6.4.3 Noise and vibration

Assessment methodology

A qualitative assessment of potential noise and vibration impacts for the proposed modification at the Parramatta Road West and Parramatta Road East civil sites, including the use of the temporary overhead pedestrian walkway. The assessment of potential noise and vibration impacts is consistent with the methodology outlined in **section 6.3.3** and includes the NCAs described in **Table 6-23** and shown in **Figure 6-3**.

Existing environment

The existing ambient noise environment was descried in Appendix J (Technical working paper: Noise and Vibration) of the M4-M5 Link EIS. **Table 6-34** provides the Residential Noise Management NMLs applicable to the Haberfield and Ashfield area.

Table 6-34 Residential NMLs for the project

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

Assessment of potential impacts

Parramatta Road West and East civil sites

Table 6-35 provides a qualitative assessment of the noise impacts associated with the use of the sites as proposed in the modification against the use of the sites assessed in the EIS and SPIR consistent with the environmental assessment requirements. This assessment considered the differences in noise and/or vibration impacts between the equivalent work activities for each of the proposed activities.

Review of the assessment outlined in **Table 6-35** indicates that the proposed use of the Parramatta Road West and Parramatta Road East civil sites is considered to be consistent with the assessment undertaken in the M4-M5 Link EIS and SPIR and would not result in a change to the mitigation proposed for the equivalent activities.

The proposed modification would remove tunnelling activities from Parramatta Road West site and is therefore is expected to result in a reduction in the impact on nearby receivers previously predicted for these activities.

Consistent with recommendations in the M4-M5 Link EIS and SPIR, a CNVIS will be prepared based on the finalised construction methodology and will include consideration of the indicative revised layout and use of the site, including the location of specific items of plant. The CNVIS will include details of how the noise emissions from the sites will be managed to achieve compliance with the applicable noise management levels as required by condition of approval C19. Where non-compliances are predicted within the CNVIS, the contractor will explore at source noise mitigation options that may include, but are not limited to:

- Site perimeter hoarding
- Localised enclosures around noise sources
- Judicious selection of fixed plant and equipment
- Optimisation of site layout to maximise localised shielding by on-site buildings

- Positioning driveways away from sensitive receivers
- If necessary, limiting noise intensive activities during sensitive periods.

Noise and vibration impacts on receivers in the vicinity of the Parramatta Road West and Parramatta Road East civil sites were assessed in the M4-M5 Link EIS. Condition of approval (E88) requires mitigation in the form of “at-property treatment” to be offered to habitable spaces for the properties identified within the Appendix E of the conditions of approval.

Sensitive receivers adjoining the Parramatta Road East and Parramatta Road West civil sites were identified in Appendix E of the conditions of approval due to their proximity to the works associated with the construction of the M4-M5 Link project and the impacts associated with the consecutive and long-term nature of construction of the wider WestConnex program of works.

While the modification proposes the use of these sites as civil sites (with the use to be in accordance with condition C19), with the exception of noise from tunnelling activities, the noise impacts are expected to be consistent with those identified in the EIS, and would not change the boundaries defined in Appendix E of the conditions of the project approval.

Table 6-35 Qualitative consistency assessment

Activity (modification)	Description	Equivalent activity assessed in the EIS	Proposed period of work (modification)	Assessed period of work (EIS)	Comparison of impacts for proposed modification and EIS (reduced / consistent / higher)	Mitigation
Site establishment	Demolition of buildings and structures such as the workshops, awnings and stores	Yes	Standard daytime hours	Standard daytime hours	**Consistent –** The extent of the site footprint was assessed in the EIS. Several buildings located within the site may be retained for use during construction. These would be demolished at the end of construction.	Recommended mitigation methods outlined in the EIS, SPIR and conditions of approval are considered appropriate.
	Vegetation clearing and removal	Yes	Standard daytime hours	Standard daytime hours	**Consistent –** No material change to the amount of vegetation clearing described and assessed in the EIS.	
	Establishment of temporary noise attenuation measures	Yes	Standard daytime hours	Standard daytime hours	**Consistent –** The extent of the site footprint was assessed in the EIS.	
	Utility works including protection and/or adjustment of existing utilities	Yes	All periods	Standard daytime hours All time periods	**Consistent –** EIS assessed utility works required within the compound. As there is no requirement for the site to provide power to support tunnelling, the extent of utility works would be less than that assessed in the EIS. The EIS scenario addressed pavement and infrastructure works required where the site adjoins Parramatta Road and was assessed against all time periods (day, evening and night).	
	Contamination remedial work	Yes	Standard daytime hours	Standard daytime hours	**Consistent –** The extent of the site footprint was assessed in the EIS.	

Activity (modification)	Description	Equivalent activity assessed in the EIS	Proposed period of work (modification)	Assessed period of work (EIS)	Comparison of impacts for proposed modification and EIS (reduced / consistent / higher)	Mitigation
	Construction of a workforce pedestrian access temporary bridge over Parramatta Road	No	All periods	All periods	An assessment of potential noise and vibration impacts associated with the construction of the pedestrian bridge is included in the sections below.	
	Establishment of site offices, amenities and temporary infrastructure	Yes	Standard daytime hours	Standard daytime hours	**Consistent –** The extent of the site footprint was assessed in the EIS. The proposed layout of the site would also provide a greater level of shielding than that assessed in the EIS as some existing buildings may be retained through the operation of the site.	
Site operations	Laydown and storage of materials Plant and equipment assembly Heavy vehicle, equipment and plant storage Delivery of materials, plant and equipment	Yes	All periods	All periods	**Consistent -** The EIS assessed general laydown operations within select areas of the site footprint. Although the proposed use of the site is to include laydown operations over a larger area of the footprint, it is expected that the predicted absolute level of noise would be comparable to that presented in the EIS at the closet receiver due to similar items of plant being used. The proposed layout of the site would also provide a greater level of shielding than that assessed in the EIS as some existing buildings may be retained through the operation of the site. The proposed site footprint is consistent with that assessed in the EIS.	Recommended mitigation methods outlined in the EIS, SPIR and conditions of approval are considered appropriate. A Construction Noise and Vibration Impact Statement (CNVIS) will be prepared based on the revised layout of the site and will detail noise mitigation and management measures in line with the contractor's finalised construction methodology.

Activity (modification)	Description	Equivalent activity assessed in the EIS	Proposed period of work (modification)	Assessed period of work (EIS)	Comparison of impacts for proposed modification and EIS (reduced / consistent / higher)	Mitigation
	Construction traffic access	Yes	All periods	All periods	**Consistent -** The site is to be used for civil activities, with no spoil storage or haulage proposed from the site. The EIS assessed spoil haulage from the Parramatta Road West site as it was a tunnelling compound. This will result in reduced number of heavy vehicles (spoil haulage truck and dogs) accessing the site.	
Site rehabilitation and landscaping	Demobilisation including works to prepare the site for a future use in accordance with the M4-M5 Link Residual Land Management Plan.	Yes	Standard daytime hours	Standard daytime hours	**Consistent –** The extent of the site footprint was assessed in the EIS.	Recommended mitigation methods outlined in the EIS, SPIR and conditions of approval are considered appropriate.

The assessment of the proposed use of Parramatta Road West and East civil sites indicates that, with the exception of tunnelling activities, the noise and vibration impacts are generally consistent with those assessed for the EIS. As such it is expected that existing environmental management measures contained in the SPIR and relevant conditions of approval would be suitable for the proposed modification.

Temporary overhead pedestrian walkway

The proposed activities associated with the construction of the temporary overhead pedestrian walkway have been broken down into three scenarios. For each scenario the use of equipment has been identified, including numbers of equipment being used and the potential sound power level (dBA). **Table 6-36** details the sound power levels for construction equipment.

Table 6-36 Sound power levels for construction equipment – Haberfield

Scenario name	Scenario ID	Equipment (realistic worst case)	Worst case items in same location	Sound power level (dBA)[1,2]		
				L_{WA}		L_{WAmax}
				Item	Activity[4]	Activity
Footing constructions include concrete saws	MPO-01	Concrete saw	1	115	110	123
		Excavator (small)	1	98		
		Truck	1	98		
Boarded piling	MPO-02	Piling rig (bored)	1	108	108	118
		Mobile crane	1	100		
		Concrete truck	1	106		
Bridge span lift	MPO-03	Mobile crane(large)	1	104	107	112
		Semi-trailer	2	106		
		Lighting tower	2	99		

Notes:

1. In accordance with the EPA ICNG for activities identified as particularly annoying (such as jackhammering, rock-breaking and power saw operation), a 5 dBA 'penalty' is added to predicted noise levels when using the quantitative method
2. Activity sound power levels account for the amount of time an item of plant is anticipated to operate within each 15 minute period

Predicted noise levels have been modelled for each MPO in relation to the relevant NCAs. The predicted NML exceedances are summarised in **Table 6-37**.

Following the completion of construction of the walkway, the use of the walkway by construction workers is anticipated to result in only a negligible noise impact to nearby receivers.

Table 6-37 Overview of NML exceedances

Activity ID	Activity	Weeks[1]	Activity duration within overall project program[2]	Number of receivers															
				Total	Highly noise affected[4]	NML exceedance receiver count[3]													
						Daytime			Daytime (out of hours)			Evening			Night-time			Sleep disturbance		
						1-10 dBA	11-20 dBA	>20 dBA	1-10 dBA	11-20 dBA	>20 dBA	1-10 dBA	11-20 dBA	>20 dBA	1-10 dBA	11-20 dBA	>20 dBA	1-10 dBA	11-20 dBA	>20 dBA
MPO-01	Footing constructions include concrete saws	1	25%	1747	-	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MPO-02	Boarded piling	3	25%	1747	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MPO-03	Bridge assembly and span lift	8	25%	1747	-	3	-	-	21	1	-	21	1	-	88	8	-	22	1	-

The NML exceedances summarised in **Table 6-37** above are described in more detail below.

Work activity MPO-01 and MPO-02

MPO-01 and MPO-02 include construction activities required for the preparation of the footings and other structures and are limited to standard daytime hours only. Exceedances of the daytime NMLs are predicted at 14 receivers within NCA01 and NCA06, with a maximum exceedance of nine dBA. These exceedances are anticipated to be associated with the use of a concrete saw during the demolition of the existing hardstand (MPO-01). Noise levels would significantly decrease when the concrete saw is not in use, and it would be expected that these works would be short in duration.

Work activity MPO-03

MPO-03 is representative of the bridge assembly and span lift which is expected to occur over a duration of 8 weeks. The work associated with assembly of the bridge would be undertaken during daytime hours and the span lift may be conducted outside of standard construction hours to avoid impacts on the road network during peak periods. Moderate NML exceedances of up to 19 dBA are predicted when the crane is operating. Noise impacts are generally limited to receivers that are situated near to the Parramatta Road facilities within NCA00, NCA01, NCA06 and NCA07. These works are expected to be completed over a few nights and would be managed via the implementation of the mitigation and management measures outlined in the EIS and SPIR.

Sleep disturbance

Sleep disturbance screening criterion is likely to be exceeded at adjacent residential receivers when night works are occurring. The assessment has included predicted maximum noise impacts for assessment of potential sleep disturbance, however, it is noted that the ICNG only requires the project to consider maximum noise levels when construction works are planned to extend over more than two consecutive nights.

An OOHW protocol would be developed as part of the project CNVMP to set parameters around how works outside standard daytime construction hours will be carried out, including timing and frequency, and the mitigation measures that will be implemented based on predicted impacts identified through location and activity specific assessments. The OOHW protocol will be developed in consultation with the NSW Environment Protection Authority (NSW EPA).

Vibration impacts

Piling works associated with the construction of the temporary overhead pedestrian bridge have the potential to result in vibration impacts at the nearest sensitive receivers. Relevant vibration criteria are provided in **Table 6-38**.

Table 6-38 Recommended minimum working distances for vibration intensive plant

Plant item	Rating/description	Minimum working distance			
		Cosmetic damage			Human response[1]
		Residential and light commercial[1]	Group 2 (typical)[2]	Group 3 (structurally unsound)[2]	
Pile boring	≤ 800 mm	2 m (nominal)	3 m	5 m	4 m

The locations of the proposed works are approximately 30 metres from the nearest sensitive receivers. No sensitive receivers are located within the minimum working distances for piling works. As such, cosmetic damage and human response vibration impacts from piling works associated with construction of the temporary overhead pedestrian bridge are considered unlikely to occur.

Management measures and conditions of approval

The existing management measures and conditions of approval provided are sufficient to manage impacts generated by the proposed modification at the Parramatta Road West and East civil sites including the construction of the temporary overhead pedestrian bridge.

The proposed modification would not require any change to the conditions of approval for noise and vibration.

6.4.4 Surface water, flooding and drainage

Assessment methodology

An assessment of flooding and drainage impacts during construction for the Parramatta Road West and Parramatta Road East civil sites is provided in **Appendix E** (Surface water and flooding report) and included:

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

Existing environment

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

The Parramatta Road West and Parramatta Road East civil sites are located within the Dobroyd Canal catchment. Construction discharges would ultimately drain to Dobroyd Canal. The sites are occupied by buildings and extensive hardstand areas with limited pervious areas.

Assessment of potential impacts

Flooding

The Parramatta Road East civil site is located outside the PMF flood extent and the Parramatta Road West civil site is located on the fringe of the PMF flood extent with no overland flow paths occurring through the site. No topographic changes are proposed for the Parramatta Road West and Parramatta Road East civil sites or for Parramatta Road, Bland Street or Alt Street which abut the two sites. Therefore no flood impacts on adjacent properties are anticipated.

The Parramatta Road West civil site is no longer proposed for tunnelling and therefore there will be no construction access tunnel at this site.

Localised drainage

All construction works would have the potential to impact local overland flow paths and existing minor drainage paths. Disruption of existing flow mechanisms, both of constructed drainage systems or those of overland flow paths, could occur as a consequence of the various construction activities and facilities.

