Transport for NSW

NSW GOVERNMENT

Parramatta Light Rail Stage 2

Amendment Report - Appendices

October 2023

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Appendix A
Updated project description

NSW GOVERNMENT

1. Project description – infrastructure and operation

This chapter provides a description of the proposed features of the project and how it would operate. It includes a description of the main light rail infrastructure proposed, ancillary infrastructure, land requirements and proposed changes to the existing road network. This chapter updates and supersedes the project description provided in Chapter 6 (Project description – infrastructure and operation) of the EIS. A description of how the project would be constructed is provided in Chapter 2.

1.1 Overview

The project comprises new light rail infrastructure in Macquarie Street, Parramatta and between Camellia and the Carter Street precinct adjacent to Sydney Olympic Park, located mainly within existing road reserves and transport corridors. New active transport links would be provided between Camellia and the Carter Street precinct. The project also comprises operation of a new light rail alignment between the Parramatta CBD and the Carter Street precinct. Part of that alignment (between the Parramatta CBD and Camellia) would be shared with Parramatta Light Rail Stage 1.

The new light rail alignment would use infrastructure proposed as part of the project, and that constructed as part of Parramatta Light Rail Stage 1 between the Parramatta CBD and Camellia. The new light rail alignment would form part of the Parramatta Light Rail network, connecting the Parramatta CBD and Stage 1 to Camellia, Rydalmere, Ermington, Melrose Park, Wentworth Point, Sydney Olympic Park and the Carter Street precinct.

The project design presented in this chapter would be further refined during the design development process. The final design may vary from the design described in this chapter.

The design considered by this chapter has been urban design-led, with a focus on placemaking and integrated land use and transport outcomes. The design development process, and the project's urban design and placemaking vision, objectives and principles, are described in Technical Paper 1 (Design, Place and Movement) (appended to the EIS).

1.1.1 Key project infrastructure and operational details

A summary of the project's main features is provided in Table 1.1 and shown on Figure 1.1 to Figure 1.6. A description of the proposed infrastructure is provided in sections 1.2 to 1.7.

Table 1.1 also summarises the proposed operational arrangements. Further information on operation is provided in section 1.10.

The project site is described in section 3.3.1 of the Amendment Report.

Table 1.1 Summary of project features

Project feature	Description
Infrastructure	
Light rail track	• about 10 kilometres of new dual light rail track would be constructed along Macquarie Street in the Parramatta CBD and between Camellia and the Carter Street precinct in Lidcombe, adjacent to Sydney Olympic Park
Light rail stops	• 14 light rail stops
Bridges over the Parramatta River	• bridge between Camellia and Rydalmere • bridge between Melrose Park and Wentworth Point
Road overbridge	• bridge over Silverwater Road between Rydalmere and Ermington
Other bridge works	• bridge in Ken Newman Park connecting to Boronia Street • a new bridge to replace the existing bridge on Hill Road in Sydney Olympic Park • strengthening of the bridge on the Holker Busway in Sydney Olympic Park
Active transport links	• about 9.5 kilometres of new active transport links (footpaths, cycleways or shared paths) • connections to existing active transport links, including to the Parramatta Valley Cycleway at Rydalmere and Melrose Park, and to Louise Sauvage Pathway via the River Walk at Wentworth Point
Public transport	• interchanges with other forms of public transport, including trains, ferries, buses and Sydney Metro West, with the main interchanges located in the Parramatta CBD, Rydalmere and Sydney Olympic Park • provision for bus access to the proposed bridge between Melrose Park and Wentworth Point
Changes to the road network	• alterations to the local road network to accommodate the new light rail infrastructure, including road realignments, road closures, changes to intersection movements, and installation of new pedestrian crossings and traffic signals • creation of a light rail and pedestrian zone (no through vehicle access) within Sydney Olympic Park along Dawn Fraser Avenue between Australia Avenue and Olympic Boulevard
Other facilities and infrastructure to support operation	• turnback facilities at Macquarie Street in the Parramatta CBD, at the Atkins Road stop in Melrose Park, near the Jacaranda Square stop and at the Carter Street stop in Lidcombe • adjustments to the Parramatta Light Rail Stage 1 stabling and maintenance facility in Camellia to increase its operational capacity • five traction power substations (to convert electricity to a form suitable for use by light rail vehicles) • overhead wiring along most of the alignment • driver facilities within the Parramatta CBD and at the Carter Street stop • communications equipment, including poles with heights between 12 and 25 metres
Other public domain works and open space	• public domain improvements at stop locations • open space improvements at Eric Primrose Reserve and Ken Newman Park, and new public open space around the Atkins Road stop
Operation	
Alignment	• operation of a 13 kilometre light rail alignment between the Parramatta CBD and the Carter Street stop in Lidcombe, via Camellia, Rydalmere, Ermington, Melrose Park, Wentworth Point and Sydney Olympic Park • shared running with Parramatta Light Rail Stage 1 services for about three kilometres between Camellia and the Parramatta CBD
Hours of operation	• light rail vehicles would operate from 5am to 1am, seven days a week
Vehicle frequency	• vehicles would arrive between every 7.5 and 15 minutes on weekdays, and between every 10 and 15 minutes on weekends and public holidays

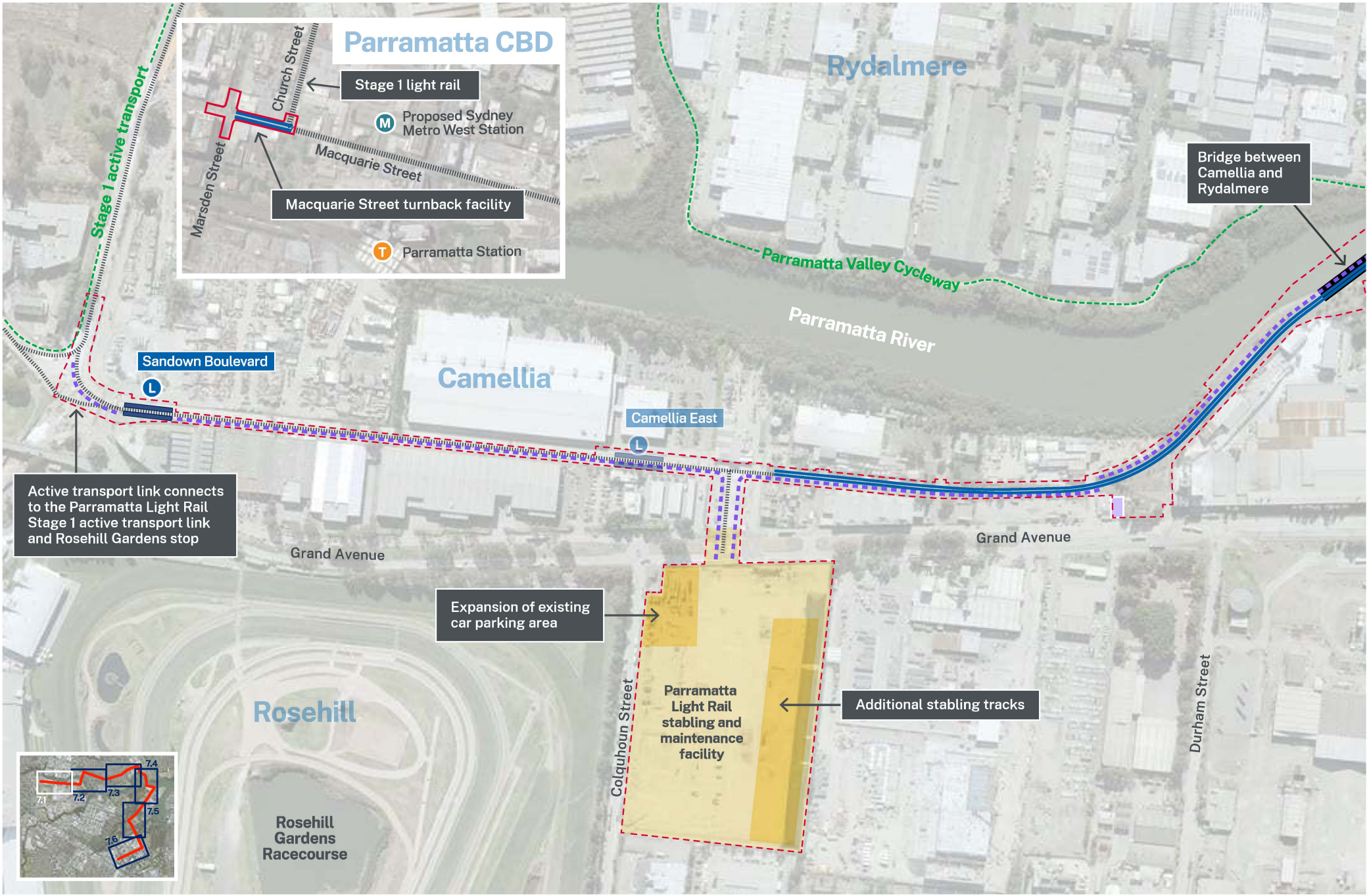

Figure 1.1 Key project infrastructure – map 1

Data source: Imagery - MetroMap (extracted 1/03/2022); Roads, Watercourses, Cadastre - NSWDCS, 2022; Metromap Tile Service.

Figure 1.2 Key project infrastructure – map 2

Data source: Imagery - MetroMap (extracted 1/03/2022); Roads, Watercourses, Cadastre - NSWDCS, 2022; Metromap Tile Service.

Project site
Substation
Modified roads
Platforms
Project alignment
New and improved open space
Bridge works
Light rail stop
Active transport link
Existing cycleway

Figure 1.3 Key project infrastructure – map 3

0 100 200 300m

Data source: Imagery - MetroMap (extracted 1/03/2022); Roads, Watercourses, Cadastre - NSWDCS, 2022; Metromap Tile Service.

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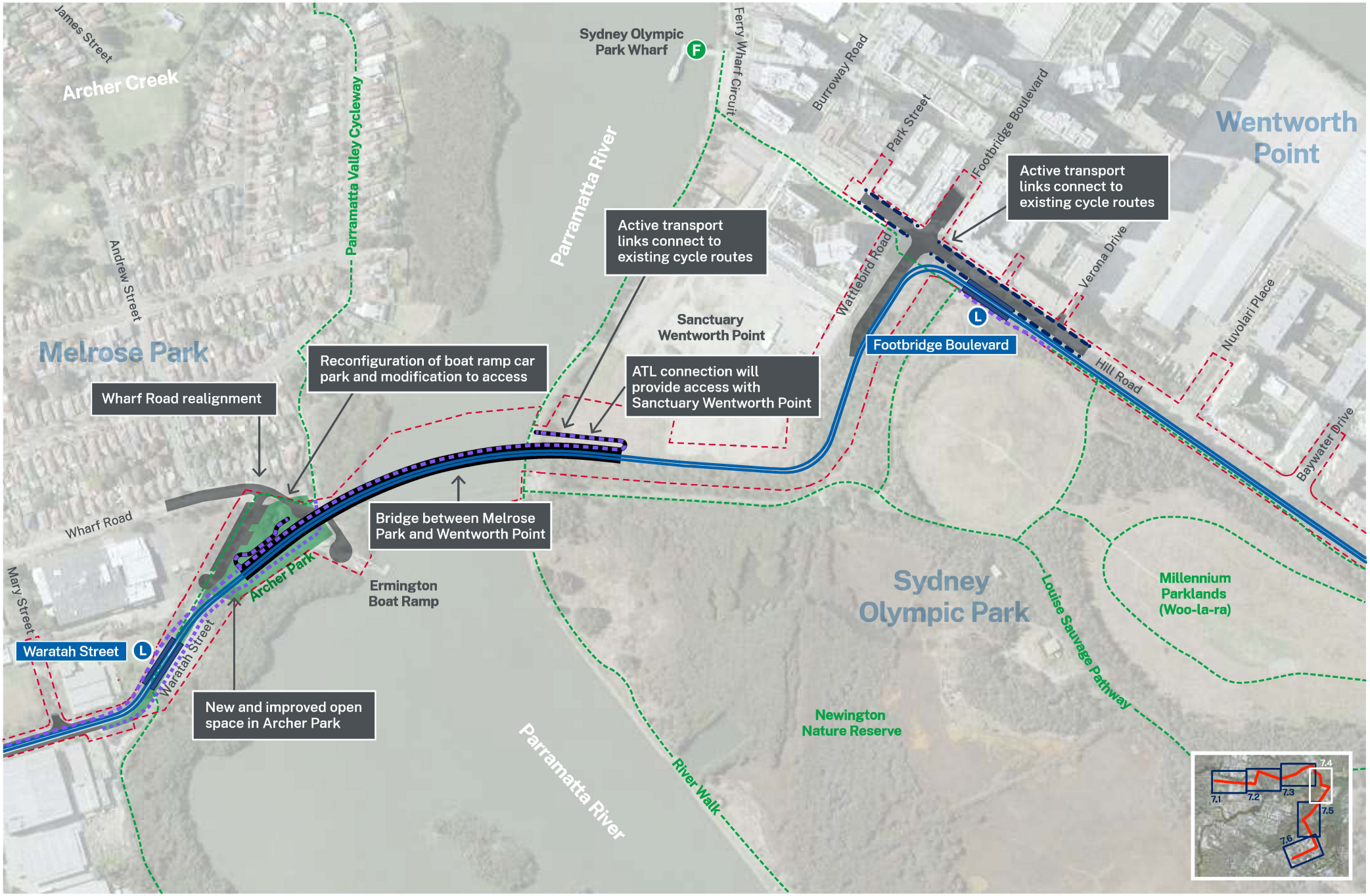


Project site
Substation
Modified roads
Platforms
Project alignment
New and improved open space
Bridge works
Light rail stop
Existing ferry wharf
Active transport link
Active transport – on-road bicycle lane
Existing cycleway

Figure 1.4 Key project infrastructure – map 4

0 100 200 300m

Data source: Imagery - MetroMap (extracted 1/03/2022); Roads, Watercourses, Cadastre - NSWDCS, 2022; Metromap Tile Service.

