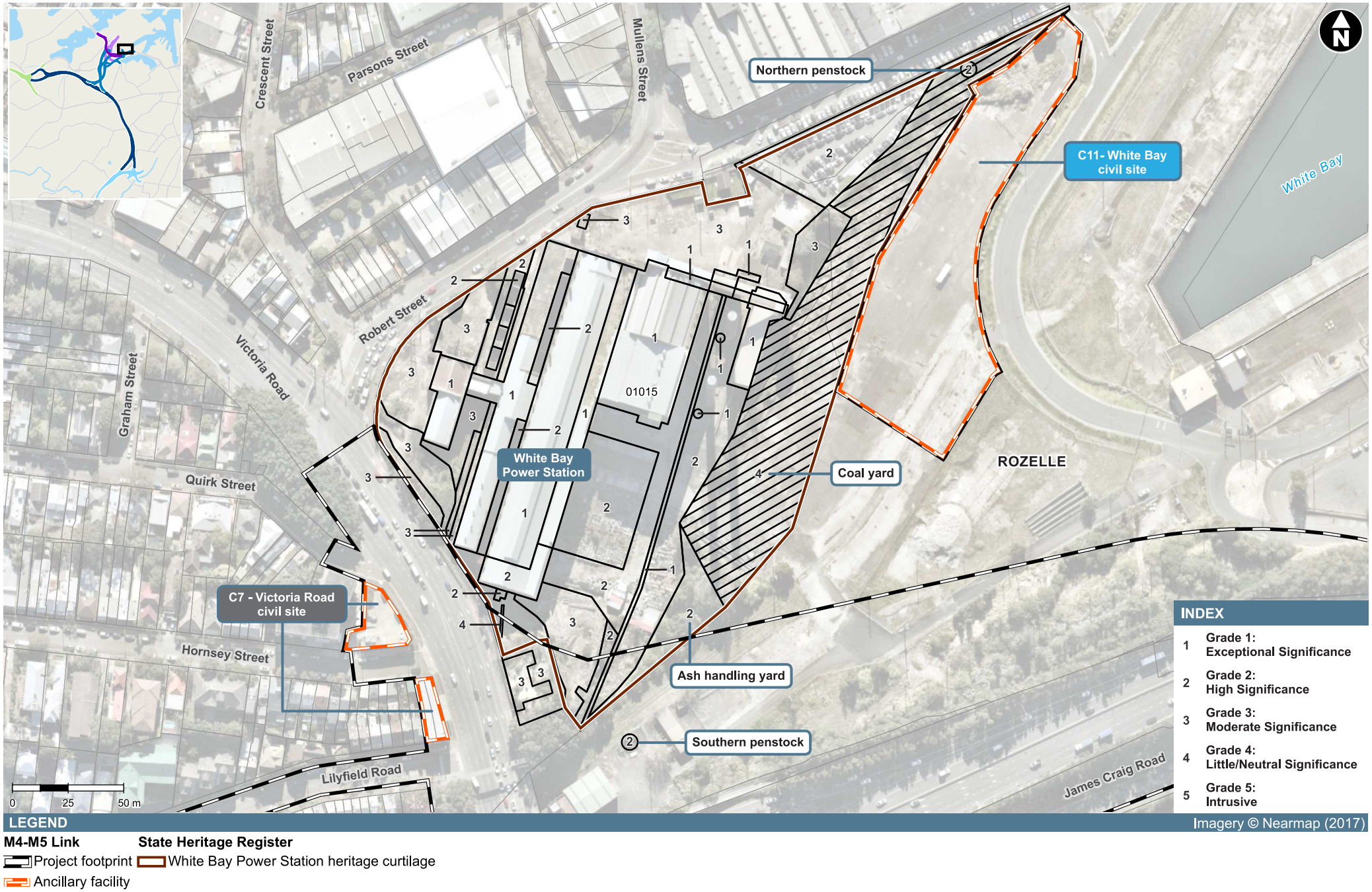


Figure D2-7 Grading of heritage significance for elements of the White Bay Power Station (source: White Bay Power Station CMP)

Potential impacts

The White Bay civil site is not within the listed heritage curtilage of the White Bay Power Station and will not directly impact on any of the associated items of conservation significance. There is potential for the White Bay civil site to have an indirect impact on the visual heritage setting of the White Bay Power Station from the presence of additional elements, such as heavy vehicles, stored machinery and laydown, fencing, lighting, the gatehouse and amenities. The main views of the White Bay Power Station that would be affected by the site are from the east (Sommerville Road and elevated parts of Anzac Bridge) and the north (Robert Street), although the view from the north is largely screened by existing hoarding and vegetation.

The visual impact of this site is described in the urban design and visual amenity section of **Table D2-3** and concludes that visual impacts of the site would be temporary and minor given the limited extent and magnitude of the works proposed and that the site is located in a visually restricted area with limited access by the general public. The site would be at least 50 metres from the power station building itself and the building would not be physically impacted by the project. In summary, the visual impact of the White Bay civil site on the White Bay Power Station would be minor and temporary.

Excavation required to prepare the site for use during construction would be shallow to facilitate the demolition of existing hardstand. This depth of excavation is unlikely to disturb any remaining features of archaeological significance associated with the coal yards used as part of the White Bay Power Station operation or water channels associated with the northern penstock. The White Bay Power Station CMP identifies the historic coal yards as having little to no heritage significance.

Some structural elements of the SHR listed White Bay Power Station, including the northern penstock, are located within the cosmetic damage minimum working distances for the vibration intensive mechanical plant proposed for the establishment of the White Bay civil site. The northern penstock is located outside the project footprint, but adjacent to the northern end of the site (see **Figure D2-7**) and would not be directly impacted by the White Bay civil site. The penstock could, however, be subject to vibration from the use of a large rockbreaker to demolish the existing hardstand and compaction equipment required to create the new hardstand. Vibration impacts occur intermittently for the duration of site establishment. The vibration assessment is conservative as it assumes the use of vibration intensive equipment at the perimeter of the site, relatively close to the northern penstock.

The main buildings of the White Bay Power Station are outside the cosmetic damage minimum working distances and would not be affected by vibration.

During operation of the site, heavy and light vehicle parking and movements to and from the site would not impact on the White Bay Power Station with regard to visual setting or vibration. There would be no operational impact of the White Bay civil site on the White Bay Power Station.

Environmental management measures

Potential non-Aboriginal heritage impacts from the use of the White Bay civil site would be managed by the environmental management measures outlined in the EIS. Additional measures to manage potential vibration impacts from the White Bay civil site are outlined in **section D2.4.1**. A full summary of the environmental management measures for the project is included in **Chapter E1** (Environmental management measures).

A condition assessment of the northern penstock will also be carried out by a heritage specialist and a structural engineer prior to any vibratory works in the vicinity that have the potential to impact on the item. The condition assessment will inform additional management measures to protect the northern penstock, if required. Any conservation works required to limit potential impacts on deteriorated fabric (loose bricks, corroded steel) will be identified and implemented prior to commencement of the relevant vibratory works in the vicinity. This is a new environmental management for the project and is included in **Chapter E1** (Environmental management measures).

Roads and Maritime will be guided by location and activity specific vibration assessment to clarify impacts and assist with the selection of appropriate management measures for the northern penstock (see environmental management measure NV4 in **Chapter E1** (Environmental management measures)). If required, potential subsurface features associated with the northern penstock would be managed in accordance with the Unexpected Heritage Finds Procedure that would be developed for the project (see environmental management measure NAH08 in **Chapter E1** (Environmental management measures)).

D2.5 Summary and conclusion

The White Bay civil site would assist in addressing concerns raised by the community, stakeholders and DP&E regarding trucks queuing on local roads and the lack of provision of construction workforce parking by the project, through the provision of a dedicated truck marshalling area and additional construction workforce parking.