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

Water quality and geomorphology

No tunnel dive is proposed for the Parramatta Road West civil site, therefore a construction water treatment plant is not proposed at this site. Tunnel water that would have been pumped to Parramatta Road West tunnel site (under option B for construction ancillary facilities at Haberfield/Ashfield) would be pumped to the Northcote Street civil and tunnel site and the Pyrmont Bridge Road civil and tunnel site.

Discharges from the Parramatta Road West and East civil sites would only relate to surface water (surface runoff from roofs and paved surfaces). The total discharge volume would vary depending on rainfall conditions. Surface water would be managed in accordance with the environmental management measures presented in the EIS, SPIR, conditions of approval and Environment Protection Licence including implementation of erosion and sediment controls and construction discharge criteria.

Management measures and conditions of approval

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

The proposed modification would not require any change to the conditions of approval for the project related to surface water, flooding and drainage impacts at the Parramatta Road West and East civil sites.

6.4.5 Land use and property

Assessment methodology

The assessment of impacts from the proposed modification on land use and property has been carried out according to the methodology summarised in **section 6.3.5**.

Existing environment

The Parramatta Road West and East civil sites are located on the western and eastern sides of Parramatta Road between Alt Street and Bland Street and to the north of Alt Street at Ashfield and Haberfield. The sites are mostly vacant and have previously comprised of a former car dealership and servicing workshop on land on both sides of Parramatta Road, with several smaller commercial premises on the western side of Parramatta Road near Bland Street.

The area around the Parramatta Road West and East civil sites consist of predominantly residential land uses, comprising attached and detached dwellings and some multi storey residential apartments which are located adjacent to the Parramatta Road West site. A mixture of commercial and light industrial land uses front onto Parramatta Road to the north of the sites. South of Bland Street, a large construction site is present on the western side of Parramatta Road to construct the Parramatta Road portals and realign Parramatta Road as part of the M4 East project. Haberfield Public School is located on Bland Street about 100 metres east of the intersection of Parramatta Road and Bland Street.

The Parramatta Road West and Parramatta Road East civil sites would be on land zoned B6 Enterprise Corridor under the Ashfield LEP. The objectives of this zone include to promote businesses along main roads and to provide a range of employment uses. The Ashfield LEP 2013 defines the land use zoning surrounding the Parramatta Road West and Parramatta Road East civil sites as a mix of the following zones: B6 Enterprise Corridor, SP2 Infrastructure and R3 Medium Density Residential. The land is also subject to the *Parramatta Road Corridor Urban Transformation Strategy* (UrbanGrowth NSW 2016).

Land use zoning surrounding the Parramatta Road West and Parramatta Road East civil sites is shown in **Figure 6-11**.

Refer to section 12.2.2 of the EIS for further information regarding existing land use and planning controls at the Parramatta Road West and Parramatta Road East civil sites.

Figure 6-11 Parramatta Road West and Parramatta Road East civil sites – existing land use zoning

Assessment of potential impacts

Property acquisition

There would be no change to property acquisition at the Parramatta Road West and Parramatta Road East civil sites. **Table 6-39** provides a comparison of property acquisition required for the approved project and the proposed modification.

Table 6-39 Comparison of property acquisition required for the approved project and the proposed modification

Location	Land use	Property acquisition assessed in the EIS	Additional property acquisition required for proposed modification
Parramatta Road West and Parramatta Road East civil sites	Former car dealership, car servicing workshop and commercial properties already owned by Roads and Maritime. One commercial property to be acquired.	1	No additional property acquisition required for modification

Ground movement

Section 6.5.5 of the EIS described the construction of a temporary access tunnel at the Parramatta Road West site. The temporary access tunnel was proposed to be around 250 metres in length. This temporary access tunnel would no longer be required for the proposed modification and a new access tunnel would be constructed from the Northcote Street civil and tunnel site.

Land use

The Parramatta Road West site is described as a civil and tunnel site in section 6.5.5 of the EIS and the Parramatta Road East site is described as a civil site in section 6.5.7 of the EIS.

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

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

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

A temporary overhead pedestrian walkway above Parramatta Road would link the Parramatta Road West and Parramatta Road East civil sites (refer to **Figure 6-12**). This walkway would only be used by the construction workforce and access would be via stairs located within the work sites.

With the exception of the temporary overhead pedestrian walkway above Parramatta Road, construction activities would be carried within the same surface construction footprint as assessed for the Parramatta Road West and Parramatta Road East civil sites in the EIS. Land use at the sites would temporarily change from commercial sites for the project which is consistent with the land use impacts described in section 12.4.2 of the EIS.

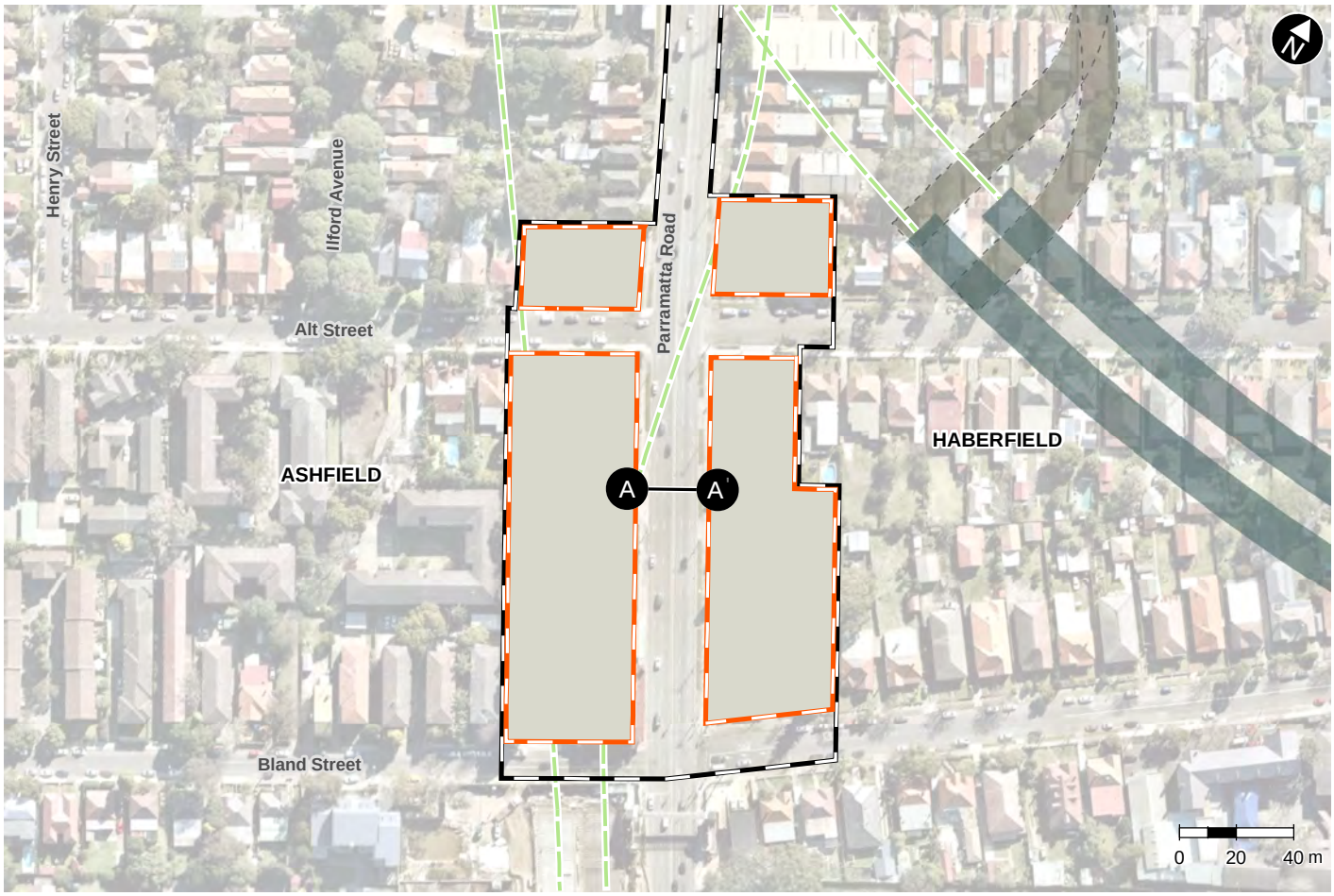
The temporary overhead pedestrian walkway would not impact the use of the Parramatta Road corridor in this location. The structure has been designed to provide sufficient clearance for vehicles travelling along Parramatta Road with the base of the walkway being around six metres above Parramatta Road. The bridge structure would not interfere with the existing footpath and pedestrian movements along either side of Parramatta Road. The structure would be generally comparable to an

existing pedestrian walkway located over Parramatta Road at Haberfield, east of Bland Street (refer to **Plate 3**).

Plate 3 View looking south along Parramatta Road towards Bland Street and the Haberfield pedestrian bridge

Following the completion of construction, the site would be restored to generally the existing ground level or as otherwise agreed with Roads and Maritime. Future development would be determined by Roads and Maritime in accordance with the relevant zoning and policy controls applicable at that time. The modification would not involve a change to the future land use of the Parramatta Road West and East sites described in section 12.4.2 of the EIS.

A comparison of land use impacts for the approved project and proposed modification is provided in **Table 6-40**.



Imagery © Nearmap (2017)

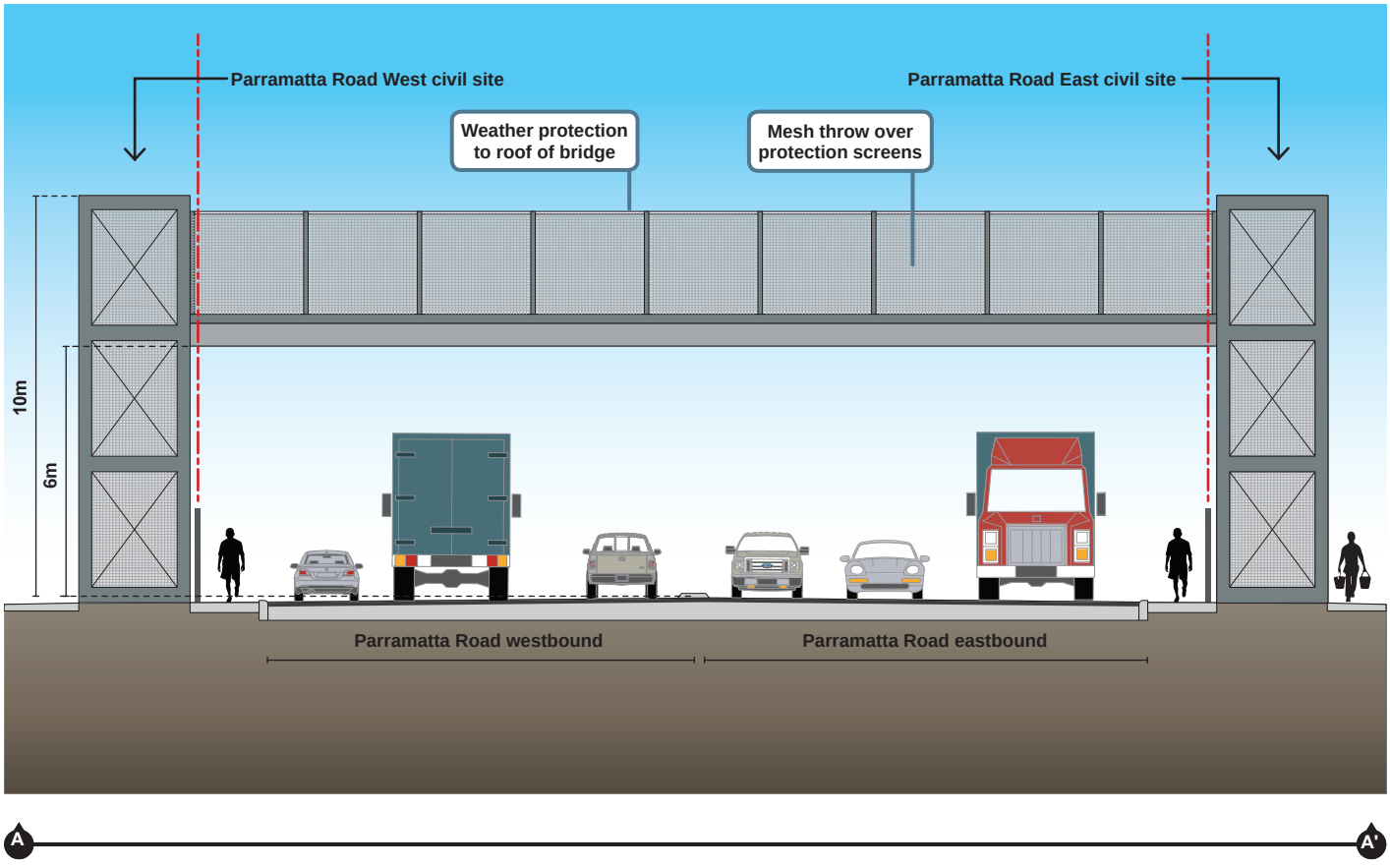


Figure 6-12 Indicative overhead pedestrian walkway over Parramatta Road

Table 6-40 Comparison of land use impacts for the approved project and proposed modification at Parramatta Road West and Parramatta Road East civil sites

	Construction		Operation	
Location	**Approved project**	**Proposed modification**	**Approved project**	**Proposed modification**
Parramatta Road West civil site	Land use would change from commercial to a construction site for the project. The site was to be used as a civil and tunnel site including tunnelling activities and laydown areas (under option B for construction ancillary facilities at Haberfield/Ashfield).	Land use would change from commercial to a construction site for the project. The site would be used in accordance with condition C19 and other conditions of the project approval. The sites would be used for parking and other works that do not exceed the 'noise affected' Noise Management Levels as identified in the ICNG. The sites would be used for site offices, light and heavy vehicle car parking, shuttle bus services, workshop and storage of equipment, materials and construction machinery. Tunnelling would not be carried out at this location. A temporary overhead pedestrian walkway above Parramatta Road would link the site with Parramatta Road East civil and tunnel site (see **Figure 6-12**).	The site would be restored to generally the existing ground level or as otherwise agreed with Roads and Maritime. Future development would be determined by Roads and Maritime.	No change in operational impact described in the EIS.