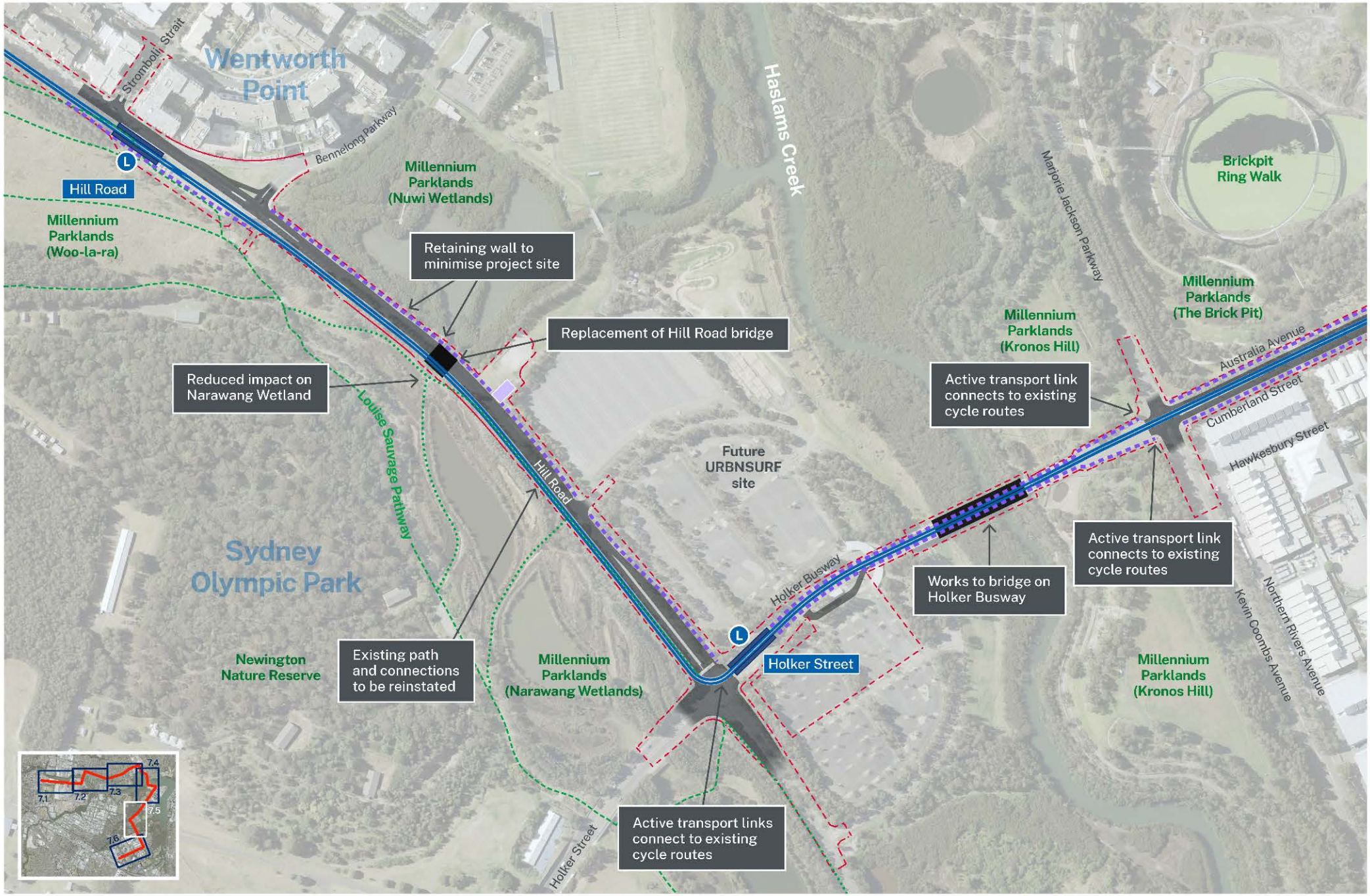
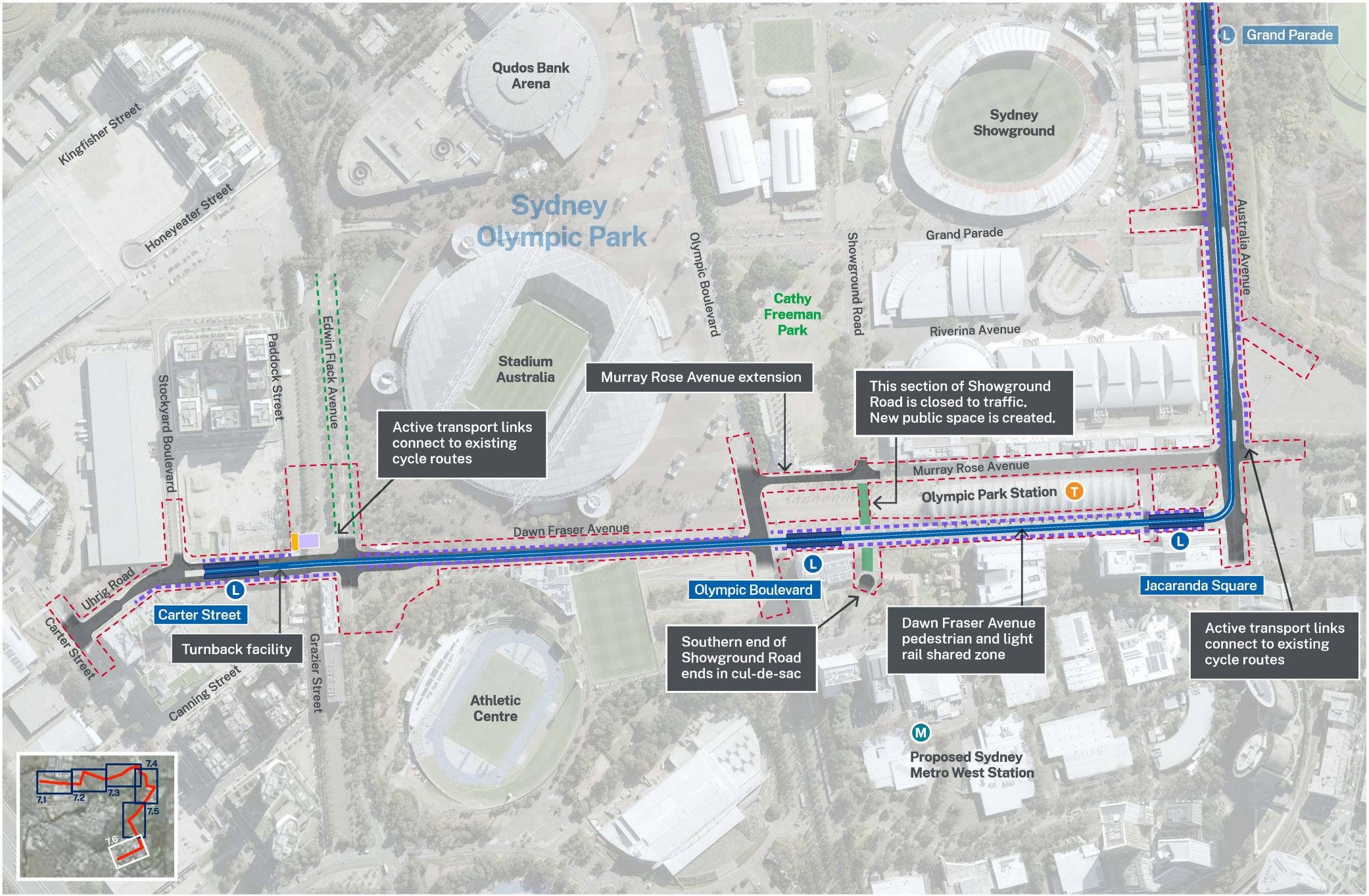


Figure 1.5 Key project infrastructure – map 5

Data source: Imagery - MetroMap (extracted 1/03/2022); Roads, Watercourses, Cadastre - NSWDCS, 2022; Metromap Tile Service.



Project site
Substation
Modified roads
Platforms
Possible future platforms
Project alignment
Light rail stop
Possible future light rail stop
Existing rail station
Proposed metro station
Active transport link
Existing cycleway
Driver amenities building
New and improved open space

Figure 1.6 Key project infrastructure – map 6

0 100 200 300m

Data source: Imagery - MetroMap (extracted 1/03/2022); Roads, Watercourses, Cadastre - NSWDCS, 2022; Metromap Tile Service.

1.2 Light rail track

1.2.1 Track form

Two sets of light rail tracks (one for each direction) would be constructed. Two main track forms are proposed as described below.

Embedded tracks

Embedded tracks are encased in concrete, except for the tops of the rails. Embedded tracks would be used for most of the alignment where the track would be laid within/adjoining existing or proposed roadways. This would typically occur in on-street environments where the running corridor (see section 1.2.2) would need to be trafficable by both rail and road vehicles to allow for:

- access for emergency services vehicles and buses
- shared road sections at intersections, and cycle and pedestrian crossings.

Most embedded track areas would be trafficable for pedestrians and other road users, as the tracks would be level with or slightly below the surrounding surface.

Figure 1.7 shows an indicative cross section of an embedded track arrangement.

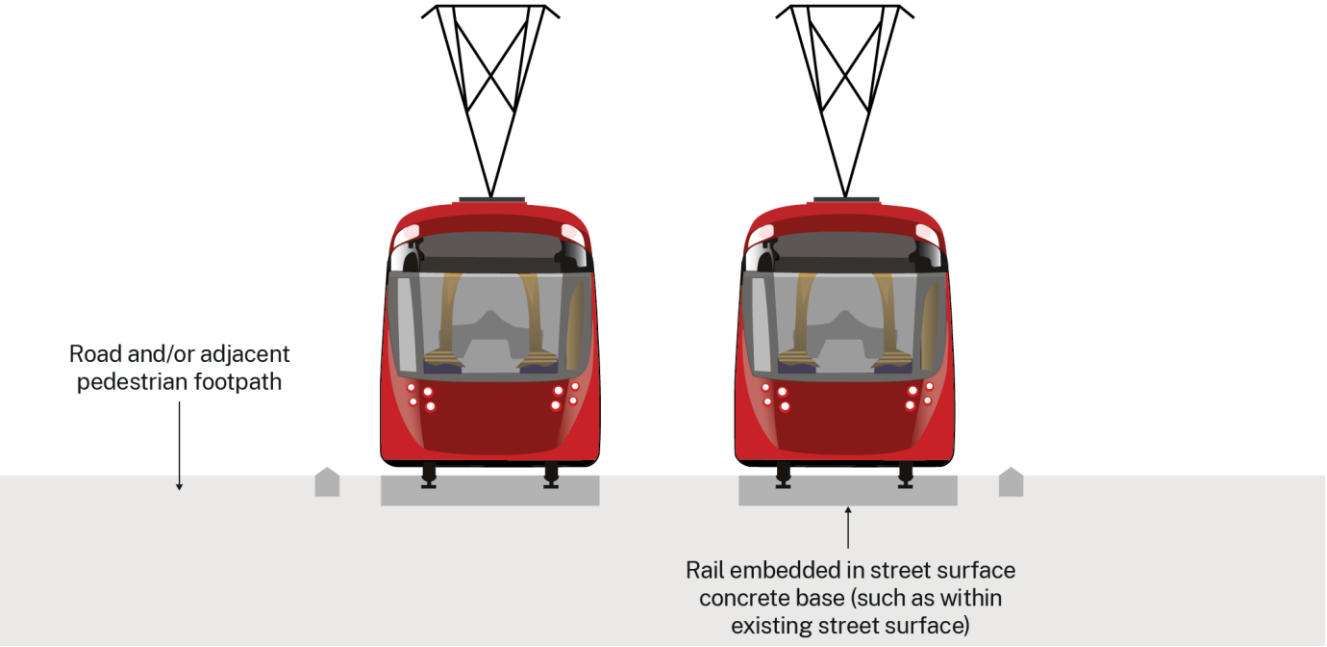


Figure 1.7 Indicative embedded track cross section

In some locations, the embedded track would include finishing materials (such as pavers) laid on top of the concrete base. This would generally include areas that are:

- likely to experience higher levels of pedestrian movements
- where the need for additional surface finishes is identified in the project's urban design requirements (see section 1.8).

Examples of locations where additional surface finishes would be used include:

- Melrose Park, including near the Melrose Park stop and areas proposed for future residential and commercial development
- Sydney Olympic Park along Dawn Fraser Avenue (between Australia Avenue and Olympic Boulevard).

Permeable tracks

Permeable tracks are laid in a concrete slab or on concrete sleepers and incorporate space for permeable materials. Permeable tracks allow for infiltration of water to reduce stormwater runoff and improve integration with surrounding open space, parks and vegetated areas. They also use less concrete and reduce glare. Types of permeable track that may be used include:

- green track – incorporating areas between and beside the tracks planted with grasses or groundcover to create a green running corridor (see example shown on Figure 1.8)
- crushed stone – incorporating crushed stone between and beside the tracks
- permeable pavers – incorporating permeable pavers between and beside the tracks.

Locations where permeable tracks would be considered include:

- within or adjacent to areas of open space
- adjacent to vegetated or environmentally sensitive areas
- where it would contribute to the amenity of the public domain, based on existing and future land uses.

Green track would be provided in the vicinity of the Atkins Road stop and the Bulla Cream Dairy (Willowmere) heritage item (see Figure 1.3), with the extent to be confirmed during design development. The potential to provide other areas of green and permeable track would be investigated during design development.

Figure 1.8 Example of green track usage for Parramatta Light Rail Stage 1

1.2.2 Running corridor

Three main arrangements of tracks are proposed to create the running corridor for the light rail vehicles. These are:

- on-road (segregated) – where the light rail vehicles run adjacent to, but are segregated from, operational traffic lanes, and general traffic may need to cross the alignment where it traverses existing roads
- off-road (separated) – where the light rail vehicles run within their own separate corridor, and access by general traffic is not permitted or is controlled at key crossing locations
- shared – including mixed use environments such as shared light rail and pedestrian zones, or where the light rail vehicles share the corridor with specified vehicles, such as buses.

A description of how these running corridor arrangements are proposed to be used is provided below.

On-road (segregated)

The project would operate along a segregated light rail corridor within or adjacent to existing roadways for most of the alignment. This arrangement would help to ensure that the light rail vehicles operate with suitable levels of safety, speed and reliability, leading to better journey times. Traffic and pedestrian crossing signals would be provided as required.

Figure 1.9 shows an indicative cross section of an on-road segregated light rail corridor arrangement, where the light rail corridor is located adjacent to (to the side of) the general traffic lanes.

An indicative cross section of an on-road arrangement where the light rail corridor is in the centre of the roadway is shown on Figure 1.10.

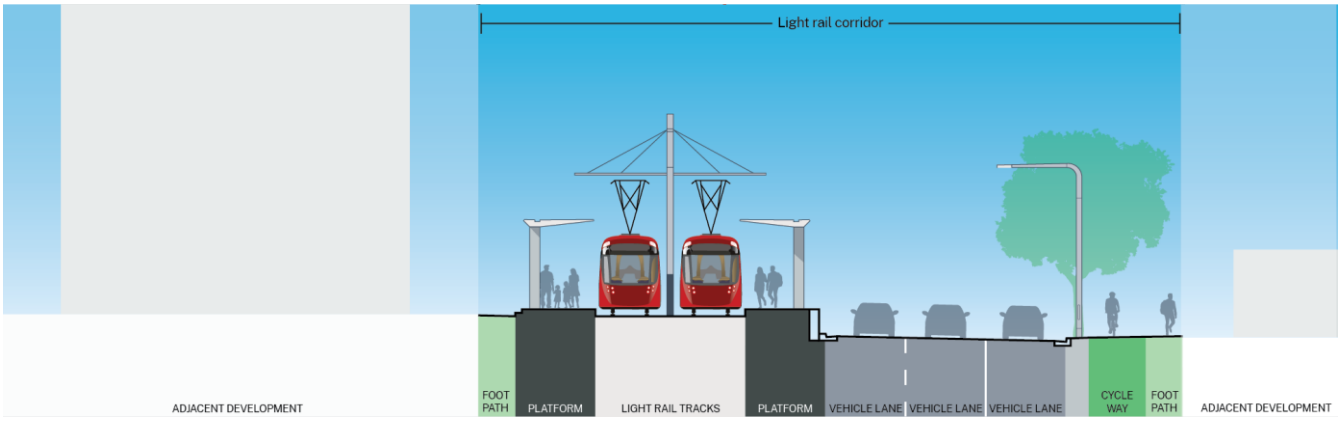


Figure 1.9 Indicative cross section of an on-road (segregated) arrangement with stop adjacent to general traffic lanes

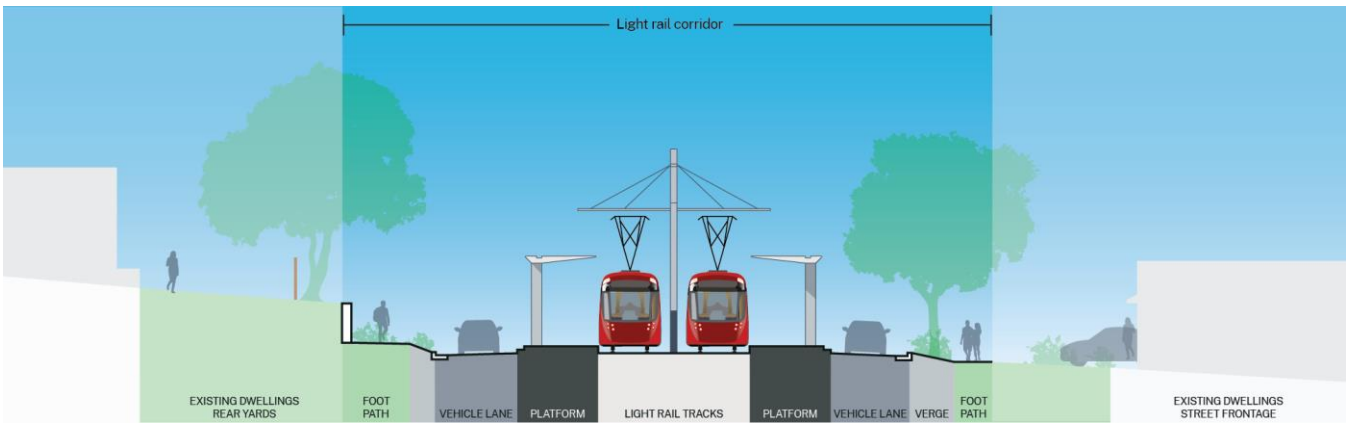


Figure 1.10 Indicative cross section of an on-road (segregated) arrangement with stop in the centre of the roadway

Off-road (separated)

The project would operate along a separate off-road corridor where the rail corridor is located outside the existing road reserve, including:

- along the Sandown Line corridor in Camellia and through Eric Primrose Reserve
- where the alignment crosses Ken Newman Park and adjacent open space
- along the western edge of Hill Road, between Footbridge Boulevard and Holker Street.