Table D2-27 summarises the key potential impacts associated with the establishment and use of the White Bay civil site and how these would be managed. A full summary of the environmental management measures for the project is included in **Chapter E1** (Environmental management measures).

Environmental management measures including those outlined in **Table D2-27** would manage the potential impacts of the White Bay civil site such that the site would not have a significant impact on the surrounding community or environment.

Table D2-27 Environmental management measures for the White Bay civil site

Impact	ID	Environmental management measures	Timing
Delays and disruptions to the road network during construction	TT01	A Construction Traffic and Access Management Plan (CTAMP) will be prepared as part of the CEMP. The CTAMP will include the guidelines, general requirements and principles of traffic management to be implemented during construction. It will be prepared in accordance with Austroads Guide to Road Design (with appropriate Roads and Maritime supplements), the RTA Traffic Control at Work Sites Manual and AS1742.3: Manual of uniform traffic control devices – Part 3: Traffic control for works on roads, and any other relevant standard, guide or manual. The CTAMP will be prepared in consultation with relevant transport stakeholders and local councils.	Construction
Impacts on road network from project-related heavy vehicles movements	TT16	Develop and implement a truck management strategy (as part of the CTAMP) that: • Identifies truck marshalling areas that will be used by project-related heavy vehicles • Describes management measures for project-related heavy vehicles to avoid queuing and site-circling in adjacent streets and other potential traffic and access disruptions • Describes monitoring programs to demonstrate that project-related heavy vehicles are complying with the strategy.	Construction
Cumulative traffic impacts at White Bay	TT19 (new)	Roads and Maritime will continue to consult with the Port Authority of NSW and other stakeholders as appropriate to ensure coordination between the operation of the White Bay civil site (C11) and other relevant projects in the vicinity, including existing operations associated with port activities.	Construction
Impacts from the generation of noise and vibration	NV3	Detailed noise assessments will be carried out for all ancillary facilities required for construction of the project. The assessment will consider the proposed site layouts and noise generating activities that will occur at the facilities and assess predicted noise levels against the relevant noise management levels determined in accordance with the requirements of the *Interim Construction Noise Guideline* (ICNG) (NSW Department of Environment and Climate Change NSW (DECC) 2009). The assessments will be used to determine the appropriate heights and configurations of noise barriers, and other appropriate noise management measures, consistent with the requirements of the ICNG and the CNVG. Noise barriers, as confirmed through the noise assessments, will be installed as early as possible during site establishment and as a minimum prior to the commencement of excavation associated with tunnel access.	Construction

Impact	ID	Environmental management measures	Timing
Impacts from the generation of noise and vibration	NV4	An out-of-hours works protocol will be developed for the construction of the project. The protocol will include: • Details of works required outside standard construction hours, including justification of why the activities are required outside standard construction hours • Measures that will be implemented to manage potential impacts associated with works outside standard construction hours • Location and activity specific noise and vibration impact assessment process(es) that will be followed to identify potentially affected receivers, clarify potential impacts and select appropriate management measures • Details of the approval process (internal and external) for works proposed outside standard construction hours. The protocol will be included in the CNVMP.	Construction
Noise monitoring	NV6	Monitoring will be carried out at the commencement of activities for which a location and activity specific noise and vibration impact assessment has been prepared to confirm that actual noise and vibration levels are consistent with noise and vibration impact predictions and that the management measures that have been implemented are appropriate.	Construction
General impacts to landscape and visual amenity	LV2	Site lighting will be designed to minimise glare issues and light spillage in adjoining properties and will be generally consistent with the requirements of Australian Standard 4282-1997 Control of the obtrusive effects of outdoor lighting.	Construction
Impacts on water quality from disturbance of acid sulfate soils	SW11	Procedures, prepared in accordance with the requirements of the *Acid Sulfate Soil Manual* (Acid Sulfate Soil Management Advisory Committee 1998), will be included in the CSWMP and implemented in the event that acid sulfate soils, rocks or monosulfidic black oozes are encountered during construction of the project.	Construction
Impacts on human and/or ecological receptors through disturbance and mobilisation of contaminated material	CM01	Potentially contaminated areas directly affected by the project will be investigated and managed in accordance with the requirements of guidance endorsed under section 105 of the *Contaminated Land Management Act 1997* (NSW) (CLM Act). This includes further investigations in areas of potential contamination identified in the project footprint. If contamination posing a risk to human or ecological receptors is identified, a Remediation Action Plan will be prepared.	Construction
	CM02	Asbestos handling and management will be undertaken in accordance with an Asbestos Management Plan (or similar) prepared in accordance with relevant legislation, regulations and codes of practice as described in Chapter 23 (Resource use and waste minimisation) of the EIS.	Construction
	CM06	The discovery of previously unidentified contaminated material will be managed in accordance with an unexpected contaminated lands discovery procedure, as outlined in the *Guideline for the Management of Contamination* (Roads and Maritime 2013) and detailed in the CEMP.	Construction

Impact	ID	Environmental management measures	Timing
Impacts on soil and water quality through incorrect handling of hazardous or contaminated material	CM07	A Construction Soil and Water Management Plan will be prepared for the project including procedures to minimise the interaction of stormwater with contaminated land, including acid sulfate soils, and manage potentially contaminated stormwater runoff as described in Chapter 15 (Soil and water quality) of the EIS.	Construction
	CM08	Measures identified in Chapter 25 (Hazard and risk) of the EIS will be implemented to appropriately store contaminated materials and materials with the potential to cause contamination and reduce the potential for environmental contamination due to spills and leaks.	Construction
Impacts on flood behaviour from construction and operation	FD01	A Flood Mitigation Strategy will be prepared by a suitably qualified and experienced person in consultation with directly affected landowners, DPI-Water, State Emergency Services (SES), Sydney Water and the relevant local councils.	Construction
	FD02	Hydrologic and hydraulic assessments will be carried out for all temporary project components (including ancillary facilities) and permanent design features that have the potential to affect flood levels in the vicinity of the project. The results of the assessment will inform the preparation of the Flood Mitigation Strategy (FD01) as well as the design development of temporary and permanent works.	Construction
	FD03	Measures developed to manage potential flood impacts, as identified in the Flood Mitigation Strategy, will be incorporated into the design of temporary and permanent project components and construction and operational management systems as relevant.	
	FD10	Flood contingency measures will be prepared and implemented where construction ancillary facilities and vulnerable temporary facilities (including fuel storages, water treatment plants and substations) are located in the 20 year ARI design flood extent.	Construction
Impacts on stormwater drainage systems	FD11	Further hydrological and hydraulic modelling based on the detailed design will be undertaken to determine the ability of the receiving drainage systems to effectively convey drainage discharges from the project once operational. The modelling must be undertaken in consultation with the relevant council(s).	Construction
Impacts on stormwater drainage systems	FD12	Where drainage systems are to be upgraded or replaced during the project, existing systems will be left in place and remain operational during the process wherever possible.	Construction
	FD14	Entry points to the stormwater used by or immediately downgradient from the project sites will be inspected regularly for blockages and cleaned as required to maintain performance.	Construction
Impacts to unexpected items of potential	NAH08	Any items of potential heritage conservation significance or human remains discovered during construction will be managed in accordance with an Unexpected Heritage Finds and Humans Remains Procedure developed for the project in accordance with relevant guidance provided by the Heritage Council of NSW, the NSW Heritage Division	Construction