	Construction		Operation	
Location	**Approved project**	**Proposed modification**	**Approved project**	**Proposed modification**
Parramatta Road East civil site	Land use would change from commercial to a construction site for the project. The site was to be used as a civil site including site offices, car parking and laydown areas.	Land use would change from commercial to a construction site. The site would be used in accordance with condition C19 and other conditions of the project approval. The sites would be used for parking and other works that do not exceed the 'noise affected' Noise Management Levels as identified in the ICNG. The sites would be used for site offices, light and heavy vehicle car parking, shuttle bus services, workshop and storage of equipment, materials and construction machinery. Tunnelling would not be carried out at this location. A temporary overhead pedestrian walkway above Parramatta Road would link the site with Parramatta Road West civil and tunnel site (see **Figure 6-12**).	The site would be restored to generally the existing ground level or as otherwise agreed with Roads and Maritime. Future development would be determined by Roads and Maritime.	No change in operational impact described in the EIS.

Management measures and conditions of approval

Potential land use and property impacts associated with the proposed modification would be effectively managed through the implementation of the approved environmental management measures for the project as summarised in Part E of the SPIR.

The proposed modification would not require changes to the conditions of approval for the project related to land use impacts at the Parramatta Road West and Parramatta Road East civil sites.

6.4.6 Urban design and visual amenity

Assessment methodology

The assessment of impacts from the proposed modification on visual amenity has been carried out according to the methodology summarised in **section 6.3.6**.

Existing environment

The Parramatta Road West and Parramatta Road East civil sites are located on the western and eastern sides of Parramatta Road between Alt Street and Bland Street and to the north of Alt Street at Ashfield and Haberfield. The sites are mostly vacant and have previously comprised of a former car dealership and servicing workshop on land on both sides of Parramatta Road, with several smaller commercial premises on the western side of Parramatta Road near Bland Street. The sites are shown in **Plate 4** and **Plate 5** and additional photos of the existing environment in this area are provided in **Appendix F** (Site photos).

The area surrounding the sites consists of predominantly residential land uses, comprising attached and detached dwellings and some residential apartments. A mixture of commercial and light industrial land uses front onto Parramatta Road to the north. South of Bland Street, a construction site is present on the western side of Parramatta Road to construct the Parramatta Road portals and realign Parramatta Road as part of the M4 East project. The adjacent Parramatta Road corridor includes adjacent commercial development and roadside infrastructure such as signage, street lighting and traffic signals and caters for high traffic volumes.

The Haberfield pedestrian bridge crosses over Parramatta Road to the south east near Bland Street (refer to **Plate 3**). Located directly to the south east of the Haberfield pedestrian bridge is Yasmar, a property listed on the State Heritage Register.

Existing sources of night lighting includes security lighting associated with the existing use of the site, street lighting associated with Parramatta Road, local streets and associated vehicular traffic, and illuminated windows of the surrounding residential and commercial properties.

Plate 4 Existing environment at the Parramatta Road East civil site

Plate 5 Existing environment at the Parramatta Road West civil site

Assessment of potential impacts

The primary visual elements that would change for the proposed modification at the Parramatta Road West and Parramatta Road East civil sites include:

- The addition of a temporary pedestrian overbridge for construction workforce between the Parramatta Road West and Parramatta Road East civil sites
- The removal of the proposed acoustic shed at the Parramatta Road West site due to change of construction activities at this location.

The proposed indicative site layout for Parramatta Road West and Parramatta Road East civil sites and the location of nearby sensitive visual receivers is provided in **Figure 6-13**.

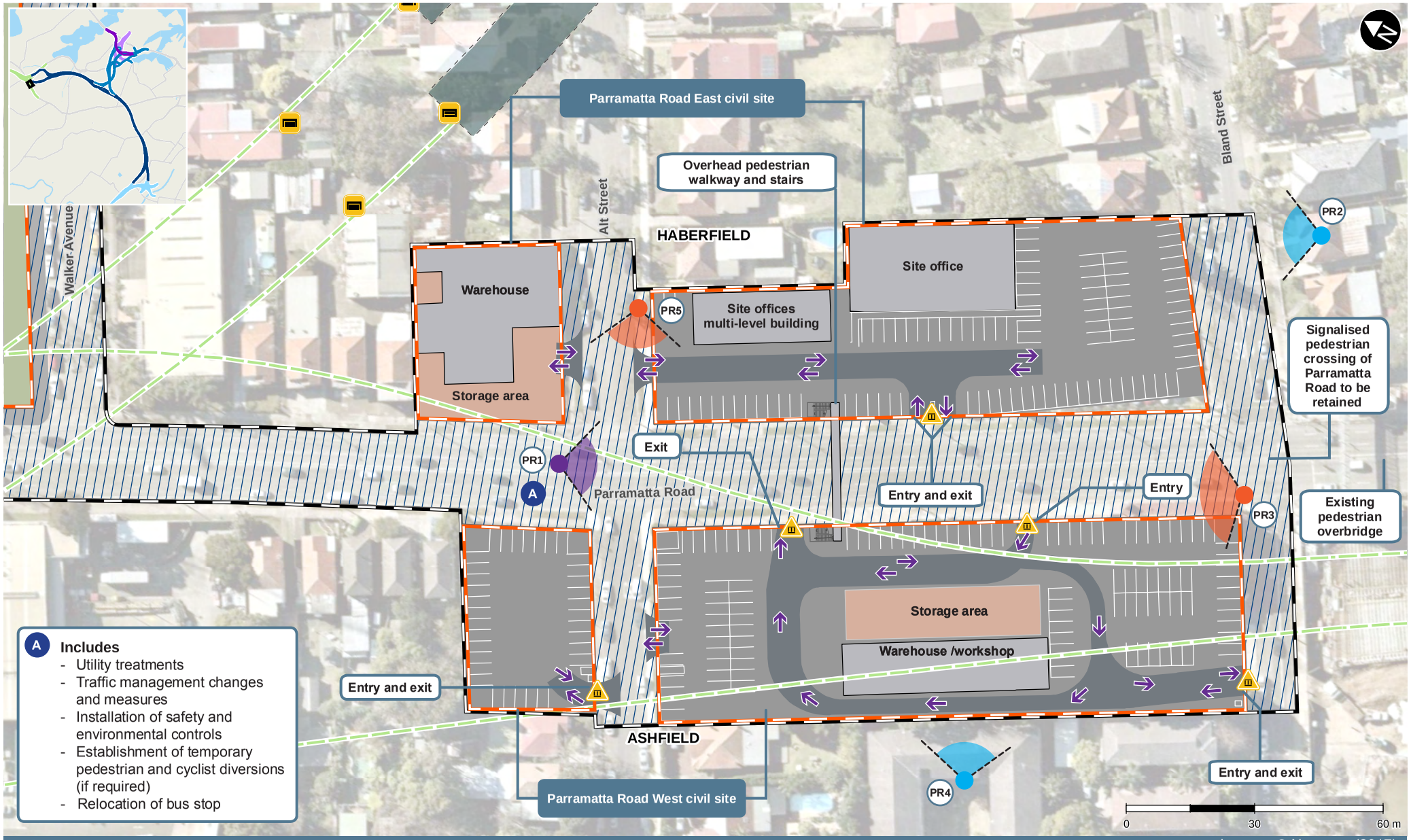


Figure 6-13 Parramatta Road West and Parramatta Road East civil sites representative receiver locations

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

The temporary overhead pedestrian walkway would introduce a visual change to the Parramatta Road corridor in this location. The walkway would be of a comparable visual scale and character to the Haberfield pedestrian bridge, which crosses over Parramatta Road to the south east near Bland Street. The temporary overhead pedestrian walkway would be viewed in the context of the busy Parramatta Road corridor which includes adjacent commercial development and roadside infrastructure such as signage, street lighting and traffic signals and caters for high volumes of traffic.

The temporary overhead pedestrian walkway would be an additional night lighting source with the lighting designed to illuminate the walkway for construction workers. The walkway is elevated but located over the road corridor and some distance from the closest residential properties.

Night lighting would be designed to minimise light spillage to adjoining properties and would be generally consistent with the requirements of AS 4282-1997 Control of the obtrusive effects of outdoor lighting.

A summary of construction visual impacts on sensitive receivers for the temporary overhead pedestrian walkway is provided in **Table 6-41**.

Table 6-41 Summary of construction visual impacts on sensitive receivers for the temporary overhead pedestrian walkway

Receiver		Sensitivity to impact	Magnitude of impact	Overall impact rating
Visual impacts				
PR1	Motorists on Alt Street, Bland Street and Parramatta Road	Low	Low	Low
PR2	Residents – Alt Street, Bland Street and Parramatta Road (west)	High	Negligible	Moderate
PR3	Pedestrians – Alt Street, Bland Street and Parramatta Road (west)	Low	Low	Low
PR4	Residents – Alt Street, Bland Street and Parramatta Road (east)	Moderate	Negligible	Moderate
PR5	Pedestrians – Alt Street, Bland Street and Parramatta Road (east)	Low	Low	Low
Night lighting impacts				
PR1	Motorists on Alt Street, Bland Street and Parramatta Road	Low	Low	Low
PR2	Residents – Alt Street, Bland Street and Parramatta Road (west)	Moderate	Low	Moderate-Low
PR3	Pedestrians – Alt Street, Bland Street and Parramatta Road (west)	Low	Low	Low
PR4	Residents – Alt Street, Bland Street and Parramatta Road (east)	Moderate	Low	Moderate-Low
PR5	Pedestrians – Alt Street, Bland Street and Parramatta Road (east)	Low	Low	Low

The removal of the proposed acoustic shed at the Parramatta Road West civil site would result in a general reduction of potential visual impacts compared to the impacts described in the EIS (for the option B construction ancillary facilities arrangement Haberfield/Ashfield). However, the removal of the acoustic shed would mean that lighting within the construction ancillary facility would not be shielded from nearby sensitive receivers to the same extent and night lighting impacts would likely increase compared to the impacts described in the EIS.

Night lighting would be designed to minimise light spillage to adjoining properties and would be generally consistent with the requirements of AS 4282-1997 Control of the obtrusive effects of outdoor lighting.

A comparison of visual and night lighting impacts on sensitive receivers during construction at the Parramatta Road West and Parramatta Road East civil sites for the EIS and the proposed modification is provided in **Table 6-42**.

Table 6-42 Summary of construction visual impacts on sensitive receivers at Parramatta Road West and Parramatta Road East civil sites

Receiver		Sensitivity to impact	Magnitude of impact	Overall impact rating (modification)	Overall impact rating (EIS)
Visual impacts – Parramatta Road West					
C1b-1	Motorists on Alt Street, Bland Street and Parramatta Road	Low	Moderate	Moderate–Low	Moderate–Low
C1b-2	Residents – Alt Street, Bland Street and Parramatta Road (west)	High	Moderate	High-Moderate	High
C1b-3	Pedestrians – Alt Street, Bland Street and Parramatta Road (west)	Low	Moderate	Moderate–Low	Moderate–Low
Visual impacts – Parramatta Road East					
C3b-2	Residents – Alt Street, Bland Street and Parramatta Road (east)	Moderate	Moderate	Moderate	Moderate
C3b-3	Pedestrians – Alt Street, Bland Street and Parramatta Road (east)	Low	Low	Low	Low
Night lighting impacts – Parramatta Road West					
C1b-1	Motorists on Alt Street, Bland Street and Parramatta Road	Low	Moderate	Moderate–Low	Low
C1b-2	Residents – Alt Street, Bland Street and Parramatta Road (west)	Moderate	Moderate	Moderate	Moderate–Low
C1b-3	Pedestrians – Alt Street, Bland Street and Parramatta Road (west)	Low	Moderate	Moderate–Low	Low
Night lighting impacts – Parramatta Road East					
C3b-2	Residents – Alt Street, Bland Street and Parramatta Road (east)	Moderate	Moderate	Moderate	Moderate-Low
C3b-3	Pedestrians – Alt Street, Bland Street and Parramatta Road (east)	Low	Low	Low	Low

Management measures and conditions of approval

Potential visual impacts associated with the proposed modification would be effectively managed through the implementation of the approved environmental management measures for the project as summarised in Part E of the SPIR.

The proposed modification would not require changes to the conditions of approval for the project related to visual impacts at the Parramatta Road West and Parramatta Road East civil sites.

6.4.7 Social and economic

The Parramatta Road West and Parramatta Road East civil sites would be used in accordance with condition C19 and other conditions of the project approval. The sites would be used for parking and other works that do not exceed the 'noise affected' Noise Management Levels as identified in the ICNG. The sites would be used to support civil and tunnelling construction activities at other project construction sites, primarily within the Haberfield and Ashfield area. No tunnelling, tunnel spoil stockpiling and handling or tunnel spoil haulage would occur at these sites.

The level of socio-economic impacts directly associated with the Parramatta Road West and Parramatta Road East civil sites identified in the EIS would therefore be reduced or remain generally consistent for the proposed modification.

6.4.8 Non-Aboriginal heritage

The proposed modification would link the Parramatta Road West and Parramatta Road East civil sites with a temporary overhead pedestrian walkway above Parramatta Road. There is the potential for the temporary overhead pedestrian walkway to impact the visual setting of the adjacent Haberfield HCA.

Potential indirect visual setting impacts on the Haberfield HCA were identified in the EIS however these were assessed to have a neutral impact (Refer to Appendix U (Technical working paper: Non-Aboriginal heritage) of the EIS). The EIS noted that indirect impact on the Haberfield HCA would primarily result from the extension of time associated with using the existing M4 East construction ancillary facilities at Northcote Street and along Wattle Street for the M4-M5 Link project.