Figure 1.11 shows an indicative cross section of an off-road corridor arrangement proposed in Ken Newman Park and adjacent open space.

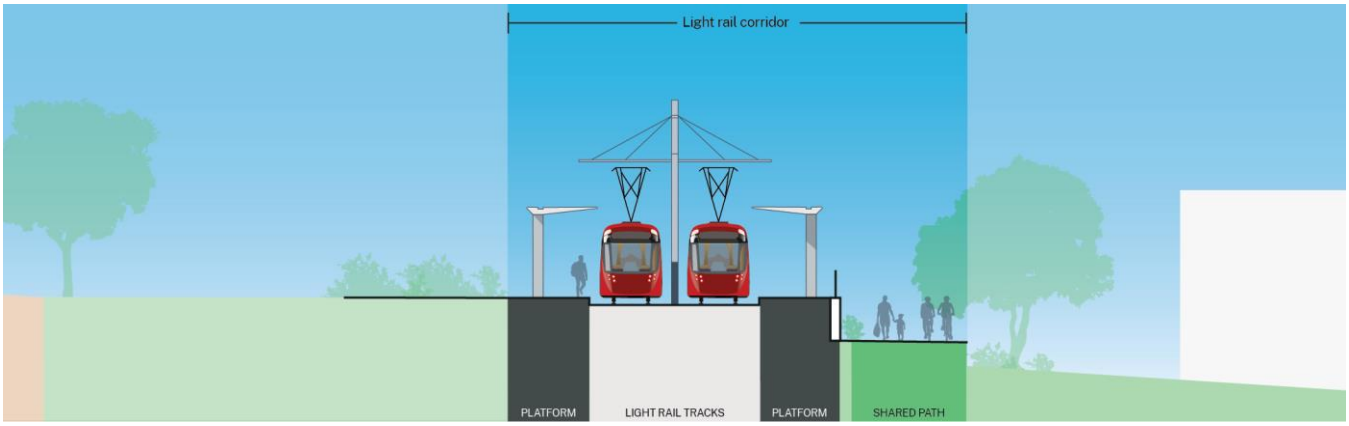


Figure 1.11 Indicative cross section of off-road (separated) arrangement with stop

Shared

A light rail and pedestrian zone (no through vehicle access) is proposed along Dawn Fraser Avenue between Australia Avenue and Olympic Boulevard in Sydney Olympic Park. Figure 1.12 shows an indicative cross section at this location.

The light rail and pedestrian zone would provide a distinct public domain environment in the vicinity of Olympic Park Station and the proposed Sydney Metro West station. This would allow pedestrians to experience a traffic-free environment with improved urban domain elements such as wider footpaths, new seating and landscaping. The light rail would travel through this area at lower speeds than along other sections of the alignment.

The alignment would be distinguished from the surrounding environment, using different material colours, finishes, textures or paving, so that pedestrians can visually and texturally distinguish between the light rail tracks and areas for pedestrians.

The project would also operate in a shared corridor across the proposed bridge between Melrose Park and Wentworth Point and along the Holker Busway, sharing the lane with buses.

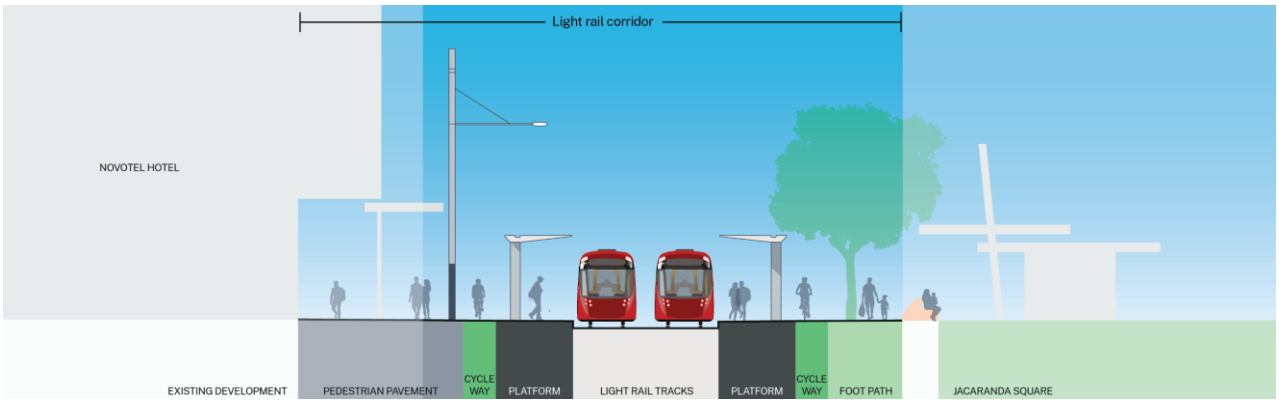


Figure 1.12 Indicative cross section of light rail and pedestrian only zone at Dawn Fraser Avenue

1.3 Light rail stops

1.3.1 Stop locations

The project includes 14 light rail stops as shown on Figure 1.1 of the Amendment Report and described in Table 1.2. Figure 1.1 to Figure 1.6 show the proposed stop locations in more detail. The names of stops are indicative and would be finalised during design development. The stop names would be determined based on stakeholder and community feedback, and approval by the Geographical Names Board of NSW.

Table 1.2 Proposed light rail stops

Suburb	Stop name	Location	Figure reference
Camellia	Sandown Boulevard	Within the Sandown Line corridor near the Parramatta Light Rail Stage 1 Rosehill Gardens stop	Figure 1.1
Rydalmere	John Street	South of Antoine Street between Jean Street and John Street	Figure 1.2
	Nowill Street	On South Street between Nowill Street and Primrose Avenue	Figure 1.2
Ermington	River Road	In the existing grassed utility easement between River Road and Hilder Road, west of Ken Newman Park	Figure 1.2
	Murdoch Street	On Boronia Street between Boyle Street and Murdoch Street	Figure 1.3
	Atkins Road	In the new open space south of Hope Street and east of Atkins Road	Figure 1.3
Melrose Park	Melrose Park	On Hope Street west of Waratah Street	Figure 1.3
	Waratah Street	Within Archer Park along the shared path between Waratah Street and Wharf Road	Figure 1.4
Wentworth Point / Sydney Olympic Park	Footbridge Boulevard	West of Hill Road at Half Street	Figure 1.4
	Hill Street	West of Hill Road south of Stromboli Strait	Figure 1.5
	Holker Street	On Holker Busway east of Hill Road	Figure 1.5

Suburb	Stop name	Location	Figure reference
Sydney Olympic Park	Jacaranda Square	On Dawn Fraser Avenue between Australia Avenue and Park Street	Figure 1.6
	Olympic Boulevard	On Dawn Fraser Avenue between Showground Road and Olympic Boulevard	Figure 1.6
Lidcombe	Carter Street	On Uhrig Road between Edwin Flack Avenue and Stockyard Boulevard	Figure 1.6

Possible future stops

The project has safeguarded space for two possible future stops, which may be constructed later. These stops would be constructed after the project commences operation based on demand and surrounding development. No stop infrastructure is currently proposed to be constructed at these locations. The possible future stops are described in Table 1.3.

Table 1.3 Possible future light rail stops

Suburb	Stop name	Location	Figure reference
Camellia	Camellia East	Within the Sandown Line corridor, west of the stabling and maintenance facility entrance	Figure 1.1
Sydney Olympic Park	Grand Parade	Australia Avenue at Grand Parade	Figure 1.6

1.3.2 Stop infrastructure

Stops have been designed to fit within their surroundings and are based on the design of Parramatta Light Rail Stage 1 stops. Stop features and facilities are described below.

Platforms

All stops would incorporate side platforms. Side platforms are located on either side of the light rail tracks, with the two tracks running between the platforms. The Atkins Road stop would have an island platform with tracks running either side of the platform, as well as a side platform, to accommodate the turnback facility described in section 1.7.1.

Each platform would have a width of about three metres. Figure 1.9 to Figure 1.12 provide examples of side platform stop arrangements.

The stops would be about 45 metres long to cater for the length of the light rail vehicle. Some platforms and the surrounding public domain may facilitate crowd management at stops where patronage is expected to be higher, including at interchange locations and within areas with a higher customer base in the stop catchment.

Access and safety

All platforms would be designed to comply with the *Disability Discrimination Act 1992* and Disability Standards for Accessible Public Transport, ensuring that less mobile members of the community have equal access to the stops. This includes designing the stops to be level with the floor of the light rail vehicle to ensure there is no need to step up to the vehicle.

Platforms would be accessed via ramps at either end of the platform for stops located within active road corridors. These stops would also provide safety barriers along the back of the platform to prevent passenger movements into traffic lanes.

At least one pedestrian crossing would be provided across the light rail tracks at each stop.

Where platforms are in pedestrian zones, such as the Jacaranda Square and Olympic Boulevard stops, platforms would be integrated into the surrounding footpath levels as far as practicable to create a seamless transition allowing easy access.

Paving for the platforms and paths would be nonslip and provide the required visual contrast. Warning tactile indicators would also be installed along the platforms and around the stops.

Stop furniture and facilities

A range of stop furniture and facilities would be provided at each stop, including a shelter, windbreak screens, emergency help points, customer information points, Opal card readers, seating and rubbish bins.

The shelters would provide weather protection for standing and seating, including space for wheelchairs and prams. They would have a modular steel frame canopy structure with a solid roof. Bicycle parking and drinking bubblers would be provided at or near most stops, subject to consultation with stakeholders and available space.

The shelters would be similar to those installed as part of Parramatta Light Rail Stage 1, which were developed in consultation with the City of Parramatta Council and the Parramatta Light Rail Stage 1 independent Design Review Panel. Refinement of the shelter design would be undertaken on a stop-by-stop basis informed by independent design review and further consultation with key stakeholders.

At the Sandown Boulevard and Jacaranda Square stops, which would provide access to events at Rosehill Gardens Racecourse and Sydney Olympic Park respectively, additional shelters and feature lighting may be provided.

Figure 1.13 shows an example of a typical Parramatta Light Rail Stage 1 stop.

Figure 1.13 Indicative image of a Parramatta Light Rail Stage 1 stop

Signage

The project would incorporate signage that meets the standards for light rail operations and applies consistent branding in accordance with Transport for NSW requirements.

Signage would generally include wayfinding, warning and customer information signage on cabinets, poles or totems located on and around the stop or fixed to shelter structures. The final branding, wayfinding and signage designs would be confirmed during design development in accordance with Transport for NSW design standards and in consultation with key stakeholders.

Security

The stops would be designed according to crime prevention through environmental design principles and would include the following security features:

- unimpeded sight lines from adjacent land uses to improve passive surveillance as far as possible
- closed circuit television (CCTV) cameras linked to the operations control centre for passenger security and to deter anti-social behaviour and vandalism
- lighting to maximise passenger safety at stops, along access paths and the active transport link, and to enable CCTV operation
- an emergency help point.

Lighting would be designed, mounted, screened and directed in accordance with relevant standards (including *AS/NZS 4282:2019 Control of the obtrusive effects of outdoor lighting*) to minimise nuisance to surrounding residents.

1.4 Active transport links

The project would include about 9.5 kilometres of new active transport links for both pedestrians and cyclists constructed along or close to the light rail alignment. The active transport links would include a combination of:

- shared paths for use by pedestrians and cyclists
- separated cycleways for use by cyclists
- roadside footpaths
- separated pedestrian paths on bridges
- use of existing shared paths.

Figure 1.14 shows the type and location of the proposed active transport links. Figure 1.1 to Figure 1.6 show the locations of the proposed active transport links as well as connections to key existing active transport infrastructure.

Figure 1.14 Indicative active transport link types

The proposed links would connect with existing active transport infrastructure, including the Parramatta Valley Cycleway and Louise Sauvage Pathway via the River Walk. The connections would be finalised in consultation with key stakeholders during design development.

With the two proposed bridges over the Parramatta River, and connections to existing facilities, the new active transport links would create three new active transport loops across and along the northern and southern banks of the river.

The material used for the active transport links would vary depending on the surrounding environment and would be guided by the urban design requirements. Localised treatments may include:

- slightly elevated surfaces where areas of sensitive vegetation, such as tree roots, cannot be avoided
- materials designed to be consistent with the surrounding public domain, taking into consideration key surrounding features (such as the location of heritage items and areas of open space)
- painted markings on the road to segregate bicycles where the active transport link would be provided on existing roads.

The active transport links would be designed in accordance with the principles outlined in Technical Paper 1 (Design, Place and Movement) (appended to the EIS), the urban design requirements, relevant guidelines and standards (including *Guide to Road Design Part 6A: Paths for Walking and Cycling* (Austroads, 2017) and *AS 1428.1-2009 Design for access and mobility*), and crime prevention through environmental design principles.

Directional and safety signage would also be provided.

1.5 Bridges

The following key design features have been used as the basis for the EIS and Amendment Report. The design of the bridges would continue to be refined during design development.

1.5.1 Bridges over the Parramatta River

Bridge between Camellia and Rydalmere

The bridge would provide a connection across the Parramatta River between proposed redevelopment areas in Camellia and Rosehill to the south, and Rydalmere to the north. The southern end of the bridge would be located on the Sandown Line corridor in Camellia. The northern end of the bridge would be located within Eric Primrose Reserve to the south of Park Road in Rydalmere (see Figure 1.2).

The bridge would be a five-span, concrete bridge about 260 metres long. It would include centrally located light rail tracks with an active transport link on the western side. The overall width of the bridge would be about 16 metres. The bridge would consist of three spans (about 52 metres long each) over the river's navigation channel, and two additional spans to the south over mangrove vegetation and to the north within Eric Primrose Reserve. The bridge would be supported by three piers located within the river and a fourth on the riverbank at Park Road.

The highest point of the bridge deck would be about 13 metres above the river and provide a clearance of about 5.2 metres above the highest astronomical tide.

The northern piers of the bridge would be located to ensure movements on the Parramatta Valley Cycleway would be maintained.

Figure 1.15 provides an indicative elevation of the bridge.