Impact	ID	Environmental management measures	Timing
heritage conservation significance or human remains		of OEH and the *Standard Management Procedure Unexpected Archaeological Finds* (Roads and Maritime 2015a). The procedure will detail requirements regarding notification of relevant agencies and the NSW Police and will be implemented for the duration of construction.	
Potential impact to White Bay Power Station	NAH16 (new)	A condition assessment of the northern penstock will also be carried out by a heritage specialist and a structural engineer prior to any vibratory works in the vicinity that have the potential to impact on the item. The condition assessment will inform additional management measures to protect the northern penstock, if required. Any conservation works required to limit potential impacts on deteriorated fabric (loose bricks, corroded steel) will be identified and implemented prior to commencement of the relevant vibratory works in the vicinity.	Construction
Impacts on unexpected finds of Aboriginal objects	AH1	Any items of potential Aboriginal archaeological or cultural heritage conservation significance or human remains discovered during construction will be managed in accordance with the Unexpected Heritage Finds and Humans Remains Procedure developed for the project.	Construction

D3 Relocation of the bioretention facility at Rozelle

D3.1 Overview and justification

Chapter 5 (Project description) of the EIS describes the location of permanent operational infrastructure for the project, including a bioretention facility for stormwater runoff at the informal car park within King George Park at Rozelle (adjacent to Manning Street). The bioretention facility would treat stormwater runoff generated by the surface road works along Victoria Road associated with the Iron Cove Link. An indicative layout of the bioretention facility is shown in Figure 5-43 of Chapter 5 (Project description) of the EIS. The EIS describes works involving the upgrade and formalisation of a section of the existing informal car park at this location, which would formalise around 30 car parking spaces.

The proposed location of the bioretention facility on Manning Street at Rozelle as outlined in Chapter 5 (Project description) of the EIS is on land currently subject to an undetermined Aboriginal Land Claim lodged by the Metropolitan Local Aboriginal Land Council (over Lot 662 in Deposited Plan 729277). Given the uncertainty regarding the future outcome and timing of resolution of this claim, an alternative location for the bioretention facility is proposed as described and assessed in this report.

Submissions received on the EIS also raised concerns regarding the impact of the construction of the bioretention facility within the informal car park at Manning Street on access to, and the availability of, parking for users of King George Park. This factor was also considered in the decision to propose relocating the facility.

D3.2 Description of change

For the reasons stated above, it is proposed to relocate the bioretention facility around 150 metres north of the location presented in the EIS, to an area adjacent to Victoria Road at the eastern abutment of Iron Cove Bridge and within King George Park, as shown in **Figure D3-1**. Part of the land that would be occupied by the bioretention facility at this location is partially outside the project footprint assessed in the EIS. A photo of the new proposed location is provided in **Figure D3-2**. An indicative cross-section of the bioretention facility is shown in **Figure D3-3**.

This area generally slopes down toward Iron Cove, with the highest point on the northern side comprising an embankment adjacent to the eastern abutment of Iron Cove Bridge. The area is bounded by Victoria Road to the north and a shared path (the Bay Run) to the south. A minor realignment to the south of this section of the Bay Run would be required to accommodate the bioretention facility as well as works along Victoria Road. The Bay Run connection with Iron Cove Bridge would be retained, with a temporary connection during construction (refer to Chapter 6 (Construction work) of the EIS) with a minor realignment to the south in the permanent design. The existing seating along this section of the path would be reinstated on completion of the works.

The design and arrangement of the bioretention facility is generally consistent with that outlined in the EIS. The bioretention facility would be constructed in a similar manner to that proposed in the EIS and provide the same level of water quality treatment. Due to the grade in this area, some earthworks would be required to establish a level surface. There are opportunities to optimise landscaping outcomes at this location which would be confirmed during detailed design.

There is potential to connect the bioretention facility to an existing drainage outlet to Iron Cove near Iron Cove Bridge to avoid the need to construct a new outlet. The suitability of connecting to this existing outlet would be confirmed during detailed design. The installation of a new underground drainage connection and outlet at Iron Cove has been assessed in the event that connecting to the existing outlet is not feasible. Although the Utilities Management Strategy did not contemplate these drainage works at Iron Cove (refer to Chapter 5 in Appendix F (Utilities Management Strategy) of the EIS), if required, the new drainage connection would be subject to the requirements outlined in the Utilities Management Strategy.

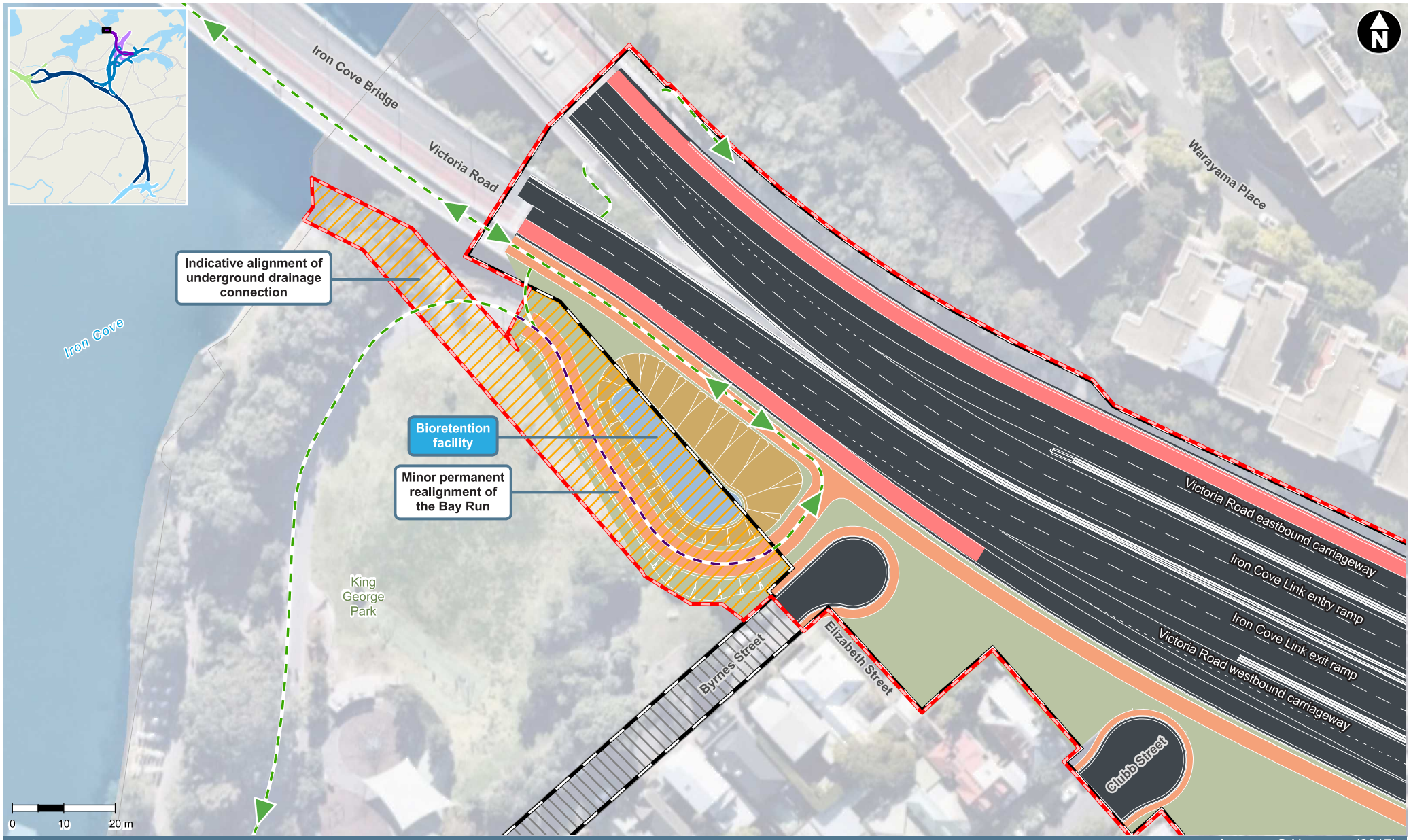


Figure D3-1 Revised location for the bioretention facility at Rozelle near the Iron Cove Bridge