The Parramatta Road East civil site and temporary overhead pedestrian walkway are located in the context of the busy Parramatta Road corridor and are located outside of, but in proximity to, the Haberfield HCA. The Parramatta Road East civil site is located adjacent to the western extent of the Haberfield HCA.

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

Oblique views of the bridge would be available from residential properties in Alt Street and Bland Street which are located further away from the site and these views would be obscured by intervening structures within the construction sites.

Given the location of the temporary overhead pedestrian walkway, it is considered that indirect impacts to the visual setting of the Haberfield HCA would represent a neutral impact consistent with the impacts assessed in the EIS.

Given that the impacts associated with the modification would be consistent with those assessed in the EIS, it is considered that the environmental management measures related to Non-Aboriginal heritage as outlined in Part E of the SPIR would be sufficient to manage potential impacts to the Haberfield HCA.

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

The following is an assessment of the issues associated with the removal of Darley Road civil and tunnel site from the project as identified in **Table 6-3**.

As described in **Chapter 4** (Proposed modification), the approved project involved the removal and transportation of around 550,300 cubic metres of tunnel spoil from the Darley Road civil and tunnel site as described in Section 23.3.2 of the EIS. Given that the length of the mainline tunnel would not change for the proposed modification, the balance of this spoil volume would be required to be removed from other tunnelling sites. The overall intensity (rate) of spoil removal at approved tunnelling sites is not expected to change, however the additional spoil to be removed would require the extension of the tunnelling component of the overall construction program by around six months. This would increase the duration of environmental impacts associated with tunnelling.

6.5.1 Traffic and transport

The EIS described that the intersection levels of service during the construction of the project are forecast to generally not be significantly impacted, with the exception of Wattle Street/Ramsay Street, and Dobroyd Parade/Timbrell Drive. This is due to Wattle Street being one of the key routes for construction traffic. Impacts due to temporary lane closures and speed reductions, particularly during traffic staging, would also occur.

The EIS also described impacts to intersection levels of service for the City West Link/James Street and City West Link/The Crescent intersections. The removal of the Darley Road site means that construction vehicles would not need to turn into and out of James Street at the City West Link/James Street intersection. This would improve the performance of this intersection compared to the M4-M5 Link SPIR. The removal of turning movements would also reduce delays at this intersection compared to the M4-M5 Link SPIR

The EIS described that the volume of traffic generated by construction is expected to be relatively low compared to existing traffic, and therefore the effects of the short term increase on the existing road network were not expected to significantly impact road safety in the study area, while noting there is still a risk with construction traffic interacting with general traffic.

The proposed modification would extend these construction traffic impacts associated with tunnelling activities for the project by around six months at the other tunnelling sites supporting the construction of Stage 1 of the project.

A Construction Traffic and Access Management Plan (CTAMP) will be prepared and implemented to minimise disruption to road users. Potential construction traffic impacts for the proposed modification would be managed in accordance with the approved environmental management measures for the project as summarised in Part E of the SPIR and relevant conditions of approval for the project.

6.5.2 Air quality

The EIS described that with the implementation of a Dust Management Plan, potential construction air quality impacts associated with dust generation including from tunnelling activities and the transportation of spoil are considered to be ‘not significant’. All loaded spoil haulage trucks and other project-related heavy vehicles carrying materials with the potential to result in dust generation will be covered to prevent dust emissions during transport in accordance with relevant road regulations.

The proposed modification would extend the construction air quality impacts associated with tunnelling for the project by around six months at the other tunnelling sites supporting the construction of Stage 1 of the project. Potential air quality impacts would be managed in accordance with the environmental management measures for the project as summarised in Part E of the SPIR and relevant conditions of approval for the project.

6.5.3 Noise and vibration

The removal of Darley Road site from the approved project would avoid the potential noise and vibration impacts at this location as described in the EIS. Such impacts include airborne noise, ground-borne noise, sleep disturbance and vibration.

Key noise impacts associated with tunnelling that would be extended for the proposed modification are described below:

- Haberfield/Ashfield: Noise from tunnelling support activities and onsite traffic movements is predicted to result in exceedances at up to 19 residential receivers. However, the predicted noise impacts from these activities are minor (less than 10 dBA above NMLs). While the magnitude of the predicted exceedance is relatively low, these impacts are predicted at receivers which would likely have been exposed to noise impacts from the interfacing M4 East project. These receivers are those adjoining the Northcote Street civil and tunnel site and that have line of sight to the Wattle Street civil and tunnel site.
- Pyrmont Bridge Road: Noise from tunnelling support activities, onsite car parking, deliveries and storage is predicted to result in exceedances at up to 14 residential receivers. The predicted noise impacts from these activities are typically minor (less than 10 dBA above NML) however up to four receivers are predicted with moderate (up to 20 dBA) NML exceedances during night-time spoil handling activities. Bridge Road School is located on the opposite side of Parramatta Road in this location and would be subject to noise impacts during construction
- St Peters: Noise from include onsite vehicle movements, tunnelling support and ventilation building construction are predicted to be minor (less than 10 dBA above NML) however one receiver is predicted with moderate (up to 20 dBA) NML exceedances during night-time cumulative activities. No receivers are predicted to be highly noise affected during the proposed works at this site. While the magnitude of the predicted exceedance is relatively low, these impacts are predicted at receivers which would likely have been exposed to noise impacts from the interfacing New M5 project.

The extension of the tunnelling component of the overall construction program by around six months would result in the extension of the duration of the noise impacts described above.

Potential impacts related to vibration were identified in the EIS to primarily relate to activities within construction ancillary facilities such as the use of rock-breakers and concrete saws. The extension of the duration of tunnelling would not impact on these types of vibration intensive activities.

The EIS described that ground-borne noise from tunnelling works would exceed the night-time ground-borne NML for up to around 16 to 20 days for receivers at Haberfield/Ashfield and Pyrmont Bridge Road respectively. Airborne noise emissions were predicted to be higher than the ground-borne noise levels at St Peters and therefore ground-borne noise was not anticipated to be the controlling factor for construction works at this location.

Given the rate of tunnelling progression would not change, an increase in the duration of ground-borne noise impacts at individual receivers is not expected by comparison to how they were described in the EIS. While most road-heading works would be anticipated to progress at a consistent rate, there may be discreet locations which require a longer duration of tunnelling works due to site conditions.

Given the intensity of the impacts would not change, the environmental management measures related to noise and vibration impacts as outlined in Part E of the SPIR would be sufficient to manage potential impacts.

6.5.4 Social and economic

The removal of Darley Road site from the approved project would avoid the potential social and economic impacts at this location described in the EIS, including impacts to parking and community safety, health and wellbeing from light spill, dust, traffic, noise and vibration.

The extension of the tunnelling component of the overall construction program by around six months would result in the extension of the duration of social and economic impacts at other tunnelling sites. Key social and economic impacts associated with tunnelling are summarised in **Table 6-43**.

Table 6-43 Social and economic impacts at tunnelling sites

Impact associated with tunnelling	Discussion
Community safety, health and wellbeing	The proposed modification would extend the duration of potential impacts to community safety, health and wellbeing including: • Health impacts from construction noise and dust generation • Impact to the community's perception of safety around roads and active transport connections from spoil haulage vehicles.
Amenity – noise and vibration, air quality and visual amenity	Construction would generate a minor exceedance of background noise levels at sensitive receivers surrounding the tunnelling sites during tunnelling activities which would impact local amenity. Nuisance dust generated from construction activities associated with tunnelling may affect residential dwellings or sensitive premises that require a cleaner and/or sterilised environment. Visual impacts associated with the presence of the tunnelling sites have the potential to affect the appeal of external and internal living spaces and reduce the overall amenity of an environment.
Social infrastructure	Social infrastructure facilities would be affected during construction by the impacts outlined in this table. This includes the following receivers nearby the relevant tunnelling facilities, including: • Kingdom Hall of Jehovah's Witnesses at 12 Wattle Street, Haberfield • Timbrell Park at Henley Marine Drive, Five Dock • The Infants Home at 17 Henry Street, Haberfield • Yasmar training facility • Chaya's Family Day Care at 12/111 Alt Street, Ashfield • Nurjahan's Family Day Care at 12a/115 Alt Street Ashfield • Haberfield Public School at 24-26 Denman Avenue, Haberfield • Bridge Road School at 127 Parramatta Road, Camperdown • Sydney Park at St Peters.
Access and connectivity	Increased intersection delays and traffic congestion associated with spoil haulage vehicles during tunnelling activities has the potential to increase stress and anxiety for road users; reduce access to residences, social infrastructure and businesses; increase air and noise pollution; and increase the costs and reduce the efficiency of the freight network. Impacts to intersection performance and the road network along proposed haulage routes are unlikely to change in magnitude from what was assessed in the EIS but these impacts will extend over a longer period.
Business and industry	Construction of the project would affect the amenity of an environment, including for people visiting or working at local businesses in the study area. This would be as a result of increased noise, vibration and dust, or reduced visual outlook and business visibility. Changes to amenity can affect business ambience, productivity, functionality and exposure.

Given the intensity of the impacts would not change, the environmental management measures related to social and economic impacts as outlined in Part E of the SPIR would be sufficient to manage potential impacts.

6.5.5 Visual amenity

The removal of Darley Road site from the approved project would avoid the potential visual and amenity impacts at this location described in the EIS. Upgrades to other construction water treatment plants to compensate for the removal for the construction water treatment plant at Darley Road would not result in visual amenity impacts that would be inconsistent with the impacts described in the EIS.

Visual impacts associated with the relocation of the operational water treatment plant from Darley Road site to St Peters are considered in **section 6.6.6**.

6.5.6 Resource use and waste

The proposed modification would result in changes to spoil volumes generated from the tunnelling sites for the project. **Table 6-44** details the change in indicative spoil volumes compared to the volumes described in section 23.3.2 of the EIS.

Table 6-44 Comparison of indicative spoil volumes for the proposed modification

Tunnelling site	Spoil volumes (cubic metres) – EIS	Spoil volumes (cubic metres) – proposed modification
Northcote Street civil and tunnel site	n/a	566,300
Wattle Street civil and tunnel site	311,500	311,500
Parramatta Road West civil site	520,000	n/a
Darley Road civil and tunnel site	550,300	n/a
Pyrmont Bridge Road tunnel site[1]	854,500	1,190,400
Campbell Road civil and tunnel site	755,000	942,900

Notes:

1. Pyrmont Bridge Road tunnel site was renamed to Pyrmont Bridge Road civil and tunnel site in the SPIR

The spoil volumes outlined in **Table 6-44** are indicative and may change subject to detailed design and construction planning.

The removal of the construction water treatment plants at the Parramatta Road West civil site and the Darley Road site would result in changes to construction wastewater discharges at the Northcote Street civil and tunnel site and Pyrmont Bridge Road civil and tunnel site. Additional infrastructure to pump wastewater would not be required as a result of this change. Changes at the Northcote Street civil and tunnel site are described in **section 6.3.10**. Discharges from the Northcote civil and tunnel site would be approximately 1,100 kilolitres per day.

At the Pyrmont Bridge Road civil and tunnel site, construction wastewater discharges would increase to around 1,400 kilolitres per day. This is approximately a 15% increase from the daily discharge volume described in the EIS.

This discharge would be predominantly associated with tunnel groundwater ingress which would be treated at the construction water treatment to be located at the Pyrmont Bridge Road civil and tunnel site. Given the increase in discharge volume is minor from that described in the EIS and considering the receiving environment is the tidally influenced concrete channel of Johnstons Creek, the potential for scour and erosion to occur is negligible.

The discharge volumes from the construction water treatment plant at the Northcote Street civil and tunnel site are also considered minor in the context of the overall Dobroyd Canal catchment and concrete channel receiving environment of the canal. As a result the potential for scour and erosion to occur at this location is also considered to be negligible (refer to **section 6.3.4**).

Impacts would be of a comparable type and magnitude for the proposed modification, it is considered that the environmental management measures related to resource use and as outlined in Part E of the SPIR would be sufficient to manage potential impacts.

6.6 Relocation of operational water treatment plant to St Peters

The following is an assessment of the issues associated with the relocation of the operational water treatment plant to St Peters.

6.6.1 Traffic and transport

The relocation of the permanent water treatment plant from Darley Road to the Campbell Road motorway operation complex at St Peters interchange is likely to result in a negligible change in impact on traffic and transport users compared to the impact assessment in the EIS, as no change in peak construction traffic volumes are forecast.

6.6.2 Air quality

A screening assessment consistent with the methodology outlined in **section 6.3.2** was carried out to assess whether the proposed changes at the Campbell Road motorway operations complex would change the construction dust risk assessment presented in Appendix I of the M4-M5 Link EIS (Technical working paper: Air quality). The screening assessment identified that there would be a negligible change to the impacts outlined in the M4-M5 Link EIS as a result of the proposed modification and that further assessment of this location is not required.

Potential air quality impacts would be managed in accordance with the environmental management measures related to air quality as outlined in Part E of the SPIR and relevant conditions of approval for the project.

6.6.3 Noise and vibration

Construction of the water treatment plant would be undertaken during standard construction hours only. Potential noise impacts associated with the construction of the water treatment plant would be consistent with the construction scenarios assessed in the EIS which did not identify any noise impacts at nearby receivers.

The water treatment plant at the Campbell Road motorway operations complex has been modelled at a sound power level of 90 dBA. This is the maximum sound power level that results in compliance with the criteria at all residential receivers. Other fixed plant at this location has been modelled consistent with the EIS.

The water treatment plant would include specific equipment designed to achieve compliance with the relevant criteria for noise output. The equipment and sound power levels modelled for the water treatment plant are indicative only and may be subject to change during the detailed design phase of the project. It is envisaged that the mechanical plant noise sources associated with the fixed facilities would be controllable by common engineering methods that may consist of:

- Judicious location selection
- Noise barriers
- Silencers
- Acoustically lined ductwork
- Acoustic louvres.