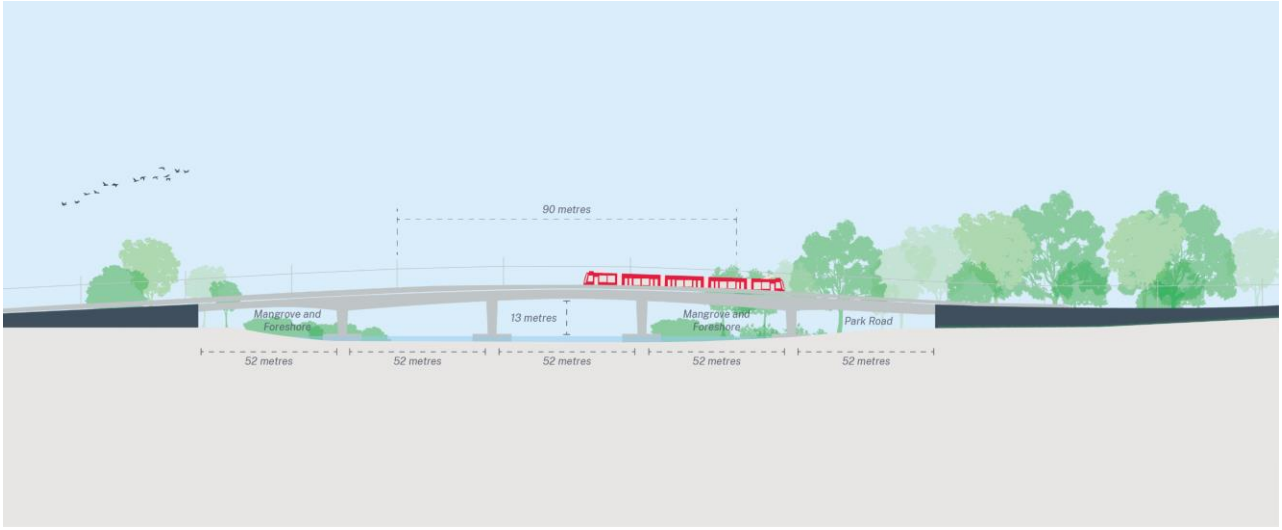


Figure 1.15 Indicative elevation of bridge between Camellia and Rydalmere (viewed from the east)

Bridge between Melrose Park and Wentworth Point

The bridge would provide public and active transport access to and from proposed redevelopment areas in Melrose Park, and the developing suburb of Wentworth Point across the Parramatta River. The northern end of the bridge would be located within Archer Park to the north of the Ermington Boat Ramp in Melrose Park. The southern end of the bridge would be located to the west of Sanctuary Wentworth Point and Hill Road (see Figure 1.4).

The bridge would be a six-span, concrete bridge about 320 metres long between abutments and 350 metres long between approaches. It would include light rail tracks on the western side of the bridge with an active transport link on the eastern side. The bridge would also include a covered rest area adjacent to the active transport link. The overall width of the bridge would be about 16 metres. The bridge would consist of three larger spans (about 72 metres long each) over the navigation channel of the river and smaller spans over the mangrove vegetation and existing active transport infrastructure on both sides of the river. The bridge would be supported by three piers in the Parramatta River. The width of the navigable channel between bridge piers would be about 46 metres.

The highest point of the bridge deck would be about 16 metres above the river and provide a clearance of about 11 metres above the highest astronomical tide. The northern abutment would provide a clearance of 5.4 metres above Wharf Road and the access to the Ermington Boat Ramp.

The bridge and its approaches would be designed to enable future shared running of light rail and bus services.

Figure 1.16 provides an indicative elevation of the bridge.

Figure 1.16 Indicative elevation of bridge between Melrose Park and Wentworth Point (viewed from the west)

1.5.2 Bridge over Silverwater Road

A new, integrated light rail and active transport bridge would provide a connection over Silverwater Road between South Street, Rydalmere to the west and South Street, Ermington to the east (see Figure 1.2). The existing pedestrian bridge, stairs and lifts would be removed.

The bridge would be a three-span concrete bridge. It would be about 96 metres long and about 15 metres wide. The active transport link would be on the southern side of the bridge. The bridge would consist of a large central span (about 42 metres long) providing about 5.4 metres clearance over Silverwater Road. The arrangement of the ramps and lifts would be finalised during design development in consultation with key stakeholders.

Figure 1.17 provides an indicative elevation of the bridge.

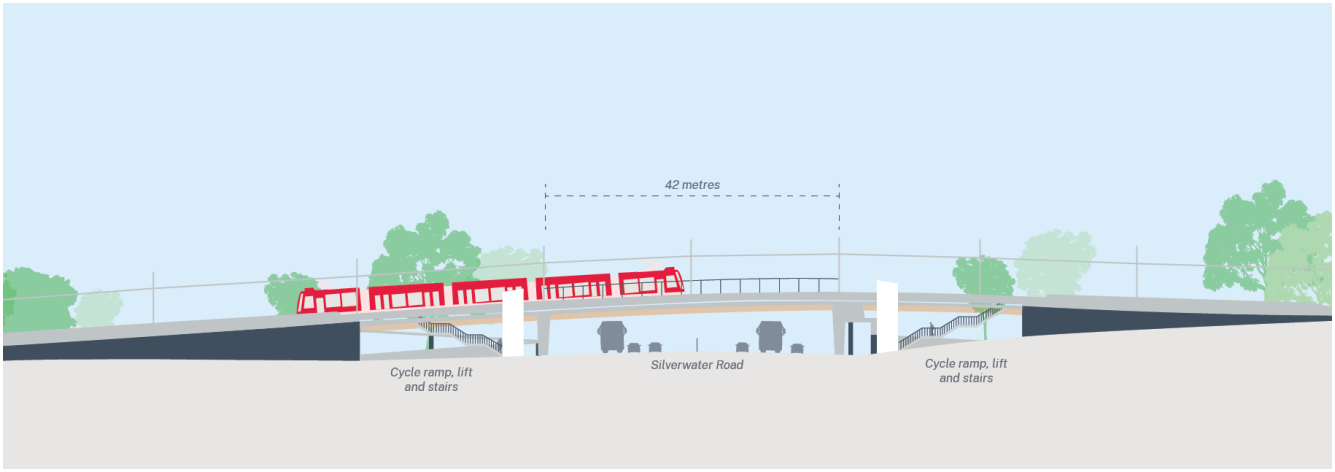


Figure 1.17 Indicative elevation of Silverwater Road bridge (viewed from the south)

1.5.3 Bridge in Ken Newman Park

The light rail alignment in Ken Newman Park would include a bridge over the drainage gully at the eastern end of the park (see Figure 1.3). The bridge would be a two-span, concrete or steel bridge about 36 metres long, consisting of two equal length spans. It would be about 15 metres wide with the active transport link on the southern side of the bridge. No piers would be required in the gully and pedestrian access would be retained underneath the bridge. The highest point of the bridge would be about six metres above ground level.

1.5.4 Bridge works in Sydney Olympic Park

Works would be required at two bridges in Sydney Olympic Park (see Figure 1.5) as described below.

Hill Road bridge

A new, integrated road, light rail and active transport bridge would replace the existing road bridge at Hill Road which would be removed.

The new bridge would be a single span, concrete structure, about 20 metres long and 29 metres wide. It would include light rail tracks on the western side of the bridge, two traffic lanes in each direction in the centre of the bridge and an active transport link on the eastern side.

Retaining structures on the eastern side would be required to manage the differences between the existing ground level and light rail alignment.

Holker Busway bridge

The existing bridge would be retained, new barriers would be installed, and the bridge would be strengthened to support the load of the light rail vehicle operations and infrastructure. Strengthening works may include strengthening the bridge deck and cantilever portions of the bridge, replacing bridge bearings and addition of external structural elements to increase the capacity of the bridge. Details of the strengthening works required would be confirmed as part of further design development.

The light rail running corridor would operate on the bridge in a shared running arrangement with buses.

1.6 Road network changes

Most of the project would be constructed within existing roadways or road reserves. As a result, changes to the road network would be required to accommodate the proposed light rail infrastructure, particularly the tracks and stops.

Changes to the road network would include realigning or closing some roads, changes to intersection movements, installing new pedestrian crossings and traffic signals, pavement works, changes to lane configuration and directional flow, and/or removal of on-street car parking to accommodate displaced traffic lanes.

The following sections provide an overview of the changes proposed.

1.6.1 Road realignments and closures

Road realignments and closures would be required in some locations to provide space for the project's infrastructure and allow safe operation of the project and road network. The proposed changes are summarised in Table 1.4. Further information on the proposed changes to the road network is provided in section 4 of Technical Paper 2 (Transport and Traffic) and section 6.2 of the Amendment Report.

Table 1.4 Road realignments and closures

Suburb	Road	Proposed change
Road realignments		
Sydney Olympic Park	Murray Rose Avenue	Murray Rose Avenue would be extended between Showground Road and Olympic Boulevard.
Road closures		
Rydalmere	John Street	John Street, between South Street and Antoine Street, would become one way to accommodate the light rail tracks on the eastern side.
Ermington	South Street	South Street would be closed between Silverwater Road and River Road to accommodate the eastern abutment of the proposed bridge over Silverwater Road.
	Hilder Road	Hilder Road would be closed to accommodate the light rail tracks and River Road stop, and as a result of the topography at this location.
Melrose Park	Waratah Street	Waratah Street would be closed between Mary Street and Wharf Road, about 110 metres west of its existing intersection with Wharf Road to accommodate access adjustments to the Ermington Boat Ramp car park.
Sydney Olympic Park	Dawn Fraser Avenue	This section of Dawn Fraser Avenue would be closed to through vehicles between Australia Avenue and Olympic Boulevard to create a light rail and pedestrian zone between Jacaranda Square and Olympic Boulevard stops.
	Showground Road	The proposed light rail and pedestrian zone (noted above) would also require closure of Showground Road between Dawn Fraser Avenue and Murray Rose Avenue.

1.6.2 Adjustments to existing lanes, intersections and access arrangements

Existing traffic lanes and intersections would be adjusted along some roads to accommodate the light rail infrastructure (including stops) within or adjacent to the road reserve. These adjustments would involve providing new pavement within the road reserve (or in some instances within additional land adjoining the existing road reserve) and the marking of new lanes, including any required turning lanes.

Traffic signals would be provided at about 20 intersections that are not currently signalised. In addition, traffic signals would be provided at five property accesses in Camellia, and at one pedestrian crossing in Ermington. Signalisation of intersections and adjustment of existing traffic signals to support the safe and efficient operation of the project and road network would be refined during design development in consultation with the relevant road authority.

There would also be changes to the way that some side streets access the roads on which the light rail alignment is located. In some locations, existing right-turn movements would not be allowed due to the presence of light rail infrastructure. Access from these roads would be limited to left-in/left-out movements.

The project would include tie-in works on some adjoining roads.

Further information about the proposed adjustments and new traffic signals is provided in section 4 of Technical Paper 2 (Transport and Traffic) (appended to the EIS) and section 6.2 of the Amendment Report.

1.6.3 Adjustments to property access

Access to properties may need to be adjusted due to the difference in grade between the property and the light rail or road alignment. This could involve changes to the location or arrangement of driveways. Design refinements that reduce property access adjustments would continue to be considered during design development.

Potential impacts on access are considered in Chapter 9 (Transport and traffic) of the EIS and section 6.2 of the Amendment Report.

1.7 Other facilities and infrastructure to support operation

1.7.1 Turnback facilities

Track turnback facilities using crossovers would be provided at strategic locations along the alignment to facilitate efficient light rail operation. Crossovers between the tracks allow light rail vehicles to change tracks and travel in the opposite direction. Turnback facilities are proposed at the following locations:

- Macquarie Street, Parramatta (described below)
- Atkins Road stop, Melrose Park (described below)
- Jacaranda Square stop, Sydney Olympic Park
- Carter Street stop, Lidcombe.

The double crossover at Jacaranda Square and Atkins Road stops would be used during special events as a temporary turnback facility for light rail vehicles.

Macquarie Street

A light rail turnback facility would be provided along part of Macquarie Street to the west of the Parramatta Square stop (see Figure 1.1). The facility would consist of two tracks, about 100 metres long, between Church Street and Marsden Street, and would enable the temporary layover of light rail vehicles. The turnback would be accessed via a new turnout from the Parramatta Light Rail Stage 1 track, located at the Macquarie Street and Church Street intersection.

Atkins Road stop

A light rail turnback facility would be provided at the Atkins Road stop to enable the temporary layover of light rail vehicles and provide additional services between Melrose Park and Sydney Olympic Park during special events (see Figure 1.3). The facility would consist of a third track of about 140 metres long, which would terminate at the Atkins Road stop. The stop would have two platforms, one side platform and one island platform.

1.7.2 Stabling and maintenance facility

The Parramatta Light Rail stabling and maintenance facility is being constructed as part of Parramatta Light Rail Stage 1 on the southern side of Grand Avenue, adjacent to the Rosehill Gardens Racecourse in Rosehill.

Works would be undertaken within the stabling and maintenance facility boundary to increase the capacity of the facility to provide sufficient space to maintain and stable about 13 additional light rail vehicles (in addition to those used for Parramatta Light Rail Stage 1).

The following modifications to the facility are proposed to increase the capacity of the facility:

- provision of additional light rail stabling tracks along the eastern side of the facility
- provision of additional signalling and power facilities to integrate the new stabling tracks
- expansion of the existing staff car park to provide about 100 additional parking spaces
- provision of supporting infrastructure (e.g. walkways, lighting, drainage) and adjustments inside the maintenance building.

1.7.3 Interchange facilities

Interchanges with other forms of public transport are proposed, including with trains, buses, ferries and Sydney Metro West services. The main interchange locations would be in the Parramatta CBD, Rydalmere and Sydney Olympic Park. During operation, customers would be able to change between transport modes at stops in these locations, as well as other stops (see section 1.3.1).

To facilitate these interchanges, works are proposed as part of the project at and in the vicinity of the stops listed in Table 1.6. This would include public domain improvements to ensure customers can change between transport modes in an easy and safe manner, including provision of:

- wayfinding signage to direct users between public transport services
- direct pathways and line of sight to other public transport services
- free-standing passenger information displays
- landscaping works to improve amenity (including providing shade where possible).

Interchange operational arrangements are described in section 1.10.3. Further information about the public domain works proposed as part of the project is provided in section 1.8.

1.7.4 Power supply

Traction power substations

Electricity is required to power the light rail vehicles in the form of 750 volt direct current power (traction power) supplied from the existing 11 kilovolt (kV) Endeavour Energy and Ausgrid electricity distribution network. Five traction power substations would be constructed to transform the electricity supplied by the existing distribution network to the required voltage. The substations are proposed at the following locations:

- Camellia – adjacent to Grand Avenue and west of Durham Street (see Figure 1.1)
- Rydalmere – at the corner of John Street and South Street (see Figure 1.2)
- Melrose Park – adjacent to Hughes Avenue (see Figure 1.3)

- Wentworth Point – on Hill Road midway between Bennelong Parkway and Holker Busway (see Figure 1.4)
- Lidcombe – near the Carter Street stop (see Figure 1.6).

The substations would typically comprise a prefabricated modular building (about 17 metres long by five metres wide with a height of about five metres), with the overall substation sites occupying an area of about 100 square metres.

The substation buildings would incorporate design features and materials (such as a fitted external façade) to integrate the buildings with the surrounding environment and minimise the potential for off-site impacts, including noise and visual impacts. The substation would include vehicle access and paved areas for service vehicle parking. The design of the site and structures would be further refined during design development.

Figure 1.18 provides an example of a traction power substation.

Figure 1.18 Example of traction power substation

Overhead wiring

Power would be distributed from the substations to the light rail vehicles via overhead wiring strung on poles. Poles would be located so as not to obstruct existing infrastructure, footpaths or cycle routes.

The overhead wiring structures would be located and designed based on site characteristics and operational requirements. The structures would typically include foundations, poles and associated electrical infrastructure.

The final configuration and design of the overhead wiring and poles would be determined during design development in consultation with key stakeholders. This would include consideration of elements such as integration of street lighting and traffic signals to minimise visual clutter.

Wire-free power supply would be provided underground along Dawn Fraser Avenue between the Jacaranda Square and Carter Street stops. Further investigations would be conducted during design development in consultation with key stakeholders to assess the potential to incorporate wire-free design in other locations. This could include visually sensitive environments or areas where existing above-ground infrastructure and significant trees need to be retained.

Wiring, tracks and other infrastructure would be designed to mitigate risks associated with high voltage cabling and potential earth leakage.

1.7.5 Retaining walls

Retaining walls would be provided in some locations as a result of the difference between the height of the existing ground surface and the proposed alignment. This would include the following locations:

- along the northern boundary of Eric Primrose Reserve (up to about 6.3 metres high)
- South Street between the light rail track and the westbound traffic lane near the Nowill Street stop (up to about 1.6 metres high)
- Hilder Road along both sides of the light rail tracks (up to about one metre high)
- Ken Newman Park along the northern side of proposed alignment (up to about 0.5 metres high)
- Boronia Street along both sides of the light rail tracks, with the track lower than the road surface (up to about 3.3 metres high) (Figure 1.19 shows an indicative cross section)
- Waratah Street along both sides of the light rail tracks (up to about 0.6 metres high)
- Hill Road north of the Hill Road bridge on the eastern side of the road (up to about 2.7 metres high).