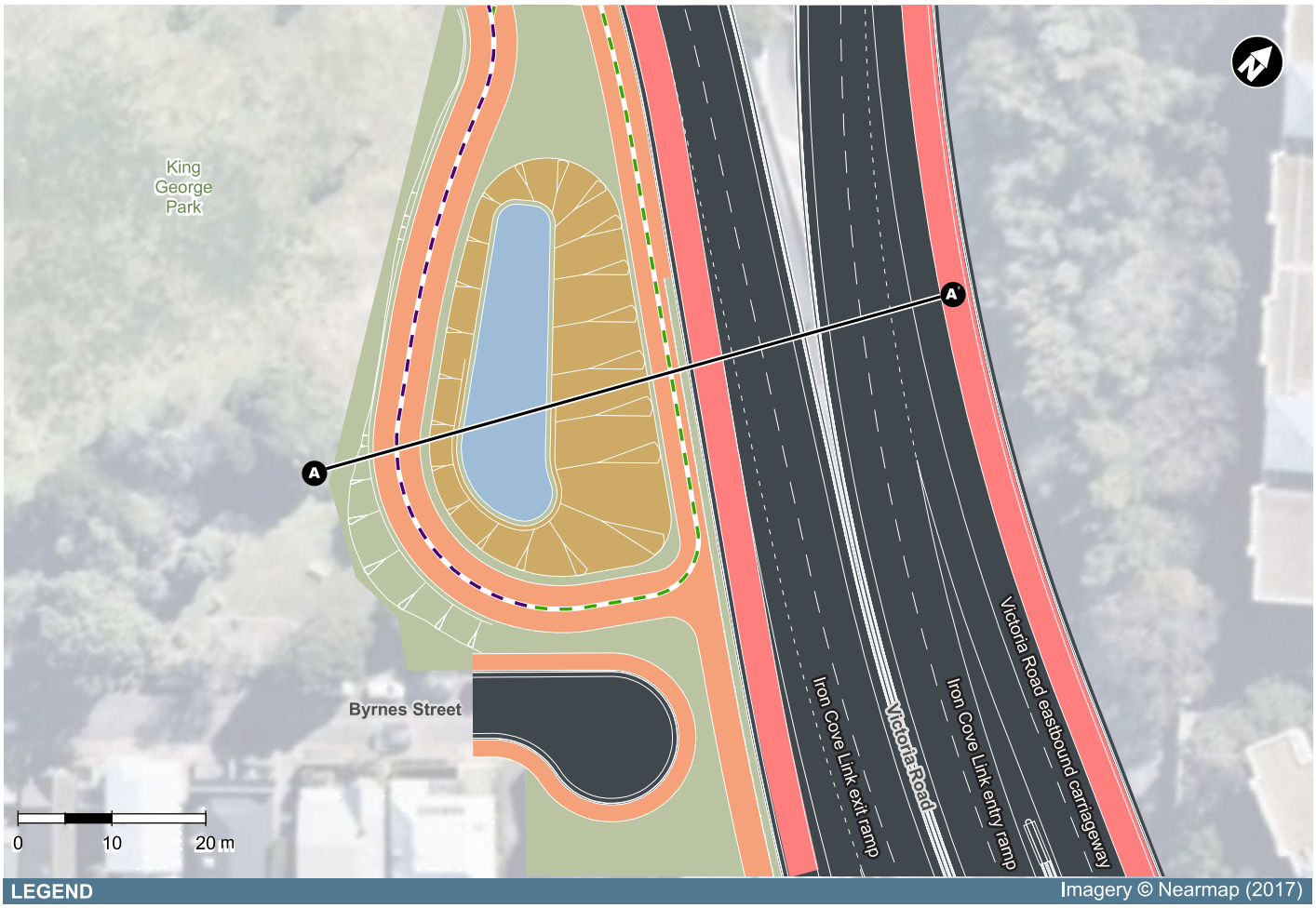
Figure D3-2 Photo showing the area within King George Park where the bioretention facility would be established

The bioretention facility would be designed to filter low flow runoff events. Drainage from Victoria Road would flow via the existing and modified stormwater system towards the bioretention system. Low flows (up to a three month ARI event) would be directed to the bioretention facility. Flows above the three month ARI event and up to around a 10 year ARI event would bypass the bioretention facility and discharge towards Iron Cove. Water levels would rise to around 300 millimetres in the facility before they would start to overflow into a grated inlet. The grated inlet would be oversized and designed to prevent risk of full blockage to avoid water levels rising in the facility.

If a new outlet to Iron Cove is required, the likely construction method would be to deconstruct a section of the sea wall, lay the pipe and then reconstruct the sea wall around it. A dissipation structure could be put in a pit to slow the water down and then some scour protection, most likely rock rip rap, would be placed in the sea bed around the outlet.

To construct the bioretention facility, construction vehicles would access the site via Victoria Road and the Iron Cove Link civil site (C8). Where feasible, construction vehicles would not use local surrounding roads, including Byrnes Street, Clubb Street, Toelle Street, Callan Street, Springside Street and Manning Street for construction of the bioretention facility. If possible, the facility would be constructed following site establishment of the Iron Cove Link civil site to enable direct access from the civil site via Victoria Road, where feasible. It is anticipated that it would take around three months to construct.

As a result of relocating the bioretention facility, the existing informal car park at Manning Street would remain in its current condition and would not be altered by the project. The drainage works proposed in the EIS along Byrnes Street for the bioretention facility previously proposed adjacent to Manning Street would no longer be required (see **Figure D3-1**).