Any mechanical equipment selected would be subject to review and assessed for compliance with the established design criteria at the detailed design stage of the project. Any specific mitigation measures would be determined at this point, taking account of cumulative noise emissions from all fixed facility noise sources at Campbell Road motorway operations complex.

6.6.4 Surface water, flooding and drainage

Assessment methodology

An assessment of flooding and drainage impacts for the operational water treatment plant at the Campbell Road motorway operations complex is provided in **Appendix E** (Surface water and flooding report) and included:

- A qualitative flooding and drainage assessment to assess potential flooding and drainage impacts associated with the construction of the operational water treatment plant
- An assessment of potential water quality impacts and scour impacts associated with the treated discharges from the operational water treatment plant and a qualitative flooding assessment based on a review of the WestConnex New M5 EIS.

A “box model” was developed to assess how the quality and quantity of pollutants associated with treated releases from the operational water treatment plant would impact Alexandra Canal. A box model simulates the average state of a system through mass balancing and is used to evaluate changes in the system, in this instance changes in water quality.

The key inputs and assumptions applied during the box modelling assessment are provided in section 3.3.2 and Annexure A of **Appendix E** (Surface water and flooding report).

Existing environment

The assessment of potential surface water and flooding impacts associated with the proposed modification has assumed that the existing environment conditions at each of the assessed locations are consistent with those set out in the Appendix Q (Technical Working Paper: Surface water and flooding) of the EIS. The Campbell Road motorway operations complex (MOC5) is located within the Alexandra Canal catchment with discharges ultimately discharging to Alexandra Canal.

Alexandra Canal is a constructed canal, originally a natural watercourse named Sheas Creek. It flows into the Cooks River near the north-western corner of Sydney Airport. As it was originally built for navigation by boat for transportation purposes, it is much larger than technically required to convey stormwater from the catchment area draining to it.

Due to its size, inflows and tidal interactions, the canal accumulates sediment. The sediments within the canal have been assessed to be contaminated and are subject to a Remediation Order issued by the NSW EPA.

A review of known water quality data was undertaken as part of the EIS. The monitoring results were compared with the slightly to moderately disturbed trigger values for marine waters or estuarine waters in the case of nutrients, which correspond with the NSW Water Quality Objectives for aquatic ecosystems in the Cooks River catchment. Elevated levels of metals (chromium (III+VI), copper, lead, nickel (Sheas Creek only) and zinc) and nutrients (nitrogen, phosphorus and reactive phosphorus) were recorded in Alexandra Canal and Sheas Creek. The results are indicative of waterways within an urbanised catchment.

Assessment of potential impacts – construction

Flooding

The operational water treatment plant is sited outside the PMF flood extent for mainstream flooding and is not located within an existing major overland flow path.

The New M5 project is providing the construction site platform within the St Peters interchange. When the operational water treatment plant area is handed over to the M4-M5 Link contractor, the contractor will refine the construction site platform (if appropriate) to manage local overland flows.

Therefore, construction of the operational water treatment plant is considered to pose a negligible risk of flooding impacts on adjacent properties.

Localised drainage

All construction works would have the potential to impact local overland flow paths and existing minor drainage paths. Disruption of existing flow mechanisms, both of constructed drainage systems or

those of overland flow paths, could occur as a consequence of the various construction activities and facilities.

These are typical impacts faced on most construction projects and can be addressed by adopting industry standard mitigation measures. Consideration of these impacts would be included during future detailed design and construction planning phases, along with consideration of the typical mitigation measures described in the EIS, SPIR and conditions of approval.

Water quality and geomorphology

There would be a slight increase in the volume of construction surface water and construction wastewater as a result of the proposed construction activities associated with the operational water treatment plant. With the proposed environmental management measures in place, impacts on water quality are considered to be negligible. Discharge would be managed in accordance with the discharge criteria in condition of approval E186.

Assessment of potential impacts – operation

Flooding

The operational water treatment plant is sited outside the PMF flood extent for mainstream flooding and will be designed with consideration to potential local overland flow impacts and flood mitigation measures stipulated within the EIS, SPIR and conditions of approval for the project. Therefore, the operational water treatment plant is not likely to cause flooding impacts on adjacent properties.

Runoff generated from the operational water treatment site will either be discharged to the St Peters interchange stormwater management system being constructed as part of the New M5 project or directly to the local drainage system.

Any potentially contaminated runoff (e.g. wash bay or a bunded chemical storage area without a roof) would be captured and disposed to sewer via a trade waste agreement or removed by a liquid waste contractor and disposed of offsite at a licensed facility.

Tunnel drainage streams

The EIS provides a description of the two tunnel drainage streams which will be managed separately including tunnel groundwater and tunnel surface water (stormwater ingress at portals, spills, maintenance washdown water, fire suppressant deluge and other potential water ingress events). As discussed in the EIS, given tunnel surface water discharges would be intermittent and the quality would be consistent with the approved discharge criteria, impacts associated with tunnel surface water are considered to be negligible.

The operational water treatment plant would discharge on average around 23 litres per second of treated flow. For the proposed modification three options would be considered for the discharge of treated wastewater from the mainline tunnel drainage system:

- Option 1: Wastewater would be pumped to the water treatment plant at the Campbell Road motorway operations complex. Treated water would discharge to the stormwater basin and/or drainage network within the St Peters interchange site being constructed by the New M5 project. This drainage network would then discharge to Alexandra Canal
- Option 2: Wastewater would be pumped to the water treatment plant at the Campbell Road motorway operations complex .Treated water would be discharged to the existing drainage network and then to Alexandra Canal
- Option 3: Wastewater would be discharged to Sydney Water's sewage system in accordance with a Trade Waste Agreement.

The discharge options are shown in **Figure 6-14**.

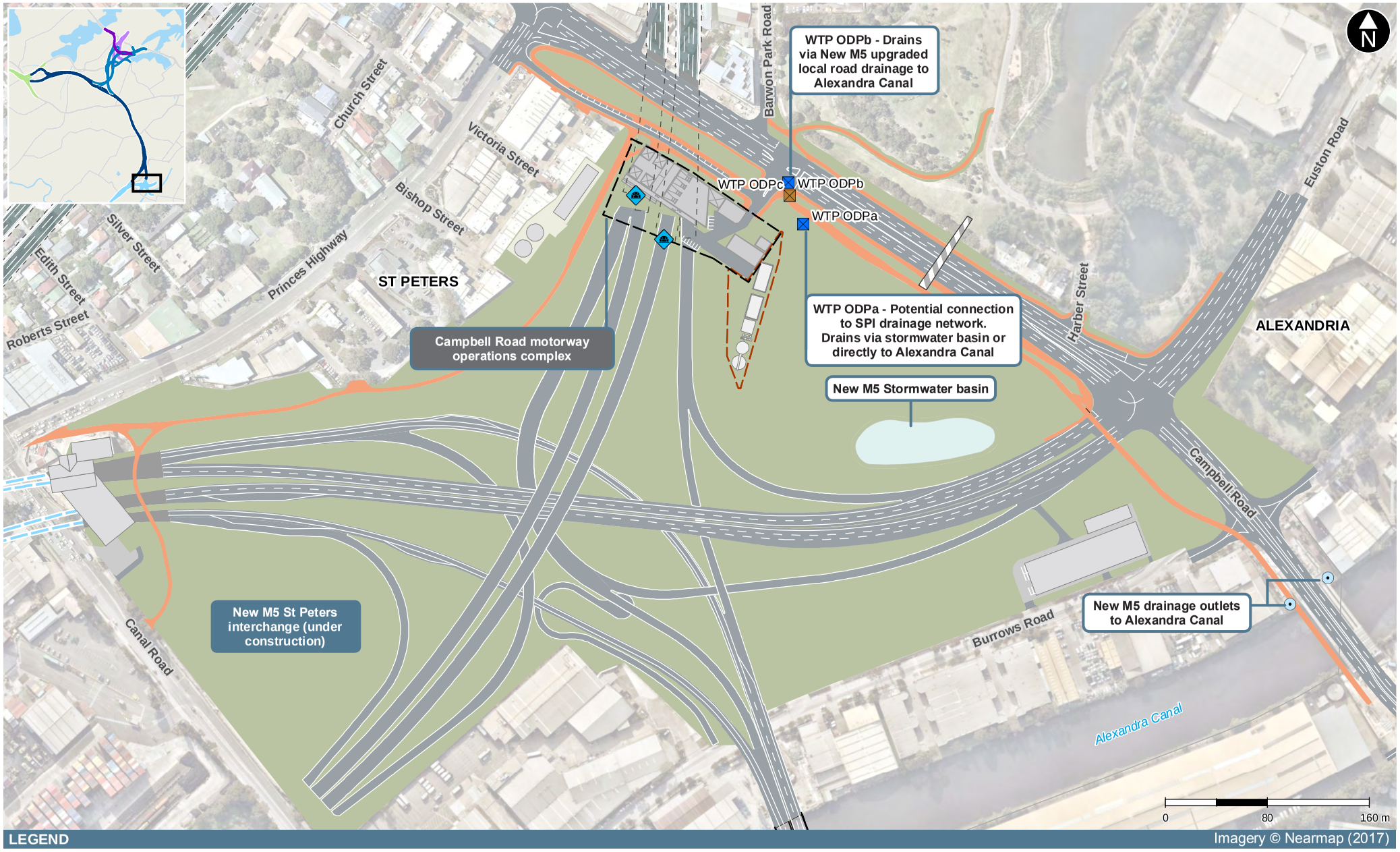


Figure 6-14 Operational water treatment plant potential discharge options

The strategy for treated tunnel discharges would be confirmed during detailed design and supported by drainage modelling to assess the capacity of the drainage network to accept the additional flows. The detailed design for the water treatment plant may include a combination of the above options. In the event a new outlet to Alexandra Canal is required, further environmental assessment would be required by the contractor.

An assessment of treated tunnel groundwater discharges is provided below assuming treated flows are ultimately discharged to Alexandra Canal. No assessment was undertaken for discharges to the sewer system as environmental impacts are considered to be negligible.

Discharge water quality

For the purposes of the assessment, tunnel groundwater quality is assumed to be equivalent to average groundwater quality recorded across monitoring wells in proximity to the mainline tunnel. Tunnel groundwater characterisation undertaken as part of the EIS was updated to incorporate the latest available groundwater monitoring data.

The review of average groundwater quality conditions indicates that chromium (III+VI), copper, iron and zinc were elevated in comparison to the approved discharge criteria.

- Iron: 24 milligrams per litre (mg/L) above the discharge criteria
- Chromium (III+VI): 0.0004mg/L above the discharge criteria
- Copper: 0.0013 mg/L above discharge criteria
- Zinc: 0.009 mg/L above discharge criteria

While iron concentrations were significantly above the discharge criteria, the concentration of chromium, copper and zinc only slightly exceeded the discharge criteria. It is noted that the average chromium (III+VI) concentration only exceeded the chromium (VI) 95 per cent species protection level and was below the chromium (III) 95 per cent species protection level.

The groundwater quality is considered to be indicative of typical groundwater quality in the Hawkesbury Sandstone aquifer.

The proposed discharge criteria for the operational water treatment plant are based on the condition of approval E187 which states:

- *The CSSI operational water treatment plant discharge criteria must comply with the ANZECC (2000) 95 per cent species protection level and a 99 per cent protection level for contaminants that bioaccumulate unless other discharge criteria are agreed in consultation with relevant stakeholders including EPA, DPI Water and Sydney Water. Discharge criteria for iron during operation must comply with the ANZECC (2000) recreational water quality criteria.*

Discharges from the operational water treatment plant would be to the estuarine environment of Alexandra Canal. Therefore, the marine water quality trigger values were adopted as the discharge criteria. The freshwater trigger value was adopted for manganese consistent with the EIS. No nutrient discharge criteria were adopted in the absence of a 95 per cent species protection level for nutrients. The adopted operational water treatment plant discharge criteria are presented in the section below.

Water quality impacts

A box model assessment was undertaken to assess impacts associated with treated tunnel water discharges. This assessment was limited to the assessment of treated tunnel groundwater flows. The results of the box model assessment are provided in **Table 6-45**.

The box model assessment results indicate that:

- Treated discharges would result in a negligible impact on water quality within Alexandra Canal
- The number of constituents that currently exceeds the NSW Water Quality Objectives for aquatic ecosystems in marine / estuarine waters within Alexandra Canal (i.e. copper, lead, zinc, nitrogen and phosphorus) would remain the same as described in the EIS.

On the basis that minor increases in nutrient loading were assessed to pose a negligible impact to Alexandra Canal, nutrient removal processes within the water treatment plant are not considered to be required.

Table 6-45 Box model assessment results

Pollutants	Baseline Alexandra Canal water quality (mg/L)	Tunnel groundwater quality (mg/L)	WTP discharge criteria[1] (mg/L)	Assumed WTP discharge quality (mg/L)[5]	Final Alexandra Canal water quality (mg/L)	Impact (%)
Arsenic	0.003	0.0009	-	0.0009	0.003	-0.3
Cadmium	0.00005	0.00006	0.0007	0.00006	0.00005	0.0
Chromium (III+VI)	0.002	0.0048	0.0044[3]	**0.0044**	0.002	0.5
Copper	0.0050	0.0047	0.0013	**0.0013**	0.0050	-0.3
Iron	0.29	24.34	0.3	**0.3**	0.29	0.0
Lead	0.0050	0.0013	0.0044	0.0013	0.005	-0.3
Manganese	0.031	0.69	1.9 [2]	0.69	0.034	9.5
Mercury	0.00005	0.00005	0.00010	0.00005	0.00005	0.0
Nickel	0.002	0.007	0.007	0.007	0.002	1.1
Zinc	0.046	0.024	0.015	**0.015**	0.046	-0.3
Nitrogen (Total)	0.9	1.64	- [4]	1.64	0.90	0.4
Nitrate	0.2	0.09	- [4]	0.09	0.20	-0.2
Ammonia	0.38	0.56	0.91	0.56	0.381	0.2
Phosphorus (Total)	0.09	0.41	- [4]	0.41	0.091	1.6
Reactive Phosphorus as P	0.010	0.013	- [4]	0.013	0.010	0.1

[1] Adopted discharge criteria based on marine water 95 per cent or 99 per cent (for contaminants that bioaccumulate) species protection level (ANZECC, 2000)

[2] Freshwater 95 per cent species protection level adopted for manganese

[3] Based on chromium (VI) marine water 95 per cent species protection level

[4] No ANZECC (2000) 95 per cent or 99 per cent species protection level

[5] Lower value of tunnel groundwater quality and WTP discharge criteria. **Bold values** indicate where the discharge criteria were adopted as the discharge quality indicating some treatment may be required

Shaded values indicate Alexandra Canal constituent exceeds NSW Water Quality Objective (WQO) for aquatic ecosystems in marine / estuarine waters.