The finishes on the retaining walls would be confirmed during further design development, in accordance with the requirements outlined in Technical Paper 1 (Design, Place and Movement) (appended to the EIS).

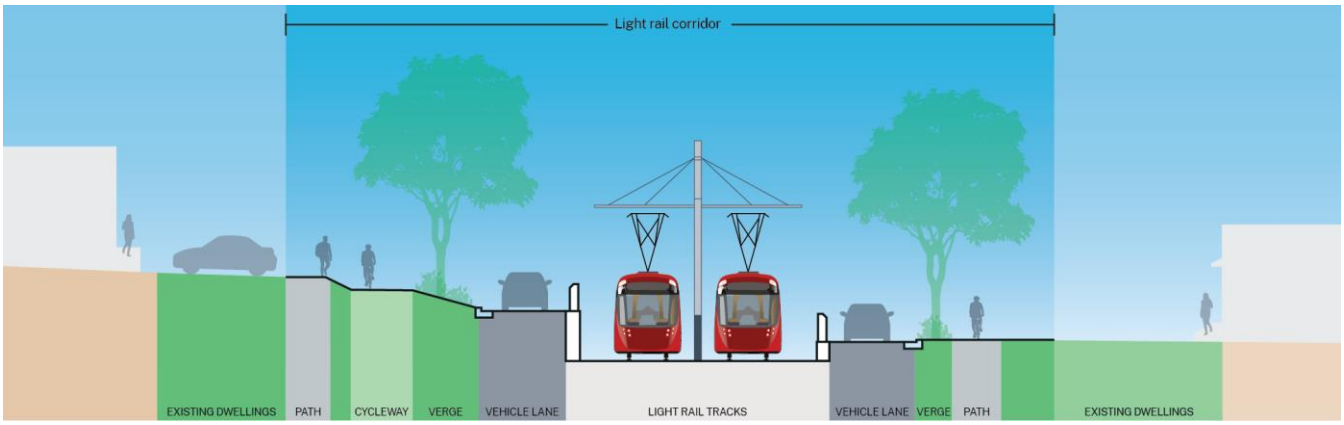


Figure 1.19 Indicative cross section showing retaining walls at Boronia Street

1.7.6 Communications system

The communications system would provide timely and reliable transmission of voice, data and video signals from key operational locations throughout the light rail system. It would be an extension of the system provided for Parramatta Light Rail Stage 1, and would include providing additional radio system poles, antennas, Wi-Fi access points and cabling.

Communications system equipment would be located at stops, road intersections and within the proposed substations. The communication system would use infrastructure constructed for Parramatta Light Rail Stage 1 in the operations control centre at the stabling and maintenance facility and the backup control centre in Dundas. Signalling infrastructure would be monitored from the operations control centre.

1.7.7 Driver facilities

Driver facilities, including a bathroom and staff room would be provided near the Macquarie Street turnback facility and Carter Street stop. The driver facilities would be about four metres wide by nine metres long, with a height of about three metres.

During design development, opportunities to integrate the driver facilities with the surrounding environment and minimise the potential for off-site impacts would be investigated, such as integration within another building or façade treatments.

1.8 Public domain works and open space

Public domain works would integrate the project with surrounding land uses and achieve the project's urban design and placemaking objectives and desired outcomes.

Technical Paper 1 (Design, Place and Movement) (appended to the EIS) describes the design, place and movement framework developed for the project and the outcomes for each precinct. A summary of the key outcomes is provided below. The design of public domain elements would be guided by the framework and the project's urban design requirements.

Public domain works would include:

- integrating works associated with the project into the surrounding streetscape
- providing new and improved open spaces and recreation facilities, and repurposing some residual land
- providing tree planting, landscaping and street furniture.

1.8.1 Integration works

The project would provide new, high quality walking and cycling facilities, new public spaces and streetscape improvements along the alignment, particularly around stops and in pedestrian-focused areas.

Stops would be integrated with their surroundings and have been designed to support pedestrian accessibility from adjacent footpaths and active transport links. Stops would provide weather protection and include fixtures such as seating, wayfinding, customer information, wind screens and rubbish bins. Bicycle parking and bubblers would be incorporated in the public domain which would improve the amenity and functionality of the stop precinct. At locations such as the Atkins Road open space in the vicinity of the Bulla Cream Dairy (Willowmere) heritage item, there are opportunities to incorporate public art and heritage interpretation, which would contribute to place benefits.

The pedestrianisation of Dawn Fraser Avenue would create a new public space which would prioritise pedestrian amenity and encourage increased activation of adjacent buildings and spaces. Stops at Jacaranda Square and Olympic Boulevard would also create new points of arrival and activation within Sydney Olympic Park.

The project would also provide for future integration and interface with proposed future developments in key locations, such as:

- Camellia town centre
- development areas in Melrose Park
- Sanctuary Wentworth Point
- development areas at Carter Street precinct.

1.8.2 Public open space

The project would provide new and improved open spaces and recreation facilities and repurpose some residual land to increase open space. This would offset the areas of open space directly impacted by the project (see section 1.9.1, Chapter 13 (Land use and property) of the EIS and section 6.6 of the Amendment Report).

The identification of opportunities and needs for open space along the corridor has followed a considered and detailed process of consultation with the City of Parramatta Council, and where available, input from the community it represents. Analysis of existing facilities, community needs and values, future growth, development and demand has influenced and shaped the concept plans (described below) that have been prepared for Eric Primrose Reserve, Ken Newman Park and the proposed Atkins Road stop open space.

Specific considerations that have informed the concept plans include:

- recreational needs outlined in the City of Parramatta Council's *Community Infrastructure Strategy* (City of Parramatta, 2020)
- City of Parramatta Council's capital works programs and plans for open spaces and river foreshore areas.

Transport for NSW would continue to consult with the City of Parramatta Council and other key stakeholders as the design is further developed.

Feedback received would be considered in design development and the design of these open spaces would evolve in response to engagement.

Eric Primrose Reserve

A concept plan has been developed for Eric Primrose Reserve (see Figure 1.20) to integrate the project and improve the existing open space. The concept plan includes:

- recreation amenities and facilities
- walking and cycling paths including improvements to the Parramatta Valley Cycleway
- tree planting and landscaped areas
- integration of wayfinding, signage, heritage interpretation and public art.

Figure 1.20 Concept plan for Eric Primrose Reserve improvements

Ken Newman Park

A concept plan has been developed for Ken Newman Park (see Figure 1.21) to integrate the project and improve the existing open space. Ken Newman Park slopes steeply, which limits the useable and accessible open space, particularly in the northern section. The concept plan includes:

- terracing of the northern grassed section of the park (where the steep slope limits usable space) to increase the level space available and improve connectivity within the park
- a new lookout at the northern edge of the park
- seating and covered picnic facilities
- additions to playground facilities
- additional paths to improve connectivity to and within the park
- integration of wayfinding, signage, heritage interpretation and public art
- landscaped areas and tree planting to increase canopy cover.

Figure 1.21 Concept plan for Ken Newman Park improvements

Atkins Road stop open space

A concept plan has been developed for a new open space around the Atkins Road stop and the heritage-listed Bulla Cream Dairy (Willowmere) (see Figure 1.22). Recommendations and opportunities outlined in the *Assessment of Cultural Significance for the property Willowmere at 64 Hughes Avenue, Ermington* (Lucas Stapleton Johnson & Partners and Circle Square Design, 2018) have been considered, together with other design constraints (including the presence of existing utilities, cyclist and road safety and the findings of Technical Paper 5 (Statement of Heritage Impact – Built Heritage)). The concept plan includes:

- playground facilities
- lawns open and spaces for sitting and passive recreation
- new forecourt courtyard integrating with Bulla Cream Dairy (Willowmere) and potential relocation of heritage plantings (see Chapter 12 (Non-Aboriginal heritage))
- integration of wayfinding, signage, heritage interpretation and public art
- tree planting and landscaped areas
- introduction of green tracks to integrate with the new open space.

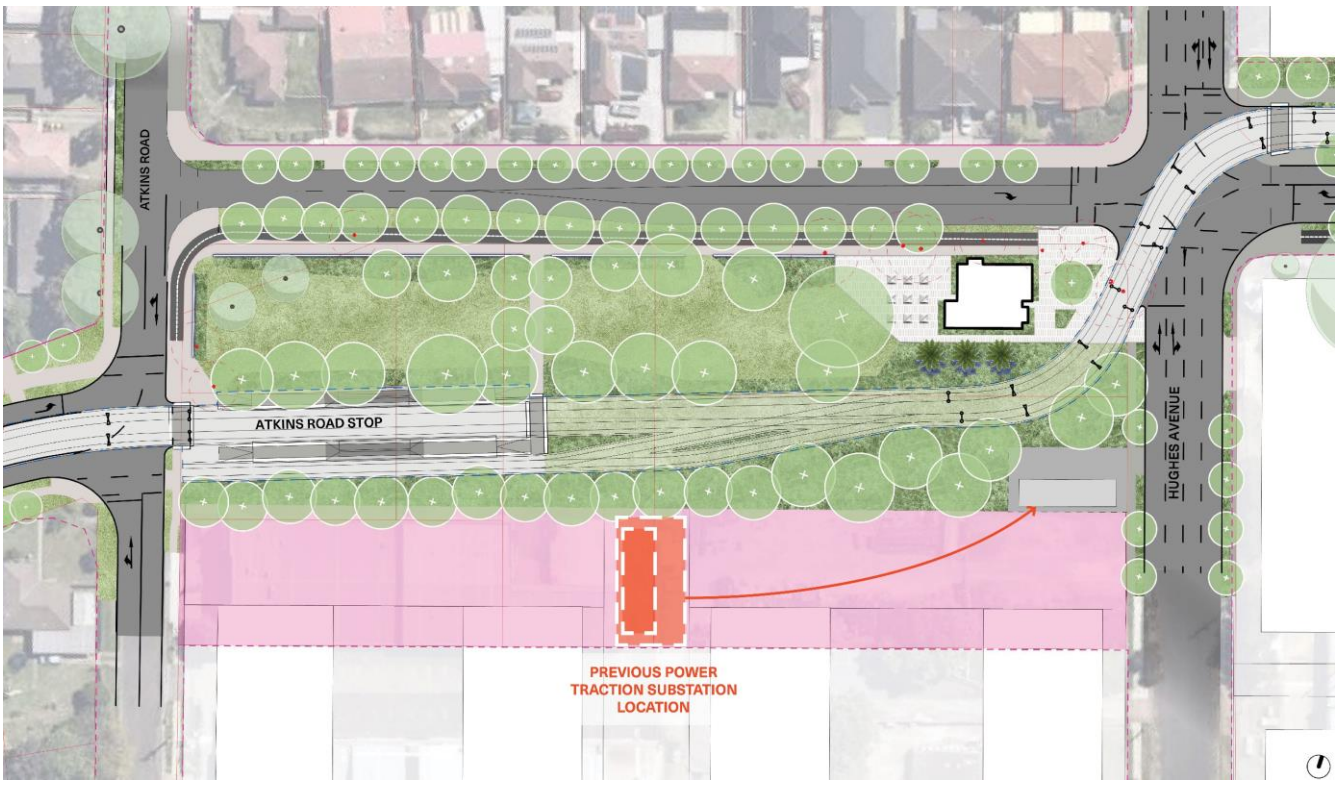


Figure 1.22 Concept plan for Atkins Road open space

1.8.3 Landscaping

The provision of landscaping would be a key element in achieving the placemaking and tree canopy objectives of the project. The landscaping design would:

- maximise retention of trees where possible and safe to do so
- replace trees in suitable sizes to mitigate impacts and suit the location
- consider the desired character of each precinct and locations for visual consistency
- consider important views and environmentally sensitive areas
- consider local soil and climate conditions
- prioritise canopy and balance the need for summer shade and winter sun, to maximise amenity for users along footpaths, active transport links and open spaces
- consider biodiversity opportunities
- consider safety, including sight lines and passive surveillance
- consider the impacts of climate change and the suitability of any new tree selections in a changed climate.

Landscape planning would consider:

- progressive rehabilitation and revegetation
- timing for implementation, including opportunities for early offset plantings
- monitoring and maintenance procedures for built elements, vegetation and landscaping.

Landscaping requirements would be defined by the urban design requirements.

1.9 Land requirements

1.9.1 Permanent land requirements

Most of the land required for the project's operational infrastructure is located within existing road reserves and land owned by Transport for NSW or other government-owned land. However, some privately-owned land and other public land would also be permanently required. In total, it is estimated that about 20.1 hectares of land would be permanently required, including about 3.6 hectares of privately-owned land.

Transport for NSW is empowered to acquire land, and interests in land, pursuant to section 177 of the *Roads Act 1993* and Schedule 1, Part 3, section 11 of the *Transport Administration Act 1988* for the purpose of exercising its functions as well as other purposes set out in the Acts. These purposes include the planning, oversight and delivery of transport infrastructure.

All property acquisition would be managed by Transport for NSW in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991*. Transport's preference is to achieve a negotiated agreement with the affected landowner in the first instance. However, if a negotiated agreement cannot be reached the compulsory process would then be followed.

The compensation payable is pursuant to section 55 of the *Land Acquisition (Just Terms) Compensation Act 1991*, which includes provisions for market value, special value, severance, disturbance (such as associated legal costs, valuation fees, relocation and removal expenses, and mortgage costs), disadvantage resulting from relocation and any increase or decrease in the value of adjoining or severed land in the same ownership.

Further information about the project's land requirements, including property impacts associated with these requirements, and the acquisition process for the project is provided in Chapter 13 (Land use and property) of the EIS.

The project would also require some temporary leasing of land for construction. Temporary land requirements are described in Chapter 2.

1.9.2 Residual land

Some of the land acquired by Transport for NSW to construct the project would be available for other uses following construction, where the land is surplus to the operational requirements of the project. This land is referred to as 'residual land' for the purpose of the EIS.

It is estimated that the residual land would comprise a total of about 4,000 square metres (0.4 hectares) with most of the residual land located in the vicinity of the Atkins Road stop, Melrose Park.

The final area of residual land would be subject to ongoing design development. This would include consideration of opportunities to consolidate lots where practicable to maximise the land available for potential future uses.

Potential future uses of residual land would be determined by Transport for NSW in consideration of:

- surrounding land uses and existing zonings
- local and regional strategic planning, including master planning for identified urban renewal areas
- consultation with key stakeholders
- the requirements (including any remediation of contaminated land) to make the land suitable for potential future uses.

A residual land management plan would be prepared by Transport for NSW which outlines the approach to managing residual land, including the future use of the land, determined in consultation with key stakeholders (see section 13.7 of the EIS).

1.9.3 Subdivision

Where acquired land is identified as being surplus to operational requirements, or requires boundary adjustment, a subdivision of the land would be undertaken and Deposited Plans for the subdivision would be developed and lodged at NSW Land Registry Services. Subdivision may be carried out to divide land for the purposes of:

- public road and public open space
- light rail operation
- management of residual land.

Any proposed subdivision is considered to be part of the project and would be undertaken in accordance with the provisions of section 104Q of the *Transport Administration Act 1988*.

1.10 Operation

The project would operate between the Parramatta Square stop in the Parramatta CBD (provided as part of Parramatta Light Rail Stage 1) and the Carter Street stop in Lidcombe. Parramatta Light Rail Stage 2 services would terminate at the Parramatta Square stop to allow customers direct access to the Parramatta CBD, Parramatta Light Rail Stage 1 services or other forms of public transport. Between the Parramatta CBD and Camellia, the project would operate along about three kilometres of the Parramatta Light Rail Stage 1 alignment. From Camellia, the project would operate along the light rail infrastructure proposed as part of Stage 2, terminating at the Carter Street stop.

1.10.1 Service frequency

Operating hours

The project would operate as a turn-up-and-go light rail service from 5am to 1am, seven days a week, similar to the operation of Parramatta Light Rail Stage 1.

Different service schedules for weekdays, weekends and public holidays (see Table 1.5) are proposed to meet passenger demand. The operator may adapt the services in response to demand and usage changes and for special events.