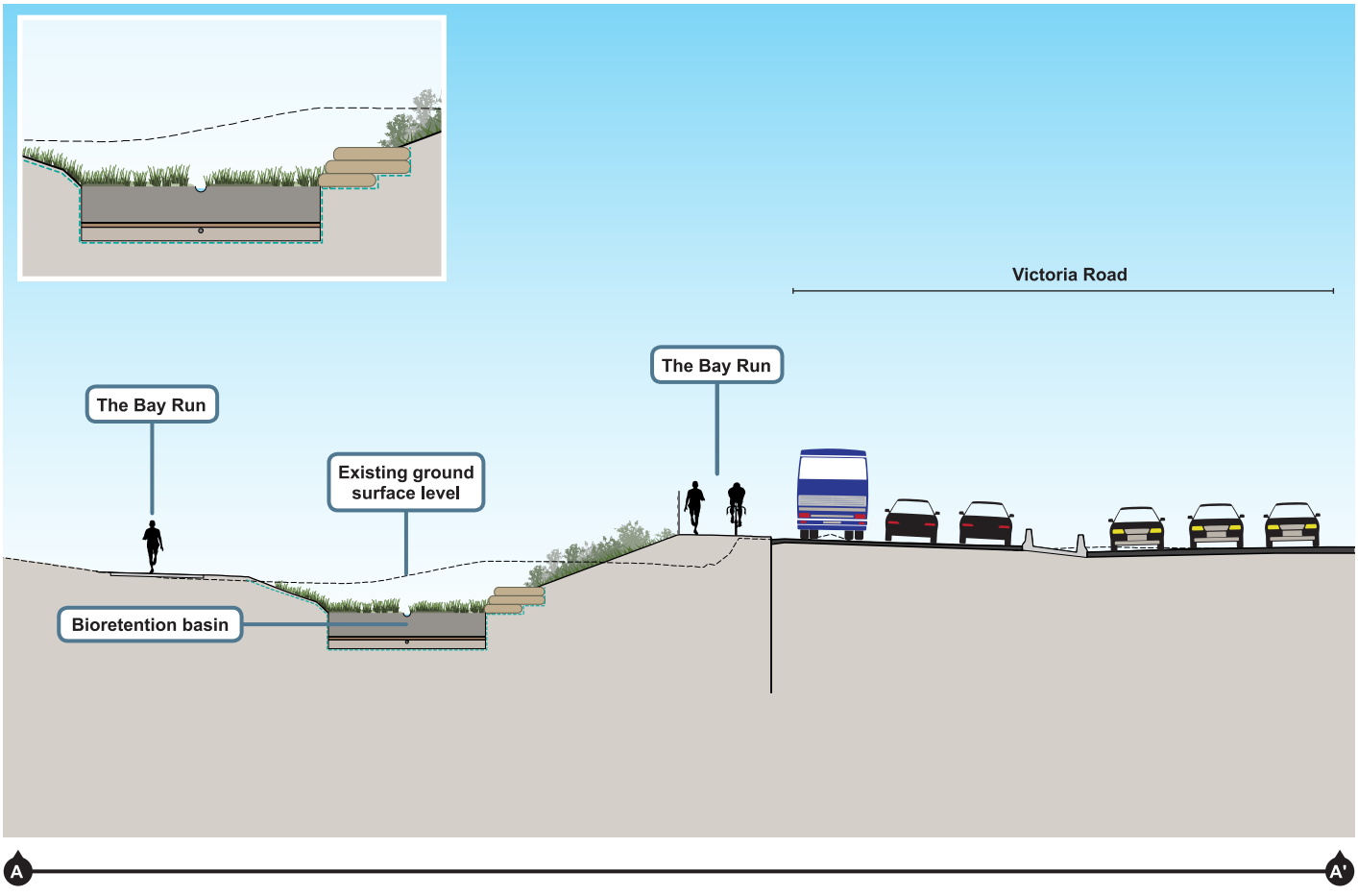


Figure D3-3 Indicative cross-section for the relocated bioretention facility at Rozelle

D3.3 Environmental impact screening

Table D3-1 presents a screening assessment of the relocation of the bioretention facility at Rozelle with regard to changed or additional potential environmental impacts. Environmental aspects that require further assessment (compared to the assessment in the EIS) to understand likely environmental impacts have been identified.

Where there are no changes to, or additional impacts anticipated from this project change (compared to the assessment in the EIS), an explanation has been provided. Where changes to, or additional impacts are anticipated, an assessment of these potential impacts is provided in **section D3.4**.

Environmental management measures proposed as a result of this project change are outlined in **section D3.5**. A full summary of the environmental management measures for the project is included in **Chapter E1** (Environmental management measures).

Table D3-1 Relocation of the bioretention facility at Rozelle – environmental impact screening

Aspect	Further detailed assessment required? See section D3.4	Description
Traffic and transport	No	**Construction vehicle access** Relocating the bioretention facility would mean that local roads would not be used to access the previously location proposed for the facility adjacent to Manning Street. Access to the relocated facility would be via Victoria Road or the Iron Cove Link civil site (C8). Where feasible, trucks would not use adjacent local roads including Byrnes, Clubb, Toelle, Callan and Manning streets, for site access. This would minimise impacts to parking and access along these streets. **Parking** The existing informal car park at Manning Street would remain in its current condition and would not be altered by the project. The temporary loss of parking availability at the informal car park described in the EIS would not occur. **The Bay Run** During construction, a portion of the Bay Run would be slightly adjusted to facilitate construction of the bioretention facility. The permanent realignment would be consistent with that described and assessed in Chapter 5 (Project description) of the EIS and access along the Bay Run would be maintained throughout construction. Other pedestrian paths that cross under Iron Cove Bridge would not be impacted. Relocation of the bioretention facility would reduce potential traffic, parking and access impacts on local residents and users of King George Park on the southern side of Victoria Road near Manning Street when compared to the original proposal in the EIS. Further assessment of this aspect is not considered necessary.
Air quality	No	The potential air quality impacts of relocating the bioretention facility would be negligible and would be consistent with those assessed in the EIS for the bioretention facility originally proposed adjacent to Manning Street. Construction work at the revised location would avoid potential air quality impacts, such as dust generation, around the informal car park. Potential air quality impacts at the revised location would be managed as part of general construction works at this location in accordance with the

Aspect	Further detailed assessment required? See section D3.4	Description
		dust management measures outlined in **Chapter E1** (Environmental management measures). Further assessment of this aspect is not considered necessary.
Noise and vibration	No	Noise generated during construction of the bioretention facility would be consistent with noise generated from other construction works in the same area, such as operation of the Iron Cove Link civil site (C8) and widening of Victoria Road, as assessed in the EIS. The EIS construction activity ICL-11 (earthworks and drainage) (refer to Chapter 10 (Noise and vibration) of the EIS) is considered to be representative of the works required to construct the bioretention facility and would result in a similar level of impact to the same receivers. Impacts from construction of the bioretention facility would generally be limited to receivers on Byrnes Street and users of King George Park, both of which are identified in Chapter 10 (Noise and vibration) of the EIS as being impacted by construction works. Construction of the bioretention facility would be undertaken during standard construction hours and for a limited duration of around three months. Impacts associated with the works would be managed through implementation of the mitigation and management measures outlined in **Chapter E1** (Environmental management measures) for construction activities that would occur during standard construction hours only.
Human health risk	No	The relocated bioretention facility would not result in any additional human health impacts with dust impacts expected to be minor and managed by the measures outlined in **Chapter E1** (Environmental management measures). Potential noise impacts would be similar to those assessed for the previous location, and there would be no highly affected noise receivers. Further assessment of this aspect is not considered necessary.
Land use and property	Yes	The relocated bioretention facility would be partly located on land outside the project footprint assessed in the EIS. **Figure D3-1** shows the additional land required, and the land no longer required by the relocation of the bioretention facility. The new drainage pipe (if required) would be located outside the EIS project footprint, however this would be below ground and not permanently affect the use of this area of King George Park. This land is Crown land and under the care and control of Inner West Council and Roads and Maritime. This area contains primarily passive open space and landscaping areas, however there is public seating that would be relocated. There are no active open space areas or playground facilities which would be impacted (other than the Bay Run, which would be realigned). The bioretention facility would not diminish the recreational use of King George Park. Further assessment of this aspect is provided in **section D3.4.1**.
Urban design and visual amenity	No	The relocated bioretention facility would result in a minor change to the visual amenity of the area during construction and operation. During construction, receivers using adjacent areas of King George Park, the Bay Run and residents along Byrnes Street would likely experience visual amenity impacts, however

Aspect	Further detailed assessment required? See section D3.4	Description
		these would be consistent with other construction activities happening in this area such as the widening of Victoria Road. These would also occur for a limited duration of around three months. During operation, there would be a minor change to the landscape character with the introduction of a wetland, which is generally consistent with the character of the existing open space and landscaping. Following completion of construction, this location would be landscaped in accordance with the relevant M4-M5 Link Urban Design and Landscape Plan (UDLP) and in consultation with the Inner West Council. Further assessment is not considered necessary.
Social and economic	No	The relocated bioretention facility would potentially impact recreational users of adjacent areas of King George Park and the Bay Run during construction. These impacts would be consistent with those assessed in the EIS for similar construction activities in this area, such as the widening of Victoria Road and would therefore be managed via management measures outlined in **Chapter E1** (Environmental management measures). These would also occur for a limited duration of around three months. No change in access for residents at the northern end of Byrnes Street near Victoria Road is expected during construction of the bioretention facility. The increase in the project footprint in this location would not significantly affect the use of this section of King George Park during operation. Further assessment of this aspect is not considered necessary.
Soil and water quality	Yes	The bioretention facility would treat surface water runoff from the same catchment of Victoria Road as the facility described in the EIS and would be designed with similar dimensions and features. The water from the relocated facility would be discharged into Iron Cove but at a different location compared to the facility described in the EIS. As the catchment area and bioretention facility designs and dimensions would be almost identical, the quality of the water discharged would also be almost identical. Flows above the three month ARI event and up to around a 10 year ARI event would bypass the bioretention facility and discharge towards Iron Cove via the drainage connection as described **section D3.2**. The construction of a new outlet to Iron Cove for the relocated facility would have the potential to result in scouring and mobilisation of sediments within the receiving waters. This potential impact, however, would be managed via management measures outlined in **Chapter E1** (Environmental management measures) with regard to potential scouring (where there is potential for similar impacts at Rozelle Bay). Further assessment of this aspect is provided in **section D3.4.2**.
Contamination	No	The relocation of the bioretention facility at Rozelle would potentially result in additional contamination impacts to those assessed in the EIS given the site is partially located outside the project footprint and within an area which may be potentially contaminated. Further assessment of this aspect is provided in **section D3.4.3**.