Geomorphic impacts

The operational water treatment plant would increase discharge volumes to Alexandra Canal on average by around 23 litres per second with a negligible increase in runoff rates also occurring associated with the minor increase in impervious surface. Potential discharge options to Alexandra Canal are described in **Chapter 4** (Proposed modification). The final design of the stormwater infrastructure would be confirmed during detailed design.

There is potential to disturb contaminated sediments within Alexandra Canal through increases in concentrated flow and velocities at an existing outlet where insufficient dissipation / scour protection is provided. There is also potential for sediment to be disturbed if flow rates within the wider canal are significantly increased. The disturbance of contaminated sediments could affect local water quality. Contaminated sediments within Alexandra Canal are regulated by a Remediation Order issued by the NSW EPA which aims to prevent the disturbance of these sediments.

The treated tunnel discharge rate (around 23 litres per second) would be minor compared to flow rates and velocities from intermittent stormwater discharges at the outlet (likely to be greater than 1000 L/s) and compared to the overall flow rates in the Alexandra Canal.

Providing appropriate dissipation / scour protection is in place at the existing outlet to cater for stormwater flows, the newly introduced continuous flow is unlikely to increase the risk of scour occurring during dry conditions. The suitability of the existing dissipation / scour protection to cater for the additional flow during design storm conditions would be confirmed during detailed design and supported by drainage modelling.

Management measures and conditions of approval

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

The proposed modification would not require changes to the conditions of approval for the project related to surface water, flooding and drainage impacts at the Campbell Road motorway operations complex.

6.6.5 Land use and property

Assessment methodology

The assessment of impacts from the proposed modification on land use and property has been carried out according to the methodology summarised in **section 6.3.5**.

Existing environment

The Campbell Road motorway operations complex site is to be located on land undergoing change due to the construction of the New M5 project. This includes construction of permanent operational infrastructure including the St Peters interchange and upgrades and modifications to the local road network.

The approved design for the interchange (as delivered by the New M5 project) would result in the provision of open space and recreation areas.

Existing land uses in the immediate vicinity of the St Peters interchange include a commercial enterprise corridor along the Princes Highway, general industrial lands, local and arterial roads, Sydney Park to the north and Alexandra Canal to the east. Surrounding land uses include the residential neighbourhoods of Newtown, Sydenham and St Peters, as well as general residential and industrial areas of Alexandria to the east. Residential areas around Campbell Road consist primarily of double storey ‘Victorian’ terrace houses on the north side of Campbell Road and a multi-storey apartment building on the corner of Campbell Road and Barwon Park Road.

Operational infrastructure for the approved M4-M5 Link project at this location will include a motorway control complex, ventilation facilities, distribution substation, fire pump rooms and deluge tanks.

Land use zoning surrounding the Campbell Road motorway operations complex site is shown in **Figure 6-15**.

Refer to section 12.2.2 of the EIS for further information regarding existing land use and planning controls at the Campbell Road motorway operations complex site.

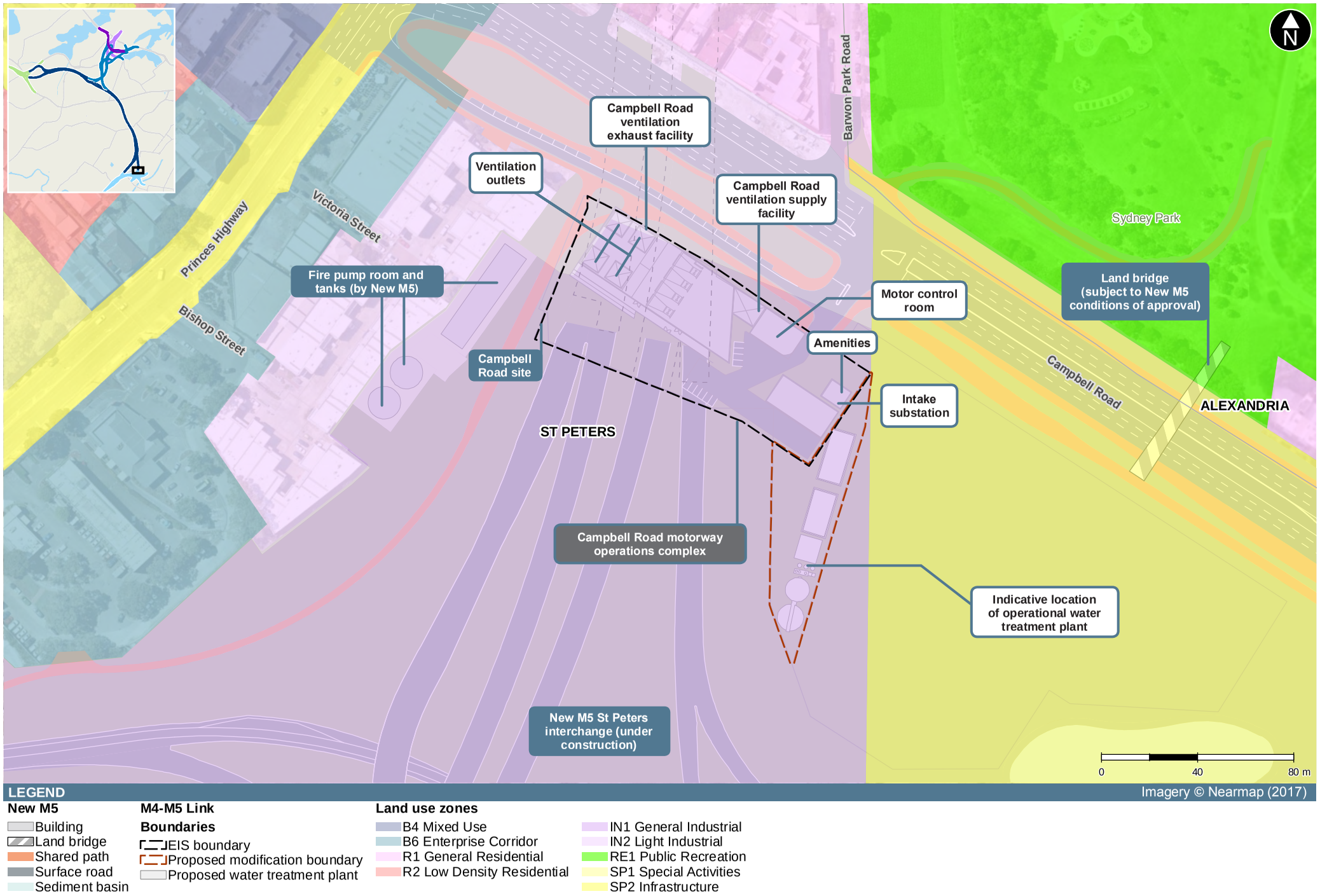


Figure 6-15 Campbell Road motorway operations complex - existing land use zoning surrounding the site

Assessment of potential impacts

Property acquisition

The operational footprint of the Campbell Road motorway operations complex would change for the inclusion of the operational water treatment plant however this land has already been acquired as part of the New M5 project and is now owned by Roads and Maritime as described in section 12.2.2 of the EIS.

Table 6-46 provides a comparison of property acquisition required for the approved project and the proposed modification.

Table 6-46 Comparison of property acquisition required for the approved project and the proposed modification

Location	Existing land use	Property acquisition assessed in the EIS	Additional property acquisition required for proposed modification
Campbell Road civil and tunnel site / motorway operations complex	A section of land is being used as a construction ancillary facility for the New M5 project and a section of land is being used construction ancillary facility for the M4-M5 Link project.	None[1]	No additional property acquisition required for modification

Notes:

[1] Refer to the New M5 EIS (November 2015) for acquisitions that occurred at this location

Land use

The Campbell Road civil and tunnel site is described in section 6.5.14 of the EIS for the approved project. The EIS describes that construction activities would be carried out on land that was at the time being used for the New M5 project. Construction activities at the facility would include tunnelling and tunnel support activities and the construction of operational infrastructure. This would remain unchanged for the proposed modification, with the exception that an operational water treatment plant would be included as part of the infrastructure to be constructed.

The proposed modification would require an increase to the operational footprint of the Campbell Road motorway operations complex towards the south east to allow for the relocation the operational water treatment plant from Darley Road, as described in **Chapter 4** (Proposed modification). The proposed modification would not involve changes to other operational infrastructure at the site. The increase in footprint for the Campbell Road motorway operations complex would be around 0.2 hectares.

The increase in footprint of the motorway operations complex would have only a minimal impact on the total area of proposed open space on the southern side of Campbell Road at the St Peters interchange that is being delivered as part of the New M5 project. The increase in footprint will also have a small impact on the proposed landscaping area for the St Peters interchange to be provided in this location.

A comparison of land use impacts for the approved project and proposed modification is provided in **Table 6-47**.

Table 6-47 Comparison of land use impacts for the approved project and proposed modification at the Campbell Road motorway operations complex

	Construction		Operation	
Location	**Approved project**	**Proposed modification**	**Approved project**	**Proposed modification**
Campbell Road civil and tunnel site	Construction activities would be carried out on land currently being used for the New M5 project. Construction activities would include tunnelling and tunnel support activities and the construction of operational infrastructure including ventilation facilities and sub-station.	Construction activities would be carried out on land currently being used for the New M5 project. Construction activities would include tunnelling and tunnel support activities and the construction of operational infrastructure including the operational water treatment plant, ventilation facilities and sub-station.	A section of the site would be used for operational infrastructure including the Campbell Road Motorway Operations Centre (MOC5).	A section of the site would be used for operational infrastructure including the Campbell Road Motorway Operations Centre. The footprint of the operational area would be increased by around 0.2 hectares to allow for the operational water treatment plant.

Management measures and conditions of approval

Potential land use and property impacts associated with the proposed modification would be effectively managed through the implementation of the approved environmental management measures for the project as summarised in Part E of the SPIR.

The proposed modification would not require changes to the conditions of approval for the project related to land use impacts at the Campbell Road motorway operations complex.

6.6.6 Urban design and visual amenity

Assessment methodology

The assessment of impacts from the proposed modification on urban design and visual amenity has been carried out according to the methodology summarised in **section 6.3.6**.

Existing environment

The Campbell Road motorway operations complex comprises a section of land being used as a construction ancillary facility for the New M5 project and a section of land is being used as a construction ancillary facility for the M4-M5 Link project.

The approved design for the interchange (as delivered by the New M5 project) would result in the provision of open space and recreation areas.

Operational infrastructure for the approved M4-M5 Link project at this location will include a motorway control complex, ventilation facilities and substation.

The existing landscape character and visual setting in this area is characterised by:

- Residential areas around Campbell Road consisting primarily of double storey 'Victorian' terrace houses and a multi-storey apartment building on the corner of Campbell Road and Barwon Park Road
- Sydney Park, which comprises open space areas and pockets of dense 'bush character' vegetation
- Industrial land uses around the Alexandra Canal
- Commercial and medium to high density mixed land uses around the Princes Highway
- A large construction site for the St Peters interchange.

Large areas of new tree planting will be incorporated as part of the New M5 project on both sides of the M4-M5 Link ramps at the St Peters interchange and above the portals to present a continuous canopy and create a sense of green immersion for the motorist upon entry or exit from the tunnel.

Roads and Maritime, as the proponent for the New M5 project, has responsibility for the urban design of the St Peters interchange. This includes a proposed land bridge connecting Sydney Park to the St Peters interchange and areas of open space and recreation areas. Roads and Maritime are currently working with the City of Sydney Council as to the Urban Design outcomes in accordance with the New M5 conditions of approval.

Existing sources of night lighting at and around the site includes street lighting associated with Campbell Road including a new signalised intersection, Albert Street, the share pathway running along the western edge of the St Peters interchange, some lighting to the facades and windows of fringing industrial and residential development, lighting associated with construction activities being undertaken at and around the site as part of the New M5 project. The location of nearby sensitive visual receivers is provided in **Figure 6-16**.