Table 1.5 Summary of proposed services

Time of day	Operating hours	Indicative time between services (minutes)	Vehicles per hour (each direction)
Weekday services			
Early morning	05:00 – 07:00	10	6
Day	07:00 – 19:00	7.5	8
Evening	19.00 – 23.00	10	6
Night	23:00 – 01:00	15	4
Weekend and public holiday services			
Early morning	05:00 – 07:00	15	4
Day / Evening	07:00 – 23:00	10	6
Night	23:00 – 01:00	15	4

Indicative journey times

The following provides an overview of the indicative journey times:

- 21 minutes between the Parramatta Square stop and the Melrose Park stop
- 14 minutes between the Melrose Park stop and Olympic Boulevard stop
- 10 minutes between the Footbridge Boulevard stop and Carter Street stop
- 35 minutes between the Parramatta Square stop and Sydney Olympic Park (Olympic Boulevard stop).

1.10.2 Special event operations

The project connects several key entertainment areas, including the Parramatta CBD, Rosehill Gardens Racecourse and Sydney Olympic Park (including Sydney Showground). During special events at these locations, there would be an increase in demand for light rail services and a special event timetable may be implemented, depending on the scale of the event.

During special events at Rosehill Gardens Racecourse and Sydney Olympic Park, changes to the frequency and stopping patterns of light rail services may be required to cater for customer demand.

During events at Sydney Olympic Park with an attendance of over 60,000 people, services would terminate at the Jacaranda Square stop and not operate from the Olympic Boulevard and Carter Street stops. A turnback facility at Jacaranda Square would facilitate the turnaround of light rail vehicles. Further information on special event operations is provided in sections 6.1 and 6.2 of Technical Paper 2 (Transport and Traffic) (appended to the EIS).

Special event services may run beyond the standard hours of operations and there is the potential to provide 24-hour operations for certain special events (such as New Year's Eve events). It is anticipated that about six to eight additional services per hour in off peak periods would operate during special event periods.

1.10.3 Public transport network changes

Interchange with other public transport services

Interchanges with other forms of public transport are proposed, including trains, buses, ferries and Sydney Metro West services.

Table 1.6 indicates the locations where interchange with other forms of transport would occur and the closest light rail stop.

Table 1.6 Locations where customers can change transport modes or services

Suburb	Stop	Public transport services located in the vicinity of the stop
Parramatta CBD	Parramatta Square (constructed by Parramatta Light Rail Stage 1)	Parramatta Light Rail Stage 1 Sydney Trains (Parramatta Station) Sydney Metro West (Parramatta Station) Bus services to Burwood, West Ryde and Central
Camellia	Sandown Boulevard	Parramatta Light Rail Stage 1 (Rosehill Gardens stop)
Rydalmere	John Street	F3 Parramatta River ferry (Rydalmere Wharf) Bus services to Ryde and Western Sydney University
Ermington	River Road	Bus services to Eastwood and Auburn (via Newington)
Melrose Park	Melrose Park	Bus services to Pennant Hills (via Carlingford), Macquarie Park (via Ryde), Concord Hospital (via Rhodes) and Lidcombe
Wentworth Point/ Sydney Olympic Park	Footbridge Boulevard	Bus services to Concord Hospital (via Rhodes) F3 Parramatta River ferry (Sydney Olympic Park Wharf)
Sydney Olympic Park	Holker Street	Bus services to Lidcombe (via Newington)
	Jacaranda Square	Sydney Trains (Olympic Park Station) Bus services to Lidcombe, Macquarie Park (via Ryde), Strathfield, Parramatta, Carlingford (via Melrose Park) and Wentworth Point
	Olympic Boulevard	Sydney Trains (Olympic Park Station) Sydney Metro West (Sydney Olympic Park Station) Bus services to Lidcombe, Strathfield, Burwood, Macquarie Park (via Ryde), Parramatta, Carlingford (via Melrose Park) and Wentworth Point
Lidcombe	Carter Street	Bus services to Burwood, Lidcombe and Rhodes

Bus service changes

Existing bus routes along roads affected by the project would be retained as far as practicable. However, an initial review has identified that some changes to the bus network may be required, including:

- introducing new routes to meet existing and future customer travel patterns
- truncating or removing some services to better integrate with the project and the broader transport network (for example reducing services that operate in a similar corridor to the project)
- changing routes to adapt to proposed changes to the road network (see section 1.6)
- considering opportunities for on-demand services in the study area.

Changes to the bus network are outside the scope of the project and would be assessed and delivered separately by Transport for NSW in conjunction with bus operators.

Minor changes to some bus stop infrastructure and locations would be required. Relocated stops would be located as close as possible to the existing stop.

Further information on changes to public transport is provided in section 9.4 (Transport and traffic) of the EIS.

1.10.4 Light rail vehicles

The proposed light rail vehicles would be about 45 metres long, electric-powered, low floor and airconditioned with real-time information provided via audio and visual displays (see Figure 1.23 for an indicative light rail vehicle).

Each light rail vehicle would provide seating and standing areas for about 300 passengers. Accessible priority seating for those with limited mobility would be provided.

To accommodate the proposed service frequency at the commencement of operations, a fleet of about 13 light rail vehicles (including one spare light rail vehicle) would be used. The proposed vehicles would be interoperable with the light rail vehicles procured for Parramatta Light Rail Stage 1.

On-board security would consist of emergency help points and CCTV cameras linked to the operations control centre.

Figure 1.23 Indicative light rail vehicle

1.10.5 Ticketing system and passenger information

Ticketing

Ticketing would be integrated with the Opal ticketing system used for Sydney's public transport network. Opal card readers would be located at each stop, with passengers required to tap on before boarding, and tap off after alighting the light rail vehicles.

Passenger information displays and public address system

Passenger information displays would be located in the interchange area to provide passengers with the information to make informed decisions on journey plans. These displays would provide up to date service information specific to the stop, general information and information during operational disruptions.

A public address system would be installed at all stops. It would be used only in the event of an emergency and would be designed to minimise impacts to the amenity of the surrounding community. Regular service information would not be provided by the public address system.

1.10.6 Operational control and safety

Operation control

The project would be operated from the existing operations control centre, which forms part of the Parramatta Light Rail stabling and maintenance facility.

Road and light rail vehicle safety

The operator would have responsibility for the safe and efficient operation of the system. Light rail vehicle drivers would use line-of-sight operation. In on-street sections, light rail vehicles would form part of the general road traffic and light rail vehicle drivers would observe the relevant provisions of the NSW *Road Rules 2014*. The light rail vehicle drivers would also be required to give due consideration to traffic flow and pedestrian movements, assessing light rail vehicles speeds and braking requirements against actual or potential hazards.

Speed limits

Speed limits for light rail vehicles would be developed considering the existing and desired street character, transport and journey time objectives, engineering requirements, and safety considerations. Where light rail operates in the street environment, it would observe the signposted speed limits of the existing roadways. Speed limits are not expected to exceed 50 kilometres per hour due to the existing road environment; however, slower speeds would be used in some sections of the alignment (such as the light rail and pedestrian zone along Dawn Fraser Avenue in Sydney Olympic Park).

Disruptions to light rail services and incident management

During operation, incidents may disrupt light rail services, preventing parts of the network from being operated. The operator would develop and implement procedures to minimise the occurrence and impact of disruptions and incidents. Such incidents could include:

- road traffic accidents (including a collision involving a light rail vehicle)
- major fault or failure of a light rail vehicle, requiring traffic diversion until the disabled light rail vehicle has been recovered
- infrastructure faults (e.g. track, overhead wiring or signals)
- derailment of a light rail vehicle
- unruly or ill passenger(s)
- environmental events (such as flooding).

All emergency or incident responses would be subject to safe management processes including risk assessments, staff training and agreements with emergency services and utilities agencies.

Customer safety

The operator would be responsible for the safety of customers, staff and the public where they interact with the light rail system. The operator would maintain a customer safety plan (or similar management plan) identifying how customers would be made aware of the safety risks associated with being near light rail vehicles. This plan would be agreed and implemented in consultation with Transport for NSW and would form part of the operator's accreditation process prior to commencement of operations.

The operator would also be responsible for the security of the light rail network (active and passive security).

1.10.7 Maintenance

Maintenance would be required along the light rail track, at bridges, stops, substations and ancillary facilities, and would include the following activities:

- track and overhead wiring inspections, inspection and clearing of the track drainage system
- preventative maintenance and repair
- maintenance of landscaping to maintain appropriate clearances
- cleaning of passenger facilities
- track grinding and periodic replacement of track and other light rail infrastructure.

Cleaning and minor maintenance would be undertaken during off-peak periods and at night. Major maintenance works requiring suspension of services would be performed during scheduled shutdowns, about two to four times per year.

Light rail vehicles would be maintained at the Parramatta Light Rail stabling and maintenance facility.

2. Project description – construction

This chapter describes the proposed approach to construction, including the indicative construction methodology, program and working hours, temporary construction compounds, workforce numbers and transport and access arrangements. This chapter updates and supersedes the project description provided in Chapter 7 (Project description – construction) of the EIS. A description of the proposed features of the project and how it would operate is provided in Chapter 1.

2.1 Overview

2.1.1 Construction overview

Construction would broadly involve the following key stages:

- site establishment (see section 2.2)
- main construction works, including constructing the light rail infrastructure, bridges and other proposed infrastructure (see section 2.3)
- finishing works, including testing, commissioning and site rehabilitation (see section 2.4).

Some preparatory investigations may also be undertaken separately from the above (see section 2.1.4).

This chapter provides an indicative construction methodology that would be refined and optimised by the successful construction contractor(s). A final construction methodology and program would be developed by the construction contractor(s) based on the conditions of approval and the mitigation and management measures provided in Appendix B (Updated mitigation measures) of the Amendment Report.

Detailed construction planning, including timing, delivery strategy and work sequencing considerations, would be confirmed once construction contractor(s) have been engaged. An indicative overview of the construction program is provided in section 2.1.3 and construction timing and working hours are described in section 2.5.

Construction resources, including land requirements, ancillary facilities and the workforce required to support construction, are described in section 2.6. The proposed arrangements for transport and access during construction are described in section 2.6.5.

Construction would also involve works to utilities within the project site, including relocating a portion of two of Sydney Water's trunk mains in Ermington. These proposed works are described in section 2.8.

Construction would involve works within the project site as described in section 3.3.1 and shown on Figure 3.1 to Figure 3.7 of the Amendment Report. In some instances, due to the ongoing nature of design development, some construction activities may need to be undertaken outside the project site, including:

- utility adjustments and connections
- drainage works where connections are made to existing infrastructure
- property adjustment works, including adjustments within properties to property fencing, driveway realignments and the provision of new property access

- minor road network and public transport changes, such as traffic signal adjustments, signage and linemarking; road, footpath or active transport tie-ins, and new or relocated car parking and bus stop infrastructure
- boat and barge movements, including loading and unloading facilities for bridge works
- tree planting in accordance with the tree offset strategy (see section 15.6 of the EIS).

2.1.2 Staging

Construction of the project would be staged to align with the procurement and delivery strategy for the project. The project construction stages are anticipated to be:

- Stage A – Bridge between Melrose Park and Wentworth Point
  - pre-construction preparation and site establishment, including heritage investigations
  - utilities relocation
  - main construction works
- Stage B – Main alignment construction works and supply, operate and maintain system works.

For further information regarding the stages please refer to Appendix G (Staging Report) of the Response to Submissions.

2.1.3 Program

The construction program shown in Figure 2.1 provides indicative timing only. The final construction program may vary.

Subject to planning approval, future decisions by the NSW Government and timing of funding allocations, and procurement, it is anticipated that early works and site establishment for Stage A would start in 2024, with main construction works starting about 12 months later and taking about four years to complete.

Main construction works for Stage B would commence in 2026 and the first passenger services are proposed to start from 2030/2031.

The two bridges over the Parramatta River are expected to take about 30 to 36 months to construct.

Construction may not occur concurrently in all work areas for the full duration of construction, with smaller portions of work occurring in distinct areas for shorter periods of time.

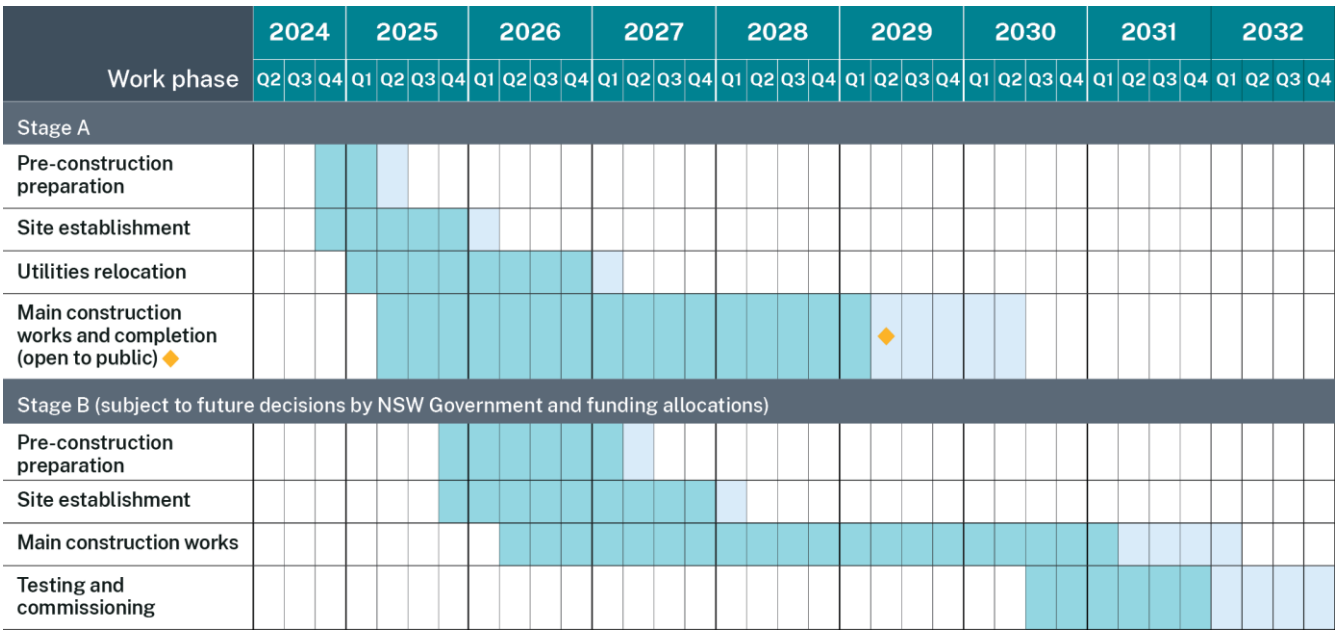


Figure 2.1 Indicative construction program

A key driver for the construction program is the works to Sydney Water's trunk mains, including the proposed relocation of two of the pipelines in Ermington (see section 2.8.1). Due to the importance of these pipelines, Sydney Water has indicated a number of requirements in relation to works to the pipelines. These include that works can only be undertaken in winter (when demand for water is lower) and works can only be undertaken on one pipeline at a time. Given these constraints, these works may be undertaken prior to the start of substantial construction of the light rail infrastructure.

2.1.4 Preparatory investigations

Some preparatory work and investigations (such as survey, soil sampling, archaeological testing, and utilities investigations) may be undertaken for the purposes of ongoing design development and construction planning. These works are typically of low environment impact. Examples of low impact preparatory works include:

- survey work, monitoring work and investigations, including investigative boreholes on land and over water
- property condition surveys
- treatment of contaminated sites (subject to the recommendations of a contaminated sites investigation report)
- minor utility works
- property adjustment works, including installation or adjustment of property fencing
- at-property noise treatments to mitigate anticipated construction noise impacts before commencement of construction.