Aspect	Further detailed assessment required? See section D3.4	Description
Flooding and drainage	No	The relocated bioretention facility would not change the flooding and drainage impacts assessed in the EIS. In the event of a large rainfall event where the capacity of the facility is reached, stormwater would either overflow into the drainage connection pipe, or flow as overland flow towards Iron Cove. The facility would not decrease floodplain storage and would not adversely impact peak flood levels. Further assessment of this aspect is not considered necessary.
Biodiversity	Yes	The revised location for the bioretention facility would require a small amount of additional clearing of vegetation from King George Park. Some of this vegetation was considered in the EIS assessment and comprises landscaping that was planted at the time the duplication of Iron Cove Bridge was completed. Other vegetation near Iron Cove that may require clearing to accommodate the new drainage outlet is outside the project footprint and was not included in the EIS assessment. Following completion of construction, this location would be landscaped in accordance with the relevant M4-M5 Link UDLP. Further assessment of this aspect is provided in **section D3.4.3**.
Groundwater	No	The revised location for the bioretention facility would not result in any additional groundwater impacts, as excavation would be shallow and would not intercept groundwater. Further assessment of this aspect is not considered necessary.
Non-Aboriginal heritage	No	No heritage items or conservation areas would be directly impacted by the revised location for the bioretention facility. The bioretention facility would have a negligible visual impact on Iron Cove Bridge as the heritage listed section of the bridge (older section listed under the SREP (Sydney Harbour Catchment) 2005 and RTA Heritage and Conservation Register under section 170 of the *Heritage Act 1977* (NSW) is located on the opposite (northern) side of Victoria Road. The new drainage pipe (if required) would be located below ground and away from the sandstone bridge abutments associated with the original bridge structure. Further assessment of this aspect is not considered necessary.
Aboriginal heritage	No	The area of the relocated facility has been previously disturbed and is unlikely to contain remaining features of Aboriginal heritage significance. There are no registered AHIMS sites recorded on or adjacent to this area. The relocated bioretention facility would avoid an area currently subject to an undetermined Aboriginal Land Claim in a section of King George Park adjacent to Manning Street. While this would result in a minor change to the impacts assessed in the EIS, this change would not result in any impact to features of Aboriginal heritage significance. Therefore, further assessment of this aspect is not considered necessary.
Greenhouse gas	No	The relocated bioretention facility would not substantially alter construction effort compared to the location assessed in the EIS. As a result it would have a negligible impact on the generation of greenhouse gases. Further assessment of this aspect is not considered necessary.

Aspect	Further detailed assessment required? See section D3.4	Description
Resource use and waste minimisation	No	The relocated bioretention facility would not generate substantially different volumes of waste materials or substantially change the use of resources compared to that assessed in the EIS. Further assessment of this aspect is not considered necessary.
Climate change and risk adaptation	No	The relocated bioretention facility would not change the climate risk profile of the project. Further assessment is not considered necessary.
Hazard and risk	No	The bioretention facility would be designed with consideration of the health and safety risks of a publicly accessible area, including maintaining a shallow maximum permissible water level and providing appropriate batter and edge treatments. The relocated bioretention facility would not involve any change to the proposed storage and use of hazardous substances and dangerous goods. Further assessment of this aspect is not considered necessary.
Cumulative impacts	No	The relocated bioretention facility would not result in any significant changes to or additional cumulative impacts compared to that assessed in the EIS.

D3.4 Further detailed impact assessment

D3.4.1 Land use and property

Existing environment

A description of the existing environment with regard to land use is provided in section 12.2 of the EIS. This area is zoned Public Recreation under the *Leichhardt Local Environmental Plan 2013*.

Potential impacts

Part of the bioretention facility would be located on land partially outside the EIS project footprint, as shown on **Figure D3-1**. This land is Crown land and under the care and control of Inner West Council and Roads and Maritime. The new drainage pipe providing a connection between the bioretention facility and Iron Cove would be located below ground and would not permanently affect the use of this area of King George Park.

This area is currently landscaped, provides public seating and is used for passive recreation (see **Figure D3-2**). The Bay Run would be slightly realigned to accommodate the construction and operation of the bioretention facility. The change in alignment compared to that assessed in the EIS would be negligible. The existing park seating would be relocated to a nearby location.

The design for the widening of Victoria Road at the eastern abutment of Iron Cove Bridge as described in the EIS would permanently impact around 1,494 square metres of King George Park. With the bioretention facility now proposed to be located in this area, the project would permanently impact around 2,259 square metres of King George Park. This area comprises around five per cent of the total area of King George Park, leaving around 42,611 square metres (or around 95 per cent) of King George Park not permanently impacted by the project. During operation, this area would be landscaped and would appear as part of King George Park.

Considering that King George Park comprises numerous areas of passive open space and that no areas of active open space or recreational facilities would be impacted (ie children's playgrounds), this impact is considered minor and would not significantly affect the use of this area of King George Park. Further, this area would be offset through the provision of land south of the realigned Victoria Road carriageway (between Springside Street and Byrnes Street) that may include areas of open space such as passive recreational facilities. The urban design and landscape concept for this land would be determined during the development of the UDLP for this area. Refer to Chapter 13 (Urban design and visual amenity) of the EIS for further details about open space that would be provided at this location.

The bioretention facility would introduce new permanent operational infrastructure adjacent to Victoria Road at the eastern abutment of Iron Cove Bridge within King George Park. Notwithstanding the minor realignment of the Bay Run and loss of a small area of passive open space, public recreation areas adjacent to the proposed facility, such as the children's playground and the Bay Run, would remain and would not be affected during construction. The bioretention facility would be designed to be visually compatible with its setting in an area of open space in King George Park. Disturbed areas adjacent to the works would be landscaped in accordance with the relevant UDLP that will be prepared for the project.

This Public recreation zoning, land tenure (Crown land) and use of King George Park for public recreation limits the potential for development of the site for other uses. The potential for construction of the bioretention facility to significantly affect the development potential of the site would therefore be low.

Environmental management measures

Potential property and land use impacts from the relocation of the bioretention facility would be managed by the environmental management measures outlined in the EIS and summarised in **Chapter E1** (Environmental management measures). This includes the preparation of UDLPs for operational project infrastructure including final landscape works and architectural design in consultation with relevant councils, stakeholders and the community (environmental management measure UD1). No additional measures are required.