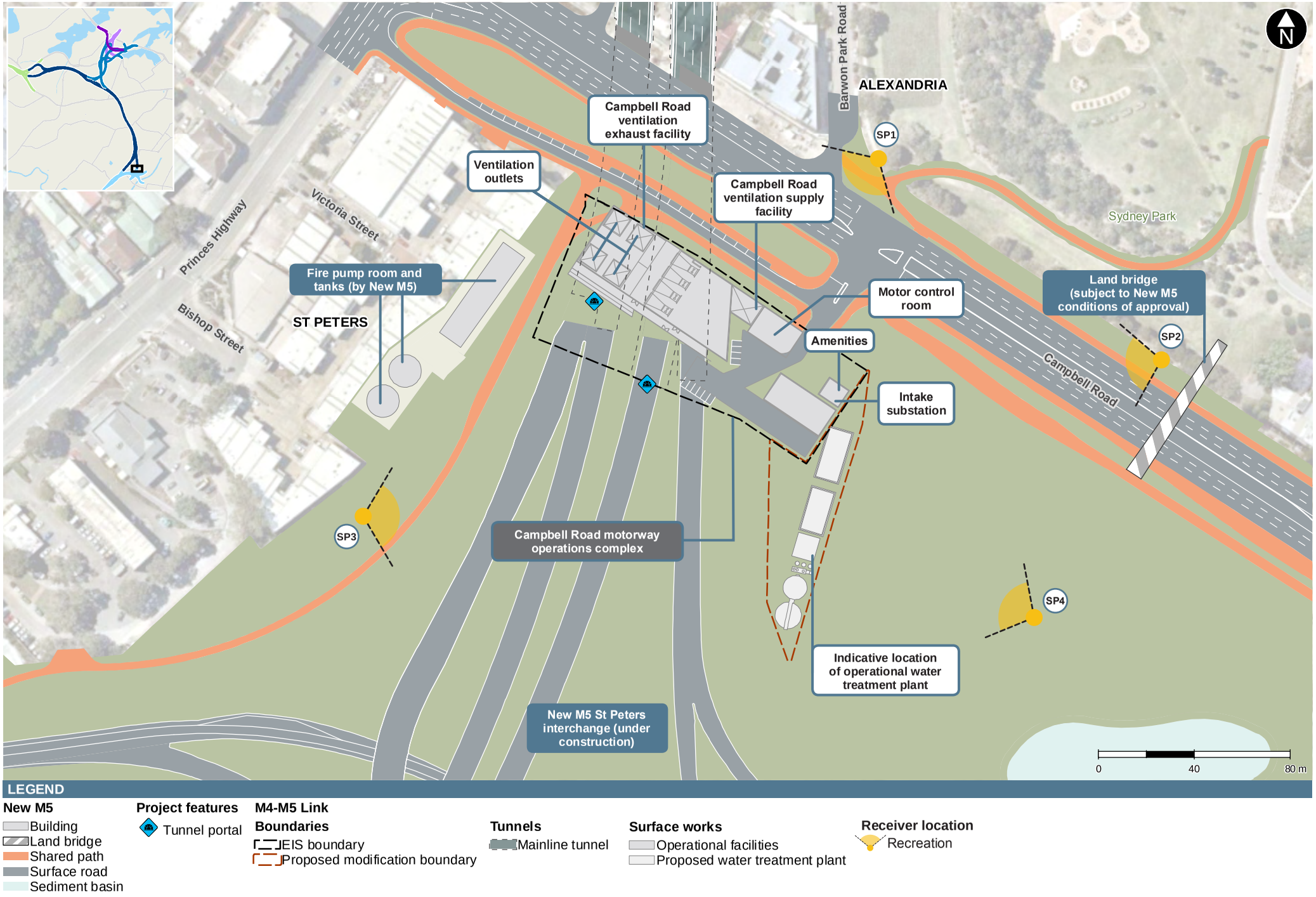


Figure 6-16 Campbell Road motorway operations complex representative receiver locations

Assessment of potential impacts – construction

The operational water treatment plant would be constructed generally within the approved construction footprint at the Campbell Road civil and tunnel site as detailed in section 6.5.14 of the M4-M5 Link EIS.

The construction of the water treatment plant would involve construction activities generally consistent with the approved construction activities described in the EIS. As a result the proposed modification would not change the magnitude of visual impact or night lighting impact of the project during construction at this location.

Assessment of potential impacts – operation

The primary visual element that would change for the proposed modification at the Campbell Road motorway operations complex would be the addition of the operational water treatment plant in the location shown in **Figure 6-16**. The footprint of the motorway operations complex would be extended to accommodate the water treatment plant and it would be located in proximity to an area of landscaping and active open space for the New M5 project.

The architectural design of the operational water treatment plant would be undertaken in accordance with a project Urban Design and Landscape Plan (UDLP) and the urban design principles developed for the project. The operational water treatment plant would be designed to be visually consistent with adjacent operational infrastructure comprising the Campbell Road motorway operations complex.

The operational water treatment plant would be located in proximity to the intake substation, amenities building and motorway control room at the Campbell Road motorway operations complex. The visibility of the treatment plant from the north would be limited given that views would be obscured in part by the ventilation facilities and intake substation.

The operational water treatment plant would be about one to two storey in height and consist of water tanks, buildings and plant equipment. The water treatment plant would generally be of a smaller scale compared to surrounding motorway infrastructure including the tunnel portals, St Peters interchange, and ventilation facilities.

The water treatment plant would include site lighting however the additional lighting would be negligible compared to overall site lighting impacts assessed in the EIS for the motorway operations and given the existing illumination levels from Campbell Street and lighting proposed at the St Peters interchange. Site lighting would be designed to minimise glare issues and light spillage in adjoining properties and would be generally consistent with the requirements of *Australian Standard 4282-1997 Control of the obtrusive effects of outdoor lighting*.

A summary of visual on sensitive receivers during operation at the Campbell Road motorway operations complex for the proposed modification is provided in **Table 6-48**.

Table 6-48 Summary of operational visual impacts on sensitive receivers at the Campbell Road motorway operations complex

Receiver location	Receiver type	Sensitivity	Magnitude	Overall impact rating (modification)	Overall impact rating (EIS)
Visual impacts					
View looking south from corner of Barwon Park Road and Campbell Road (SP1)	Residents	Moderate	Moderate	Moderate	Moderate
	Pedestrians	Moderate	Moderate	Moderate	Moderate
	Motorists/ cyclists	Low	Moderate	Moderate–Low	Moderate–Low
View from Campbell Road verge looking west (SP2)	Pedestrians	Low	Moderate	Moderate–Low	Moderate–Low
	Motorists/ public transport/ cyclists	Low	Moderate	Moderate–Low	Moderate–Low
View looking north from St Peters interchange shared pathway (SP3)	Pedestrians/ recreational cyclists	Low	Moderate	Moderate–Low	Moderate–Low
Night lighting impacts					
View looking south from corner of Barwon Park Road and Campbell Road (SP1)	Residents	Low	Low	Low	Low
	Pedestrians	Low	Low	Low	Low
	Motorists/ cyclists	Negligible	Negligible	Negligible	Negligible
View from Campbell Road verge looking west (SP2)	Pedestrians	Low	Low	Low	Low
	Motorists/ cyclists/ public transport	Negligible	Negligible	Negligible	Negligible
View looking north from St Peters interchange share pathway (SP3)	Pedestrians/ recreational cyclists	Low	Low	Low	Low

The operational water treatment plant would have potential visual impacts on future users of the proposed open space to be provided by the New M5 project directly to the east. The operational water treatment plant would be viewed in the context of other building structures and road infrastructure associated with the St Peters interchange.

The proposed modification would comprise the addition of small scale structures that would be congruent with the portals, ventilation facilities, sub-station and other structures that will form part of the broader St Peters interchange landscape. The architectural design, detailing, fencing and landscaping of the water treatment plant would consider potential views from the proposed adjacent open space areas for the New M5 project. The potential visual impact to future users of the active open space to be provided by the New M5 project is therefore considered to be minor.

Potential landscape character impacts associated with the operational water treatment plant would be limited to the St Peters interchange precinct (landscape character zone (LCZ) 33 as assessed in

Chapter 13 (Urban design and visual amenity) of the EIS). The description of the LCZ 33 in the EIS is consistent with the description of the existing environment described above. The water treatment plant infrastructure would generally not be visible from other LCZs in the context of the large scale of the St Peters interchange.

As described above, the water treatment plant would be located at the St Peters and would comprise the addition of small scale structures that would be highly congruent with the portals and other structures part of the broader St Peters interchange landscape. The overall impact to LCZ 33 is therefore considered to be negligible. A summary of potential landscape character impacts is provided in **Table 6-49**.

Table 6-49 Summary of landscape character impacts at the Campbell Road motorway operations complex associated with the operational water treatment plant

Receiver location	Sensitivity	Magnitude	Overall rating (Modification)	Overall rating (EIS)
LCZ 33 – St Peters interchange precinct	Negligible	Low	Negligible	Negligible

Given the location of the operational water treatment plant and the fact that it would be designed in accordance with a project UDLP and would be of a comparable or smaller scale to surrounding operational infrastructure, it is considered that the modification would not result in an increased magnitude of visual or landscape impacts at this location compared to the impacts assessed in the EIS.

Urban design

An environmental management measure relating to urban design has been included (see section below) to ensure the operational water treatment plant would integrate with nearby areas of open space. The operational water treatment plant would be subject to the M4-M5 Link UDLP for the Campbell Road motorway operations complex and would consider landscaping along the perimeter of the operational water treatment plant to provide a degree of visual screening of the infrastructure when viewed from the south and east.

A detailed review and finalisation of architectural treatment of the operational water treatment plant as part of a review of all project operational infrastructure, including ventilation facilities, would be undertaken during detailed design. The architectural treatment of the operational water treatment plant would be guided by, the outcomes of community consultation and the urban design principles identified in section 13.2.2 of the EIS.

Management measures and conditions of approval

Potential visual impacts associated with the proposed modification would be effectively managed through the implementation of the approved environmental management measures for the project as summarised in Part E of the SPIR.

For the relocation of the operational water treatment plant at the Campbell Road motorway operations complex, the environmental management measure identified in **Table 6-50** would be implemented to ensure the structure would be visually consistent with the adjacent open space areas that would be delivered for the New M5 project.

Table 6-50 Environmental management measures for the proposed modification

Impact	Environmental management measure	Timing
Impacts to visual amenity at St Peters interchange	The architectural design, detailing, fencing and landscaping of the water treatment plant would consider potential views from the proposed adjacent open space areas for the New M5 project.	Construction

The proposed modification would not require changes to the conditions of approval for the project related to urban design and visual amenity at the Campbell Road motorway operations complex.

6.6.7 Social and economic

Construction of the operational water treatment plant at the Campbell Road civil and tunnel site would not result in any additional amenity impacts by comparison to those considered in the EIS. The increase in footprint of the motorway operations complex would have only a minimal impact on the total area of proposed open space on the southern side of Campbell Road at the St Peters interchange that is being delivered as part of the New M5 project. The increase in footprint will also have some impact on the proposed landscaping area for the St Peters interchange to be provided in this location.

Impacts associated with the construction of the operational water treatment plant at the Campbell Road civil and tunnel site for the proposed modification would be consistent with the impacts identified for the approved project.

6.6.8 Non-Aboriginal heritage

Options 1 and 2 for the discharge of wastewater from the mainline tunnels (as described in **section 6.4.4**) would discharge to the stormwater basin and/or drainage network within the St Peters interchange site being constructed by the New M5 project or to the existing local drainage network. These drainage networks would then discharge to Alexandra Canal. The Alexandra Canal is listed on the State Heritage Register and Sydney Water s.170 NSW State agency heritage register.

By using the existing drainage infrastructure or drainage infrastructure being constructed by the New M5 project, no additional works are proposed which would impact on Alexandra Canal. The additional discharge flow is considered to pose a negligible impact on flow velocities and flow energy in the canal. The proposed modification would therefore not result in direct or indirect impacts to the heritage item.

Option 3 would discharge to Sydney Water's sewage system in accordance with a Trade Waste Agreement and would not directly impact the Alexandra Canal.

7 Conditions of approval

This chapter outlines the conditions of approval relevant to the WestConnex M4-M5 Link (the project) (as described in **Chapter 1**(Introduction)) that would need to be amended as a result of the proposed modification.

A review of the conditions of approval for the project was undertaken to identify the conditions that would require either amendment or deletion as part of the proposed modification.

7.1 Conditions to be amended or removed

Table 7-1 presents the proposed changes to the conditions of approval for the project. These changes are required to Schedule 1 (description of critical State Significant Infrastructure (CSSI)) and Schedule 2 (conditions of approval). Proposed amendments are shown in red text and deletions shown as strikethrough text (e.g. ~~strikethrough~~ text).

Table 7-1 Conditions of approval to be amended or removed

No.	Description of CSSI or condition of approval	Action and reason
Sch1	Development for the purposes of the WestConnex M4-M5 Link project being a new multi-lane road link connecting the M4 East project at Haberfield with the New M5 project at St Peters comprising: • (…) • ~~five~~ four motorway operations complexes – ~~one at Darley Road, Leichhardt,~~ two within the former Rozelle Rail Yards, one adjacent to Victoria Road between Callan and Springside Streets, Rozelle and one adjacent to Campbell Road, St Peters interchange; • (…)	**Amend condition** Remove specific reference to the Darley Road motorway operations complex. The Darley Road motorway operations complex no longer forms part of the project. The removal of the Darley Road motorway operations complex is described in **Chapter 4** (proposed modification). By removing this reference Schedule 1 would be consistent with the proposed modification.
A1	The CSSI must be carried out in accordance with the terms of this approval and generally in accordance with the description of the CSSI in the WestConnex M4-M5 Link Environmental Impact Statement – Volumes 1A-C and 2A-J (dated August 2017) (the EIS), ~~and~~ the WestConnex M4-M5 Link Submissions and Preferred Infrastructure Report (dated January 2018) (the SPIR), and WestConnex M4-M5 Link Modification Report (MOD 1) (September 2018).	**Amend condition** The project would be changed by the proposed modification. Reference to the modification application documentation should be included in the condition.
A2	The CSSI must be carried out in accordance with all procedures, commitments, preventative actions, performance criteria and mitigation measures set out in the EIS, ~~and~~ SPIR, and MOD1 unless otherwise specified in, or required under, this approval.	**Amend condition** The project would be changed by the proposed modification. Reference to the modification application documentation should be included in the condition.