2.2 Site establishment

Site establishment works would generally include:

- installing site environment management controls, including site fencing, exclusion fencing for sensitive areas, sediment and erosion control, screening and noise attenuation
- removing redundant buildings and structures (as required), including the existing pedestrian bridge over Silverwater Road and the existing bridge at Hill Road
- salvage Aboriginal objects if required in accordance with the salvage methodology (see Chapter 11 (Aboriginal heritage) of the EIS)
- establishing construction compounds (see section 2.6.2) and work areas, including providing access, erecting demountable buildings and fencing
- supplying power, water and other utilities to construction compounds and work areas
- vegetation removal, trimming and tree removal/relocation where required
- relocating, adjusting and protecting utilities and services (other than minor utility works)
- establishing temporary road, pedestrian and cyclist diversions
- preparing works areas for main construction works, including bridge works (levelling, grading and/or compacting)
- remediation of contaminated land (to the extent required for the proposed use) (see Chapter 18 (Soils and contamination) of the EIS).

2.3 Main construction works

2.3.1 Light rail infrastructure

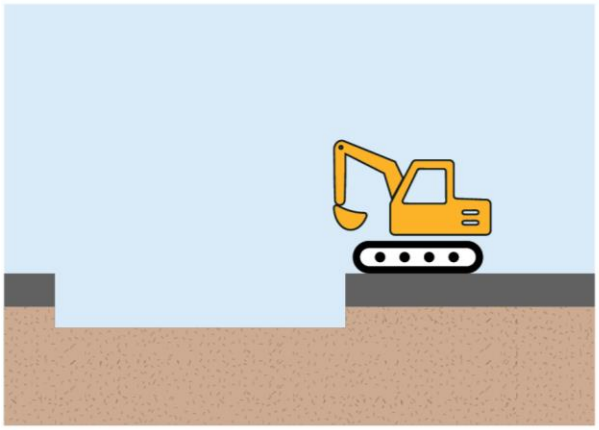
Track work

Constructing the light rail tracks would generally involve civil works, track installation works and overhead wiring installation, as described below. Figure 2.2 shows a simplified construction process for these elements.

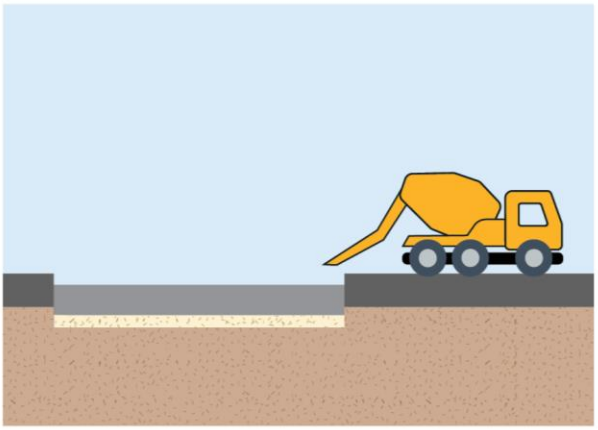
Civil works

Civil works associated with track construction would typically involve:

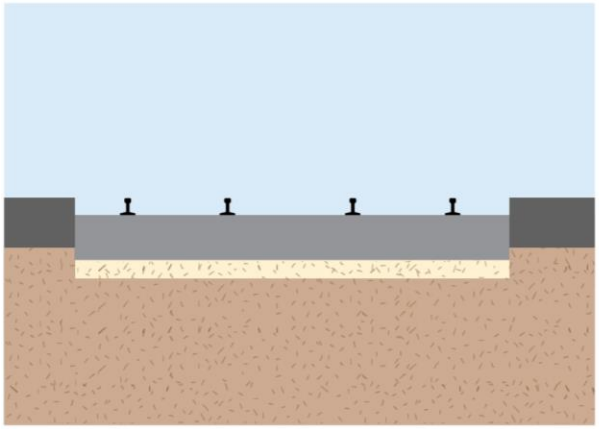
- removing existing road pavement and subgrade in the vicinity of the proposed track location
- earthworks (see section 2.3.5), including subgrade works for the track slab foundation and compaction of fill material
- installing services conduits
- constructing drainage
- preparing the track bed
- placing steel reinforcement and concrete formwork, pouring concrete or installing pre-formed concrete slabs
- constructing retaining walls (see section 2.3.6)
- backfilling areas of excavation
- reinstatement of affected areas, including roads, paths and grassed areas
- public domain works (including landscaping) where required (see section 1.8).



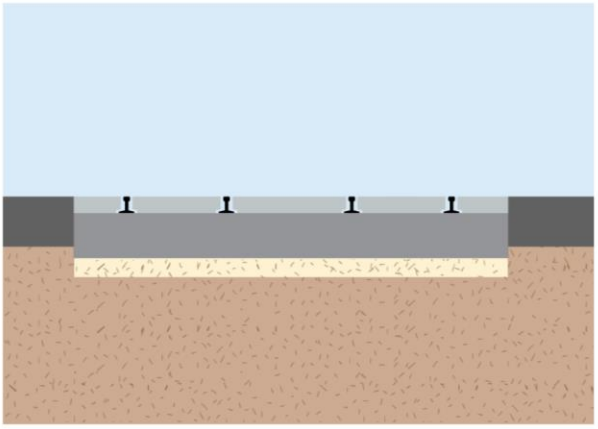
1 Remove existing road surface, road base and other elements such as kerb and gutter



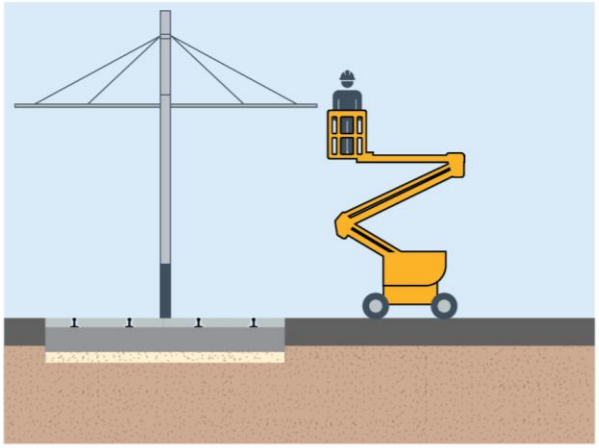
2 Compact fill material and track slab



3 Installation of tracks



4 Installation of topping slab, pavers or green track



5 Install overhead wiring

Figure 2.2 Typical construction process for track work

Track installation

Track installation would typically involve:

- installing the tracks in concrete, including track laying, welding and grinding
- rail systems installation, including conduits installed during civil works
- surface finishing, depending on the track form proposed at each location (see section 1.2.1)
- reinstating affected areas
- installing road and on-track linemarkings.

Generally, the tracks would be installed in linear sections, with multiple sections constructed at any one time. During detailed construction planning, the contractor(s) would confirm whether the light rail tracks are installed together, or whether each track is installed separately based on the design of the project and surrounding constraints, such as property adjustments and access and road usage.

Figure 2.3 shows an example of track installation for Parramatta Light Rail Stage 1.

Figure 2.3 Image showing track installation works for Parramatta Light Rail Stage 1

Overheard wiring, poles and street lighting

Where overhead wiring and pole and street lighting is required, installation would typically involve:

- removing existing pavement and excavating footings
- placing prefabricated reinforcement cage, base plate and other sub-structure elements
- concrete pouring
- off-site fabrication of poles and delivery to the work site

- erection of poles
- stringing overhead wires (where proposed), utility connection, installing droppers and wiring terminations.

Stops

Light rail stops may be constructed concurrently with the track infrastructure or constructed separately, with works at each stop commencing after the adjacent section of track infrastructure has been constructed.

Stop construction is likely to consist of installation of prefabricated materials and on-site concrete pours. Construction activities would typically involve:

- removing existing road pavement (where not undertaken as part of the track infrastructure works)
- excavation
- installing services, including communications and power supply into the stop structure
- construction of footings
- installing prefabricated columns, stop canopy, integrated service cabinets, signage, seating, windbreaks, balustrades at back of platforms (as required), and paving tactile indicators (see section 1.3.2)
- finishing works.

2.3.2 Bridges

Bridge construction

As described in section 1.5, the project involves the construction of five new bridges (two over the Parramatta River, one over Silverwater Road, one in Ken Newman Park and a new bridge to replace the bridge at Hill Road).

Construction of the bridges, would typically include:

- excavation works at approaches and supports
- constructing abutments on the approaches to the bridge
- constructing bridge piles (if applicable) and pile caps (if applicable)
- constructing bridge piers (if applicable)
- constructing bridge superstructure, which may include:
  - lifting and installing concrete girders and/or precast concrete bridge segments using cranes
  - off-site assembly of structural elements and lifting into place
  - in-situ concrete pouring of bridge superstructure elements
- concrete pouring the bridge deck
- installing light rail infrastructure on the bridge deck
- other bridge fit-out works, including installing handrails, overhead wiring and other safety and operational infrastructure.

Figure 2.4 shows an example of the track form for a Parramatta Light Rail Stage 1 bridge.

Figure 2.4 Image showing light rail track form for a Parramatta Light Rail Stage 1 bridge

The proposed construction methods for the bridges over the Parramatta River have been refined to minimise potential impacts on environmentally sensitive areas, including contaminated land, river bed sediments, and the presence of mangrove vegetation along the shoreline (see section 5.5.2 of the EIS).

The sections of river within which the proposed bridge piers would be located are relatively shallow. It is therefore proposed to construct the bridges over the river by establishing temporary working platforms, supported by piles, on the northern and southern banks of the river, and progressively extending the platforms out into the waterway. Two temporary platforms would be established for each bridge, with lengths ranging from about 40 metres up to about 110 metres. The platforms would be installed in segments on top of piles within the riverbed, which would support a steel structure.

Piles for bridge piers would be installed from piling rigs located on top of the platforms or barges. Silt curtains would be installed at the proposed platform and bridge piles when there is a risk of mobilising sediments.

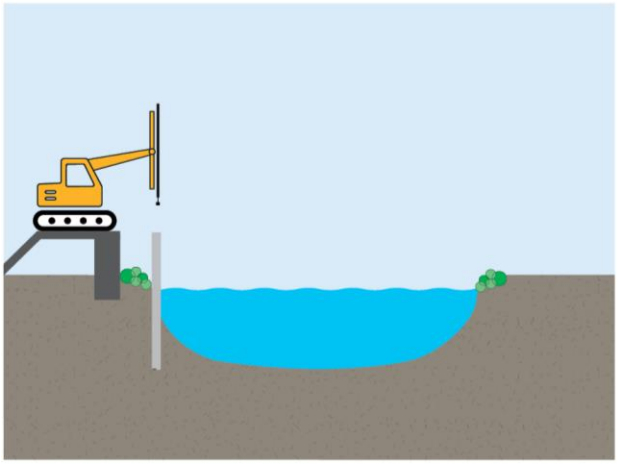
Lifting and installing the precast bridge segments on top of the piers would be undertaken using cranes located on the temporary platforms or barges (depending on crane reach). Barges would also be used to deliver bridge segments and other construction materials from an existing purpose built facility such as at White Bay.

Figure 2.5 shows the typical process for constructing the bridges over the Parramatta River.

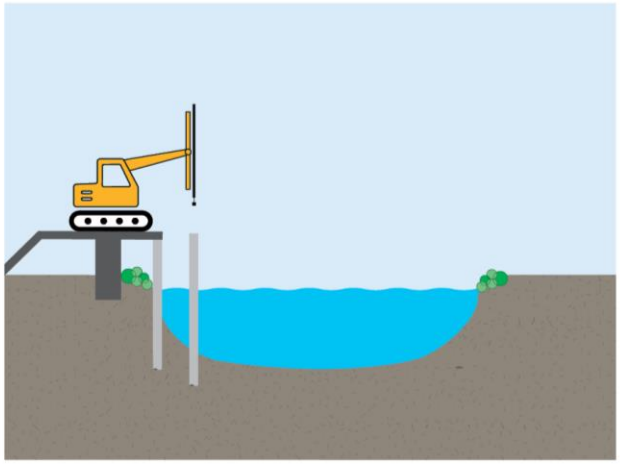
Strengthening works

As described in section 1.5, the existing Holker Busway bridge would be retained however additional works would be required to strengthen the bridge to ensure compliance with current standards.

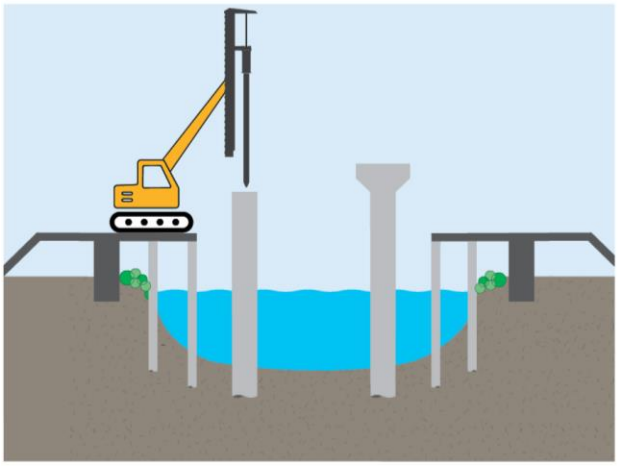
Works to the Holker Busway bridge would be subject to further investigation during design development, including the extent of works needing to be undertaken during periods of road closure. Any road closures would be co-ordinated with the Greater Sydney Operations and Sydney Olympic Park Authority.



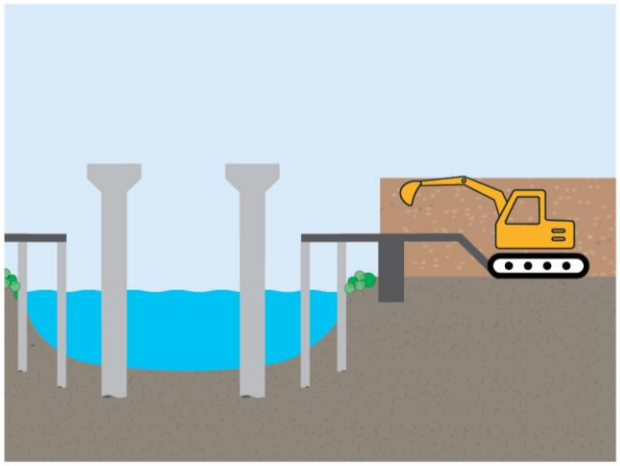
1 Install temporary working platform piles from land



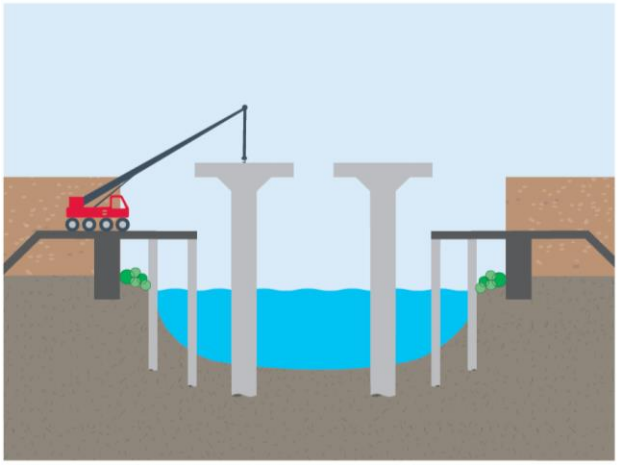
2 Install steel support onto pile then install next pile for temporary working platform



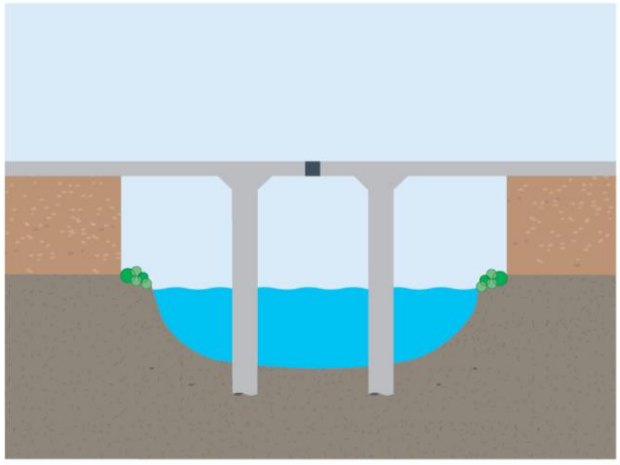
3 Drill and install piles for bridge piers. Construct pile caps and headstocks from temporary working platform



4 Construction of reinforced earth abutments



5 Bridge segments lifted into place from temporary working platforms or barge



6 Span meet at centre with final segment placed followed by bridge fitout

Figure 2.5 Typical process for bridge construction over the Parramatta River

2.3.3 Road works

As described in section 1.6, the road network would need to be modified to accommodate track infrastructure. Works are required to ensure that roads and footpaths continue to operate safely, that the road surface ties into the new track, and that the grade is sufficient to provide suitable drainage.