D3.4.2 Soil and water quality

Existing environment

The existing environment with regard to soil characteristics and receiving waterways for the project is described in section 15.2 of the EIS. The proposed bioretention facility would be located within colluvial soil derived from the Hawkesbury soil landscape (subject to high erosion potential) and within an area identified as Class 5: Acid sulfate soils (acid sulfate soils are not typically found in Class 5 areas). Relevant catchments include the Iron Cove catchment and larger Sydney Harbour and Parramatta River catchment. Runoff from the site would drain to Iron Cove (refer to Figure 15-1 in Chapter 15 (Soil and water quality) of the EIS).

Potential impacts

Soil

The potential construction erosion and sedimentation impacts of the relocation of the bioretention facility are consistent with those assessed in Chapter 15 (Soil and water quality) of the EIS.

The project footprint from the EIS at this location would have been subject to soil disturbance from the surface works associated with the widening of Victoria Road and the Iron Cove Link civil site. Installation of the bioretention facility at this location would result in soil disturbance over a slightly larger area (around 1,600 square metres). The additional soil disturbance has the potential to result in increased erosion within the works areas and increased sedimentation in Iron Cove if not appropriately managed.

The environmental management measures in the EIS, however, are considered to be appropriate to manage erosion and minimise the potential for sedimentation impacts in Iron Cove due to the works. Erosion and sediment control plans would be prepared in accordance with the Blue Book and implemented during the works. All disturbed surfaces would be stabilised at the completion of construction of the facility and maintained during operation of the facility, minimising the potential for erosion and sedimentation.

Soils would not be impacted during project operation.

Water quality

The design and arrangement of the bioretention facility is consistent with that outlined in the EIS, with the facility being relocated around 150 metres north of the original location described in the EIS, at the eastern abutment of Iron Cove Bridge. The bioretention facility would provide the same level of treatment as that assessed in the EIS. The potential construction water quality impacts of the relocation of the bioretention facility are therefore consistent with those assessed in Chapter 15 (Soil and water quality) of the EIS.

The purpose of the bioretention facility is to treat surface water run-off from the widened section of Victoria Road before it discharges to Iron Cove, thereby improving water quality. The existing drainage outlet that will be subject to increased inflow from the project will be assessed. If necessary, energy dissipation or scour protection will be added at the existing outlet to prevent sediment disturbance and resuspension in Iron Cove. See environmental management measure OSW18 in **Chapter E1** (Environmental management measures). The existing outlet to Iron Cove is shown in **Figure D3-4**.

If required, the new drainage pipe outlet has the potential to result in sediment plumes and mobilisation of sediment in Iron Cove if not constructed or managed appropriately. To manage these potential impacts, a site specific erosion and sediment control plan will be prepared in accordance with the Blue Book and implemented to reduce erosion and prevent sedimentation in Iron Cove.

The new discharge outlet (if required) will be designed with appropriate energy dissipation and scour protection measures as required to minimise the potential for sediment disturbance and resuspension in the receiving waters as identified in environmental management measure OSW17 in **Chapter E1** (Environmental management measures).

Potential operational water quality impacts of the relocation of the bioretention facility would also be consistent with those assessed in Chapter 15 (Soil and water quality) of the EIS, however, at a new location.

Figure D3-4 Photo of the existing drainage outlet at Iron Cove

Environmental management measures

Potential erosion and sedimentation impacts during construction of the bioretention facility would be managed via the management measures outlined in the EIS and consolidated in **Chapter E1** (Environmental management measures). Measures will be consistent with *Managing Urban Stormwater: Soils and Construction Volume 1* (Landcom 2004) and *Managing Urban Stormwater: Soils and Construction Volume 2* (NSW Department of Environment and Climate Change 2008a), commonly referred to as the Blue Book.

No additional management measures are proposed to manage the potential soil and water quality impacts of the relocated bioretention facility.

D3.4.3 Contamination

Existing environment

Former land uses resulting in potential contamination in this general area include underground petroleum storage systems and the demolition of former buildings (potentially containing asbestos or lead paint). The contamination assessment in the EIS identified the project footprint at this location, for the Iron Cove Link civil site, as a medium contamination risk. The proposed footprint of the facility extends slightly outside the project footprint assessed in the EIS. The proposed location for the bioretention facility would partly impact on a grassed mound to the south of the Bay Run shared path, which was likely created during construction of the duplication of Iron Cove Bridge, using fill material.

A contamination assessment was carried out for the Victoria Road Upgrade Project (Golder Associates 2008), which included the construction of a new bridge over Iron Cove. The assessment included the drilling of boreholes, including two boreholes on the southern side of Victoria Road near the proposed location of the bioretention facility. Boreholes were drilled to depths of up to eight metres and soil samples were collected and analysed for identified contaminants of concern. The assessment identified that the soil samples closest to the proposed location of the bioretention facility at the eastern abutment of Iron Cove Bridge were nominated as general solid waste for the purpose of offsite disposal.

In addition, the King George Park Draft Plan of Management (Leichhardt Municipal Council 2012) includes a description of historical uses of the area. Prior to the 1900s, the area now referred to as King George Park was comprised of tidal mudflats off the main body of Iron Cove, with the adjoining gentle slopes being used for farming. The park itself was proclaimed in 1912 and was used as a United States servicemen's encampment during World War II. Since 1970 it has been used predominantly for active and passive recreation.

Potential impacts

Excavation required at this site has the potential to intercept contaminants of concern. It is likely that contaminated material would be classified and transported off-site to be disposed of appropriately. However, if on-site treatment is determined to be the preferred option during detailed design/construction, given the limited depth of excavation it is not expected that significant volumes of soils would need to be treated on-site and therefore the site would have sufficient area to allow this to occur.

The site is located in an area mapped as Class 5 acid sulfate soils, where acid sulfate soils are unlikely to be present.

Environmental management measures

Potential contamination at this area would be managed via management measures outlined in the EIS, including investigation and management of potentially contaminated areas in accordance with the *Contaminated Land Management Act 1997* (NSW). This may include the preparation of a Remediation Action Plan if construction works in areas of potential contamination pose a risk to human or ecological receptors (see environmental management measure CM01 in **Chapter E1** (Environmental management measures)). Potential contamination would also be managed in accordance with environmental management measure CM06 (Unidentified contamination protocols) in **Chapter E1** (Environmental management measures).

D3.4.4 Biodiversity

Existing environment

A description of the existing environment with regard to biodiversity is provided in section 18.2 of the EIS. This description considers all vegetation within the EIS project footprint, which has been mapped as urban exotic and native cover. The majority of vegetation required to be removed for the bioretention facility was considered in the EIS (the area within the EIS project footprint), however the removal of vegetation outside the EIS project footprint for the relocated facility, including along the alignment of the proposed drainage connection to Iron Cove, was not assessed in the EIS.

Ecological investigations identified vegetation at the new location as comprising species including swamp oak and swamp mahogany, which may need to be removed to construct the drainage outlet associated with the bioretention facility. If during detailed design it is feasible to connect to the existing drainage outlet, there would be no requirement to remove this vegetation. **Figure D3-1** shows the areas where the proposed bioretention facility would extend outside the EIS project footprint.

The terrestrial vegetation in this area is not listed as threatened and represents landscaped native vegetation (consistent with urban exotic and native cover that comprises the remainder of the project footprint). This vegetation has little biodiversity conservation significance, would provide limited foraging habitat for common (non-listed) fauna and it is considered unlikely that any threatened fauna species would rely on this habitat. Threatened flora are also unlikely to be present. Where trees are required to be removed, these would be replaced in accordance with the tree replacement strategy as identified in environmental management measures B6 and OB9 in **Chapter E1** (Environmental management measures).