No.	Description of CSSI or condition of approval	Action and reason
C19	The Parramatta Road West and Parramatta Road East civil sites are to be ~~Only one of the two ancillary facility options (A or B) presented in Chapter 6 of the EIS can be implemented at Haberfield, except if one site is~~ used for parking and other works that do not exceed the 'Noise affected' Noise Management Levels as identified in the ICNG.	**Amend condition** As construction design and planning has progressed since the EIS and SPIR, the proponent is proposing to delete reference to the ancillary facility options (A or B) as presented in Chapter 6 of the EIS. The proponent is proposing to use the Parramatta Road West and Parramatta Road East civil sites for parking and other works that do not exceed the 'Noise affected' Noise Management Levels as identified in the ICNG, which is consistent with the intent of condition of approval C19.
C20	~~Should Option B, as presented in Chapter 6 of the EIS, be progressed, a comparative analysis of environmental impacts of the use of the sites during construction of the project (excluding Site Establishment Works and erection of acoustic enclosures), must be undertaken. The comparative analysis must be undertaken for the following key environmental impacts: noise and vibration, traffic and transport, visual amenity and socio-economic.~~	**Remove condition** The proponent is not proposing to proceed with ancillary facility option B as proposed in Chapter 6 of the EIS. The condition is no longer required.
C21	~~In the event that Option B is progressed, for purposes other than for parking and works that do not exceed the 'Noise affected' Noise Management Levels as identified in the ICNG, the Proponent must submit a report outlining the findings of the comparative analysis required by Condition C20 to the to the Secretary for approval at least one (1) month prior to the establishment of the Option B construction ancillary facilities. The report must demonstrate how management and mitigation measures, consistent with those included in the documents referred to in Condition A1 and as required by the terms of approval, would be implemented to achieve, on balance, comparable environmental outcomes when compared to Option A.~~	**Remove condition** The proponent is not proposing to proceed with ancillary facility option B as proposed in Chapter 6 of the EIS. The condition is no longer required.
E59	Enhanced cycle facilities at Rozelle Bay ~~and Leichhardt North~~ light rail stop~~s~~ must be investigated and implemented if possible in consultation with Transport for NSW and incorporated into the Pedestrian and Cycle Implementation Strategy required by Condition E60.	**Amend condition** The proposed modification would remove the Darley Road site from the project. Therefore this condition should be amended to remove reference to works at this location.

No.	Description of CSSI or condition of approval	Action and reason
E71	~~Notwithstanding Conditions E70 and E73 spoil haulage from the Darley Road construction ancillary facility must only be undertaken during the hours specified in Conditions E68 and E69. Onsite deliveries to the Darley Road ancillary facility may only be undertaken outside the hours specified in Conditions E68 and E69 in accordance with Condition E73(e).~~	**Remove condition** The proposed modification would remove the Darley Road site from the project as described in **Chapter 4** (Proposed modification). With the Darley Road site no longer forming part of the project this condition is no longer required.
E73	Notwithstanding Conditions E68 to E72 works may be undertaken outside the hours specified under those conditions in the following circumstances: (a) for the delivery of materials required by the NSW Police Force or other authority for safety reasons; or (b) where it is required in an emergency to avoid injury or the loss of life, to avoid damage or loss of property or to prevent environmental harm; or (c) where different construction hours are permitted or required under an EPL in force in respect of the CSSI; or (d) works approved under an Out-of-Hours Work Protocol for works not subject to an EPL as required by Condition E77; or (e) construction that causes LAeq(15 minute) noise levels: (i) no more than 5 dB(A) above the rating background level at any residence in accordance with the Interim Construction Noise Guideline (DECC, 2009), and (ii) no more than the 'Noise affected' noise management levels specified in Table 3 of the Interim Construction Noise Guideline (DECC, 2009) at other sensitive land uses, and (iii) continuous or impulsive vibration values, measured at the most affected residence are no more than the maximum values for human exposure to vibration, specified in Table 2.2 of *Assessing Vibration: a technical guideline (DEC, 2006)*, and (iv) intermittent vibration values measured at the most affected residence are no more than the maximum values for human exposure to vibration, specified in Table 2.4 of *Assessing Vibrations: a technical guideline (DEC,2006).* *Note: Section 5.24(1)(e) of the EP&A Act requires that an EPL be substantially consistent with this approval.* ~~*For example, an EPL cannot authorise spoil movements at the Darley Road construction ancillary facility outside of the hours specified in Conditions E68 and E69.*~~ *Out of Hours Works considered under Conditions E73(c) and (d) must be justified and included an assessment of mitigation measures.*	**Amend condition** The note attached to the condition makes reference to the Darley Road construction ancillary facility. The proposed modification would remove this site from the project. As such the condition note should be amended to remove reference to the Darley Road construction ancillary facility.

The proposed changes would ensure that the conditions of approval are consistent with the proposed modification.

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8 Environmental management measures

Chapter 29 of the Environmental Impact Statement (EIS) for the project summarised the identified environmental management measures that would be adopted to avoid or reduce potential environmental impacts. These measures were revised in Part E of the Submissions and Preferred Infrastructure Report (SPIR) after consideration of the issues raised during the EIS public exhibition period.

This chapter:

- Amends or deletes existing environmental management measures that are no longer required or need to be amended as a result of the proposed modification
- Identifies additional environmental management measures that are required to address potential impacts associated with the proposed modification.

Chapter 6 (Environmental assessment) indicated that potential impacts for the following environmental issues would be effectively managed through the implementation of the approved environmental management measures for the project as summarised in the SPIR:

- Traffic and transport
- Noise and vibration
- Air quality
- Surface water and flooding
- Land use and property
- Groundwater
- Non-Aboriginal heritage
- Resource use and waste
- Social and economic.

Chapter 6 (Environmental assessment) indicated that for the following environmental aspects, new or revised environmental management measures would be required to manage potential impacts associated with the proposed modification:

- Urban design and visual amenity.

Table 8-1 lists the environmental management measures which would be deleted or amended as a result of the proposed modification, including the removal of the Darley Road site from the project.

Where environmental management measures have been added or new text has been added to an existing measure, this new text is highlighted in red. Where an environmental management measure has been deleted or text from the measure deleted, it appears as strikethrough text (e.g. ~~strikethrough~~).

Table 8-1 Environmental management measures to be amended by proposed modification

Impact	Ref #	Environmental management measure	Timing	Comment
Urban design and visual amenity				
~~Impacts to visual amenity as a result of the Darley Road motorway operations complex~~	~~LV11~~	~~Investigate options for planting of vegetation to screen residents on the southern side of Darley Road from the Darley Road motorway operations complex. Include feasible and reasonable measures in the relevant UDLP.~~	~~Construction~~	No construction activities or permanent operational infrastructure would be provided at the Darley Road site.
	~~LV12~~	~~Architectural design and detailing of the water treatment facility, substation and front fencing should achieve articulation, visual interest, and integrate with the streetscape.~~	~~Construction~~	No construction activities or permanent operational infrastructure would be provided at the Darley Road site.
Impacts to visual amenity at St Peters interchange	LV20	The architectural design, detailing, fencing and landscaping of the water treatment plant would consider potential views from the proposed adjacent open space areas for the New M5 project.	Construction	New measure for the management of potential visual impacts associated with the operational water treatment plant.
Non-Aboriginal heritage				
~~Potential impacts to heritage items at Leichhardt (Darley Road)~~	~~NAH15~~	~~Landscaping, following the construction of the substation, should consider screening the substation and water treatment plant, from the Leichhardt (Charles Street) Underbridge. The design and location of the landscaping will be informed by a heritage specialist and should seek to create a visual separation between the new structure and the heritage item.~~	~~Construction~~	No construction activities or permanent operational infrastructure would be provided at the Darley Road site.

Impact	Ref #	Environmental management measure	Timing	Comment
Soil and water quality				
Operational impacts on surface water quality	OSW16	The operational water treatment facilities will be designed and managed such that effluent will be of suitable quality for discharge to the receiving environment. ~~Opportunities to incorporate nutrient treatment within the plant at Darley Road will be investigated during detailed design.~~ Discharge criteria will be developed in accordance with the ANZECC (2000) and relevant NSW WQOs, including the following discharge criteria: • 0.3 milligrams per litre for iron • 1.9 milligrams per litre for manganese. The discharge criteria for the treatment facilities will be nominated during detailed design in consultation with relevant stakeholders and included in the OEMP.	Construction and operation	No construction activities or permanent operational infrastructure would be provided at the Darley Road site.

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9 Justification and conclusion

Approval for the construction and operation of the M4-M5 Link (the project) was granted on 17 April 2018 by the NSW Minster for Planning (application number SSI 7485). The approved project allows construction and operation of the M4-M5 Link in two stages. The proposed modification relates to Stage 1 of the project, the mainline tunnels between the M4 East Motorway at Haberfield and the New M5 Motorway at St Peters.

Since approval was granted for the M4-M5 Link, a contractor has been appointed to construct Stage 1 of the project on behalf of the proponent, NSW Roads and Maritime Services (Roads and Maritime).

Construction design and planning has progressed since the assessment contained in the Environmental Impact Statement (EIS) and Submissions and Preferred Infrastructure Report (SPIR) and a review of the concept design for the approved project has occurred. As a result, the proponent has further optimised the construction site arrangements assessed in the EIS and SPIR to reduce environmental and community impacts and to decrease the overall number of construction sites required for the project

Chapter 6 (Environmental assessment) assesses the likely potential environmental impacts associated with the proposed modification and provides a comparison of the potential environmental impacts for the proposed modification and the approved project.

The proposed modification would result in the following key benefits and impacts:

- The removal of the Darley Road civil and tunnel site from the project will ensure that potential noise, air quality, traffic and other impacts associated with tunnelling are avoided in this area. In addition potential ground-borne noise and vibration impacts associated with the proposed construction of a temporary access tunnel at this location would also be avoided
- The removal of the Darley Road civil and tunnel site from the project will result in tunnelling works at other project tunnelling sites being extended by around six months. This would result in an increase in the duration of traffic, air quality, noise and other impacts directly associated with tunnelling at these locations
- The use of the Northcote Street civil and tunnel site will extend tunnelling operations and associated noise, air quality, traffic and parking impacts at this site for a further four years. This site is being used for tunnelling by the M4 East project. This enables existing infrastructure at the site such as the acoustic shed, driveways, water treatment plant, site offices and other structures to be re-used thereby reducing impacts associated with site establishment activities
- The new construction access tunnel at the Northcote Street civil and tunnel site will be at a depth of over 30 metres where it passes under a limited number of residential properties in the vicinity of Walker Avenue and Alt Street. Construction of the access tunnel will result in minimal ground borne noise impacts to these properties when road headers are being used. During rock-breaker tunnelling works it is predicted that the night time criterion would be exceeded at a number of sensitive receivers in the vicinity of the access tunnel. Predicted settlement impacts are minimal and well within accepted criteria
- The proposed spoil haulage routes for the Northcote Street civil and tunnel site would be more direct and less constrained by comparison to the proposed spoil haulage route for the Parramatta Road West civil and tunnel site described in the EIS and SPIR. The proposed spoil haulage routes would be restricted to state roads that are controlled by Roads and Maritime. Use of the G-loop would allow spoil haulage vehicles the option of using the M4 East motorway tunnels and as a result reduce impacts on the surface road network. Reconstruction and demobilisation works for the G-loop would have some short-term and temporary noise impacts for a few sensitive receivers during limited night works requiring Wattle Street occupancy
- The Parramatta Road West and Parramatta Road East civil sites would be used as civil sites in accordance with condition of approval C19 and other conditions of the project approval. The sites would be used for site offices, light and heavy vehicle car parking, shuttle bus services, workshop and storage of equipment, materials and construction vehicles. Both sites would operate 24 hours a day, seven days a week. No tunnelling, tunnel spoil stockpiling and handling or tunnel spoil

haulage would occur at these sites. It is considered the operation of the Parramatta Road West and Parramatta Road East civil sites would be consistent with the assessment presented in the EIS and SPIR and in accordance with the conditions of approval, noting that tunnelling activities previously proposed at this site would be removed

- The temporary overhead pedestrian walkway between the Parramatta Road West and Parramatta Road East civil sites would allow for the safe and efficient movement of construction workers over Parramatta Road. The walkway structure has been designed to achieve a clearance of 6 metres above Parramatta Road to allow for the safe movement of traffic. The visual impacts of the structure will be minimal when considered in the context of visual environment along this section of the Parramatta Road corridor. A small number of sensitive receivers would experience short-term, temporary noise impacts during the limited night works requiring Parramatta Road occupancy to complete the lifting of the bridge span overhead pedestrian walkway
- The relocation of the operational water treatment plant to the Campbell Road motorway operations centre will occupy a small area of additional land at the St Peters interchange. However, the additional footprint would result in only a minimal impact on the proposed area of open space and landscaping on the southern side of Campbell Road that is being delivered as part of the New M5 project. The visual impact of the water treatment plant will be minimal
- The relocated operational water treatment plant would be designed so that treated water would be in accordance with the discharge criteria specified in condition of approval E187 of the project approval. Treated water would be discharged to Alexandra Canal either via the proposed stormwater infrastructure for the New M5 project or via existing drainage infrastructure. Alternatively it would be discharged to sewer via a Trade Waste Agreement.

The environmental assessment has considered the existing environmental management measures provided in the EIS and SPIR and the conditions of approval for the project. The impacts associated with proposed modification can generally be accommodated by the environmental management measures provided in the EIS and SPIR. An additional environmental management measure has been recommended in relation the visual impacts associated with the relocation of the operational water treatment plant to St Peters. Some environmental management measures have been amended or deleted as a result of the removal of the Darley Road civil and tunnel site from the project.

Changes to the conditions of approval have been proposed to accommodate the proposed modification. The proposed changes to the conditions of approval would provide certainty regarding the arrangement of construction ancillary facility sites at Haberfield and Ashfield and the removal of the Darley Road site at Leichhardt. All other conditions of approval would continue to apply to the project.

Consultation has been carried out with the community, local councils, government agencies and other stakeholders during the preparation of the modification as outlined in **Chapter 5** (Consultation). This modification report will be exhibited for 14 days from 12 September 2018. Following exhibition of the modification, Roads and Maritime will review the submissions received and respond to the issues raised in a Response to Submissions Report.

10 References

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