All of Sydney Harbour and its tributaries, including Iron Cove, are mapped as Key Fish Habitat by NSW Department of Primary Industries (Fisheries). The aquatic environment where the drainage connection meets Iron Cove comprises a vertical rock seawall (similar to that within Rozelle Bay). Species commonly found in these environments and in the intertidal and subtidal zone include the Sydney Rock Oyster, Sea Lettuce and different types of macroalgae. The macroalgae expected to occur may be used by Seahorses and related species (Seadragons, Pipefish, Pipehorses, Ghostpipefish and Seamoths), however given the turbulence from boat wash and tidal movement expected at this location, these species are likely to avoid the area.

Potential impacts

If required, removal of the terrestrial vegetation from the area of the proposed bioretention facility would not have a significant impact on biodiversity values as this vegetation comprises landscaped native vegetation (urban exotic and native cover) and provides limited foraging habitat for native fauna. Where possible, the drainage pipe would be located such as to avoid and/or minimise vegetation removal.

The EIS describes that there would be no direct impacts to Iron Cove as part of the project. There is potential to connect to an existing pipe outlet that drains to Iron Cove and the suitability of this connection would be confirmed during detailed design. As a precautionary approach, this assessment assumes the installation of a new drainage connection between the bioretention facility and Iron Cove via a new underground pipe, which would discharge treated water into Iron Cove. For construction of the pipe headwall, a section of the Iron Cove seawall would be removed, which would result in the loss of and flora and fauna attached to the wall. Considering the small scale of disturbance to the seawall, this impact would be negligible.

If present, microbats under Iron Cove Bridge may be affected during construction, primarily from noise during installation of the drainage connection to Iron Cove adjacent to the bridge. The proposed works would not directly impact on the bridge structure, which may provide microbat habitat. As construction would be undertaken during standard hours, night lighting would not be used and as such, would not affect microbats in this area, if present. Microbats are also unlikely to be affected, as they are a highly mobile species and installation of the drainage connection would be a short-term activity.

During operation, water quality impacts would be consistent with those assessed in the EIS, however at a new location closer to Iron Cove Bridge. Therefore no operational impacts on biodiversity from changes in water quality at Iron Cove are expected.

Environmental management measures

These impacts are consistent with those assessed for both construction and operation in the EIS for Rozelle Bay. These additional impacts would be effectively managed by environmental management measure OB9 in **Chapter E1** (Environmental management measures), which requires the relevant UDLP to include compensatory planting for trees removed by the project.

D3.5 Summary and conclusion

The relocation of the bioretention facility would avoid land currently subject to an undetermined Aboriginal Land Claim adjacent to Manning Street in King George Park (refer to Figure 5-43 of Chapter 5 (Project description) of the EIS). This change would also address concerns raised in community submissions on the EIS relating to temporary impacts on the informal car park within King George Park adjacent to Manning Street.

As a result of the relocation of the bioretention facility at Rozelle, the need for the environmental management measure 'to provide a well-articulated, integrated car parking and landscape design for the bioretention facility in Manning Street that is place sensitive, and enhances the interface between the project and both King George Park and adjacent residences' (refer to environmental management measure LV20 in Chapter 29 (Summary of environmental management measures) of the EIS) is no longer required. This environmental management measure has been deleted from **Chapter E1** (Environmental management measures).

Table D3-2 summarises the key potential impacts associated with the relocation of the bioretention facility at Rozelle and how these would be managed. A full summary of the environmental management measures for the project is included in **Chapter E1** (Environmental management measures).

The environmental management measures outlined in **Table D3-2** would manage the potential impacts of the relocated bioretention facility such that there would be no significant impact on the surrounding community or environment. No new management measures are proposed for the relocation of the bioretention facility.

Table D3-2 Environmental management measures for the relocated bioretention facility at Rozelle

Impact	ID	Environmental management measures	Timing
Urban design of project infrastructure	UD1	Prepare an Urban Design and Landscape Plan (UDLP) for permanent built works and landscaping in consultation with relevant councils, stakeholders and the community. The construction of permanent built works will not commence until the element is included in a suitably prepared and approved UDLP, unless otherwise agreed to by the Secretary.	Construction
Impacts on surface water quality	SW01	A CSWMP will be prepared for the project. The plan will include the measures that will be implemented to manage and monitor potential surface water quality impacts during construction. The CSWMP will be developed in accordance with the principles and requirements in *Managing Urban Stormwater – Soils and Construction, Volume 1* (Landcom 2004) and Volume 2D (NSW Department of Environment, Climate Change and Water 2008), commonly referred to as the Blue Book.	Construction
Sedimentation of waterways	SW03	Erosion and Sediment Control Plans (ESCPs) will be prepared for all work sites in accordance with the Blue Book. ESCPs will be implemented in advance of site disturbance and will be updated as required as the work progresses and the sites change.	Construction
Sedimentation or scouring effects at operational discharge locations	OSW17	New discharge outlets will be designed with appropriate energy dissipation and scour protection measures as required to minimise the potential for sediment disturbance and resuspension in the receiving waters. Outlet design and energy dissipation/scour protection measures will be informed by drainage modelling.	Construction
	OSW18	Existing drainage outlets that will be subject to increased inflow from the project will be assessed. If necessary, energy dissipation or scour protection will be added to prevent sediment disturbance and resuspension in receiving waters.	Construction
Impacts on human and/or ecological receptors through disturbance and mobilisation of contaminated material	CM01	Potentially contaminated areas directly affected by the project will be investigated and managed in accordance with the requirements of guidance endorsed under section 105 of the *Contaminated Land Management Act 1997* (NSW) (CLM Act). This includes further investigations in areas of potential contamination identified in the project footprint. If contamination posing a risk to human or ecological receptors is identified, a Remediation Action Plan will be prepared.	Construction
	CM06	The discovery of previously unidentified contaminated material will be managed in accordance with an unexpected contaminated lands discovery procedure, as outlined in the *Guideline for the Management of Contamination* (Roads and Maritime 2013) and detailed in the CEMP.	Construction
Loss of trees	B6	As many trees as possible will be retained during construction. In the event that tree removal cannot be avoided, a tree replacement strategy will be prepared. Replacement trees will be included in the relevant UDLP. Opportunities for the provision of replacement trees outside the project boundary will be investigated	Construction

Impact	ID	Environmental management measures	Timing
		in consultation with local councils.	
Loss of trees	OB9	The UDLP will include compensatory planting for trees removed by the project. The plan will include: • A tree replacement strategy • Species recommendations for the landscape design to consider, including foraging trees for the Grey-headed Flying-fox • Relevant project specific rehabilitation and revegetation measures associated with the M4 East and New M5 projects, where there is an overlap in use of project footprint.	Operation

D4 Future community and stakeholder consultation

A M4-M5 Link Preferred Infrastructure Report Communication and Engagement Plan has been developed to ensure impacted communities are aware of the proposed changes to the project as described in this report. As part of the plan, the engagement tools listed in **Table D4-1** would be used.

Table D4-1 Stakeholder communication activities for project changes assessed in the PIR

Project change	Communication method	Stakeholder
White Bay civil site	Door knock	Impacted receivers
	Letter box drop	Residents and businesses in Rozelle/ Balmain as shown in **Figure D4-1**
	Briefing	Inner West Council Port Authority of NSW Sydney Boathouse Other commercial receivers (as required)
	Street meeting (if required)	Immediately impacted stakeholders
Relocation of the bioretention facility at Rozelle	Door knock	Impacted receivers
	Letter box drop	Residents in Rozelle as shown in **Figure D4-2**
	Briefing	Inner West Council Bay Run event organisers

In addition to the activities listed in **Table D4-1**, the following tools will be used to keep the community and stakeholders updated regarding the project:

- Website information updates
- Social media releases
- Update to Frequently Asked Questions (FAQs).

Figure D4-1 Approximate letter box distribution area for information regarding the White Bay civil site (C11)

Figure D4-2 Approximate letter box distribution area for information regarding the relocation of the bioretention facility at Rozelle

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