This would include changes to the road surface and lane arrangements, such as road widening, reconfiguration of traffic lanes, milling and resurfacing of pavement surfaces and intersection works. Road works would typically involve:

- removing existing kerb, gutters, median strips and redundant infrastructure
- milling and excavation to the level required for the installation of light rail infrastructure
- placing and compacting road base and road pavement works
- integration with existing road pavements (where required)
- constructing new kerbs, gutters and other drainage
- erection of directional, wayfinding, regulatory and other signage
- erection of roadside furniture
- installing new light rail infrastructure (see section 2.3.1)
- road paving and pavement marking
- constructing tie-ins to existing roads
- installing/modifying traffic lights, induction loops and signage
- public domain works (including landscaping) where required (see section 1.8).

In some areas, the profile of existing carriageways would be modified (raised or lowered) to tie into the light rail alignment.

Some on-street parking would be removed to facilitate construction. Further information is provided in Chapter 9 (Transport and traffic) of the EIS and section 6.2 of the Amendment Report.

2.3.4 Active transport links

Works to construct the active transport links would vary along the route according to the configuration proposed. For the bridges, active transport links would be constructed as part of the bridge deck structure. In other areas, the active transport links would be constructed as part of other project elements, such as the modified roadway or areas adjacent to the roadway/stops.

Generally, where excavation for the active transport links is required, this would be completed as part of the overall project earthworks (see section 2.3.5). This would be followed by:

- installing formwork
- pouring concrete
- installing drainage and services (as required)
- finishing the surface (including painting and linemarking)
- installing signage (as required).

Figure 2.6 shows an example of the construction of an active transport link for Parramatta Light Rail Stage 1.

Figure 2.6 Image showing part of the Parramatta Light Rail Stage 1 active transport link under construction

2.3.5 Earthworks

Earthworks would be required to construct various infrastructure, including light rail infrastructure, bridges and substations, and undertake some road and utility works.

Figure 2.7 shows an example of earthworks for Parramatta Light Rail Stage 1.

Figure 2.7 Image showing earthworks underway for Parramatta Light Rail Stage 1

The estimated quantities of materials associated with earthworks are provided in Table 2.1 for each of the planned urban growth precincts along the project site (described in Chapter 2 (Location and setting) of the EIS).

Table 2.1 Estimated volume of cut and fill material by precinct

Precinct	Estimated volume of material to be excavated (cubic metres)	Estimated volume of material required for fill (cubic metres)	Earthworks balance (cubic metres)
Camellia	700	12,800	-12,100
Rydalmere East	1,900	26,300	-24,400
Ermington	5,700	34,000	-28,300
Melrose Park	9,500	8,200	1,300
Wentworth Point	1,900	29,800	-27,900
Sydney Olympic Park	12,500	15,100	-2,600
Carter Street	3,900	1,500	2,400
Total	**36,100**	**127,700**	**-91,600**

Fill material would generally be required for backfilling excavations, subgrade works where sections of the alignment are not underlain by existing road pavements, and retaining wall construction. The following hierarchy would apply to managing excavated materials, excluding activities associated with the remediation of contaminated land:

1. Material with suitable engineering properties that meets soil quality requirements would be reused within the project site, where practicable, and in accordance with the project's urban design requirements.
2. Excess usable material (if any) would be transported off site for reuse on other Transport for NSW project sites, recycling or disposal at an appropriately licensed facility (to be determined based on the waste classification).
3. Excess material (including contaminated material) that is unable to be reused within the project site or other Transport for NSW project sites would be transported off site for treatment and/or disposal at an appropriately licensed facility (to be determined based on the waste classification).

Where fill material is not available from project earthworks, suitable material (i.e. subject to a resource recovery exemption) may be sought from other projects to maximise the opportunity to divert waste from landfill.

Further information on waste management is provided in Chapter 22 (Waste and resources) of the EIS.

2.3.6 Other infrastructure

Modifications to the stabling and maintenance facility

Modifications to the stabling and maintenance facility at Camellia would include:

- providing a new temporary construction access road on the eastern side of the site
- preparing and levelling land within the new sections of the stabling and maintenance facility
- installing new drainage and services
- installing new stabling tracks and turnouts
- installing overhead wiring for the new tracks

- installing light rail systems and operational infrastructure
- adjustments to the maintenance building constructed by Parramatta Light Rail Stage 1.

The existing car park at the facility would also be extended with works involving:

- excavation to level the site
- placement and compaction of the road base
- construction of a new kerb and gutter
- laying asphalt surface and linemarking
- installation of ancillary elements such as paths and lighting
- general landscaping works.

The contamination capping layer installed as part of Parramatta Light Rail Stage 1 works would not be affected by the modifications.

Macquarie Street turnback facility

Construction of the turnback facility at Macquarie Street would include:

- removing existing kerb and gutters
- removing and excavating the existing road surface and road base to the formation level
- earthworks, including subgrade works for the track slab foundation and compaction of fill material
- placing steel reinforcement and formwork, concrete pouring, and pavement installation for track slab and kerbs
- installing new tracks including the crossover between Marsden and Church streets
- installing the turnout from the Parramatta Light Rail Stage 1 tracks at the intersection of Macquarie and Church streets
- installing below ground charging infrastructure to power the light rail vehicles
- installing an end of line light rail vehicle stop treatment
- road adjustments on Macquarie and Marsden streets to accommodate the light rail infrastructure (see section 2.3.3).

Traction power substations

Constructing the traction power substations would typically involve:

- constructing foundations, footings and conduits
- constructing and/or delivery and installation of substation structure and electrical equipment, including wiring fit out
- installing earthing and lighting systems
- installing high voltage cables between substations and light rail stops, and to the existing electricity supply network
- installing access paths and service parking bays as required
- ground finishing with concrete, pavers or other materials
- installing the facade.

Retaining walls

Retaining walls would vary in structure and construction methodology, depending on location. Construction activities would typically involve:

- excavating below the existing ground surface to prepare the foundation for the retaining wall
- installing steelwork/formwork and concrete pouring (for cast in situ walls)
- installing precast segments and retaining straps (for reinforced earth walls)
- installing subsurface drainage systems, including free draining aggregate and geotextile materials
- progressive backfilling and compaction
- installing any surface drainage proposed at the top or bottom of the retaining wall
- installing retaining wall finishes.

2.4 Finishing, testing and commissioning

2.4.1 Finishing works

At the end of construction in each work area, the contractor would remove all construction related equipment and infrastructure.

Finishing works would be undertaken progressively (as far as practicable) and would generally include:

- demobilising compounds and works areas, removing all equipment and temporary infrastructure
- removing materials, waste and redundant structures from the project site
- removing temporary fencing
- rehabilitation of disturbed areas in accordance with the rehabilitation strategy (see section 13.7 of the EIS)
- landscaping (see section 1.8.3)
- erecting directional and other signage, and roadside furniture such as street lighting.

2.4.2 Testing and commissioning

Testing and commissioning activities would typically include:

- testing infrastructure and electrical systems
- testing the substations and energising of track zones
- delivery and assembly of light rail vehicles at the stabling and maintenance facility
- testing the light rail vehicles
- line-wide testing of the track and intersection signalling and operations
- rectification of defects
- operation tests, including emergency simulations for track, electrical and operational systems.

2.5 Construction timing

2.5.1 Working hours

Recommended standard hours

The *Interim Construction Noise Guideline* (DECC, 2009) provides the following hours for normal construction work:

- Monday to Friday: 7am to 6pm
- Saturday: 8am to 1pm
- no work on Sundays or public holidays.

The *Interim Construction Noise Guideline* notes that these recommended standard hours are non-mandatory and that work should be scheduled during these recommended standard hours unless work outside these hours can be justified.

The *Interim Construction Noise Guideline* further states that there are some situations where construction work may need to be undertaken outside of these hours such as works on public infrastructure to maintain the operational integrity of the road network or utilities, as this infrastructure provides a benefit to the greater community.

The guideline also notes that the consent authority may impose more or less stringent construction hours.

Primary project working hours

As the project would be constructed along road corridors for most of its length, including adjustments to a number of utilities in key locations, working hours are proposed that would extend the recommended standard hours outlined in the *Interim Construction Noise Guideline* to:

- Monday to Friday: 7am to 7pm
- Saturday: 7am to 7pm
- Sundays and public holidays: 7am to 7pm.

Where there is the potential for construction noise impacts, no work would be undertaken in that area one weekend per month, except in the following circumstances:

- where the substantial majority of potentially affected receivers agree that the work can be undertaken
- where construction works do not exceed the noise management levels specified in the *Interim Construction Noise Guideline* (Table 3) at residential sensitive receivers
- where emergency work is required to avoid the loss of life or damage to property, or to prevent environmental harm.

The proposal to construct the project during periods other than the recommended standard hours outlined in the *Interim Construction Noise Guideline* requires a strong justification to be provided and negotiation with the affected community.

The proposed primary project working hours would:

- be consistent with the aims of the *Interim Construction Noise Guideline* and the *Construction Noise and Vibration Strategy* (Transport for NSW, 2019a) which establishes a hierarchy for works to occur during less noise sensitive periods (refer below)
- reduce the duration of construction in any one location and associated amenity (including noise, access, etc) impacts

- permit works within the road corridor at times when traffic volumes are lower, reducing the potential for disruption to the general public and providing a safe working environment for workers
- minimise potential disruptions to critical utilities during times of greatest needs
- enable works within Sydney Olympic Park to be planned around special events.

A similar approach was implemented during construction of Parramatta Light Rail Stage 1 which significantly reduced the number of nights worked and the associated noise and access impacts to the community.

The *Construction Noise and Vibration Strategy* notes that where work cannot be scheduled during the recommended standard hours, a hierarchy of working hours outside the standard hours should apply. As far as practicable, Transport for NSW would seek to minimise impacts by scheduling work during the recommended standard hours and then according to the following hierarchy of preferred working hours for work outside recommended standard hours:

1. Saturday afternoon periods between 1pm and 6pm
2. Sunday and public holiday day periods between 8am and 6pm
3. weekday evening periods between 6pm and 7pm
4. weekend evening periods between 6pm and 7pm
5. weekday evening periods between 7pm and 10pm
6. weekend evening periods between 7pm and 10pm
7. weekend night periods between 10pm and 8am
8. work during the weekday evening and night, scheduling the noisiest work first (between 6pm and 10pm) to minimise sleep disturbance in the night (between 10pm and 7am)
9. all other times outside the recommended standard hours.

Highly noise and vibration intensive works would be limited to the recommended standard working hours as far as practicable.

Potential construction noise and vibration impacts, which include consideration of the proposed primary project working hours, are described in Chapter 10 (Noise and vibration) of the EIS and section 6.3 of the Amendment Report.

Further clarification regarding the primary project working hours is provided in section 4.3.1 of the Response to Submissions.

2.5.2 Work outside the primary project working hours

Discrete construction activities would need to be undertaken outside the primary project working hours at some locations to minimise the potential for road safety hazards and maintain operation of key roads and public transport facilities. Such works would include:

- delivery of oversized plant, equipment and structures that the police or other authorities determine require special arrangements to transport along public roads
- constructing track infrastructure and undertaking road works at busy intersections or where temporary road closures are required during periods of lower traffic volumes
- certain utility adjustments depending on the location and requirements of the utility provider, particularly where disruption to essential services, required system conditions (such as low-flow conditions for sewers) and/or considerations of worker safety do not allow work during standard working hours

- works associated with constructing the bridges over the Parramatta River to minimise navigation impacts
- works associated with constructing the bridge over Silverwater Road where temporary road closures are required during periods of lower traffic volumes
- emergency work to avoid the loss of life or damage to property, or to prevent environmental harm.

Managing out-of-hours work

An out-of-hours work protocol would be prepared to define the process for considering, managing and approving work outside the primary project working hours. The protocol would be prepared with regard to the *Construction Noise and Vibration Strategy* and the requirements of any environmental protection licences.

Further information about the approach to managing out-of-hours work is provided in Chapter 10 (Noise and vibration) of the EIS and further clarification regarding the primary project working hours is provided in section 4.3.1 of the Response to Submissions.

2.6 Construction resources and ancillary facilities

2.6.1 Temporary land requirements

In addition to the project's anticipated permanent land requirements (see section 1.9.1), some land would be required during construction only. These areas, which are listed in Appendix E (Updated preliminary land requirements) would be required for:

- construction compounds (see section 2.6.2 for activities which would occur at the compounds)
- to provide access to construction work areas
- for temporary traffic staging
- to relocate utilities
- to facilitate the manoeuvring of construction plant and machinery.

It is estimated that about 12.1 hectares of land would be required during construction, in addition to land within existing road corridors which would be used during construction and operation of the project. Use of this land would be via acquisition or a lease, licence or a memorandum of understanding with the relevant government agency or private landholder.

Further information about the project's land requirements, and the potential property impacts of these requirements, is provided in Chapter 13 (Land use and property) of the EIS and section 6.6 of the Amendment Report.

2.6.2 Construction compounds and ancillary facilities

Construction compounds

Fourteen construction compounds are proposed to support construction activities in nearby work areas. The proposed compounds are listed in Table 2.2 and shown on Figure 2.8 and Figure 2.9.

Table 2.2 Indicative construction compounds

Reference (see Figure 2.8 and Figure 2.9)	Name	Location	Role of compound
1	Grand Avenue	Grand Avenue, Camellia	Support works along the western section of the project site (including along the Sandown Line corridor for the bridge between Camellia and Rydalmere, from the southern side of the Parramatta River).
2	John Street	Eric Primrose Reserve, Rydalmere	Support works for the bridge from the northern side of the Parramatta River and works around John Street and South Street, including the John Street stop.
3	Broadoaks Park	Broadoaks Park, Primrose Avenue, Rydalmere	Support works along South Street and bridge works at Silverwater Road.
4	Ken Newman Park west	Ken Newman Park, Hilder Road, Ermington	Support works east of Silverwater Road, including the River Road stop and works within Ken Newman Park.
5	Ken Newman Park east	Ken Newman Park, Heysen Avenue, Ermington	Support works within and around Ken Newman Park, including relocation of the water mains, and works along Boronia Street.
6	Hope Street	Hope Street, Melrose Park	Support works along Boronia Street and Hope Street, and works at the Atkins Road stop.
7	Wharf Road	Archer Park, Waratah Street, Ermington Boat Ramp, Wharf Road, Melrose Park	Support works for the bridge between Melrose Park and Wentworth Point from the northern side of the Parramatta River and works for the Waratah Street stop.
8	Wentworth Point north	Sanctuary Wentworth Point	Support works for the bridge from the southern side of the Parramatta River and for the alignment to and including the Footbridge Boulevard stop
9	Hill Road north	Hill Road (at Bennelong Parkway), Wentworth Point	Support works along Hill Road including the Hill Road light rail stop.
10	Hill Road south	Hill Road (north of Holker Busway), Sydney Olympic Park	Support works along Hill Road including Hill Road bridge construction.
11	Holker Busway	Holker Busway, Sydney Olympic Park	Support works along Hill Road and the Holker Busway, including bridge works and the Holker Street stop. The compound would include a construction workforce parking area for about 200 vehicles.
12	Australia Avenue	Australia Avenue, Sydney Olympic Park	Support works along Australia Avenue and the Jacaranda Square stop.
13	Dawn Fraser Avenue east	Dawn Fraser Avenue, Sydney Olympic Park	Support works along Dawn Fraser Avenue, including the Olympic Boulevard stop.
14	Dawn Fraser Avenue west	Dawn Fraser Avenue, Sydney Olympic Park	Support works at and around the Carter Street stop.

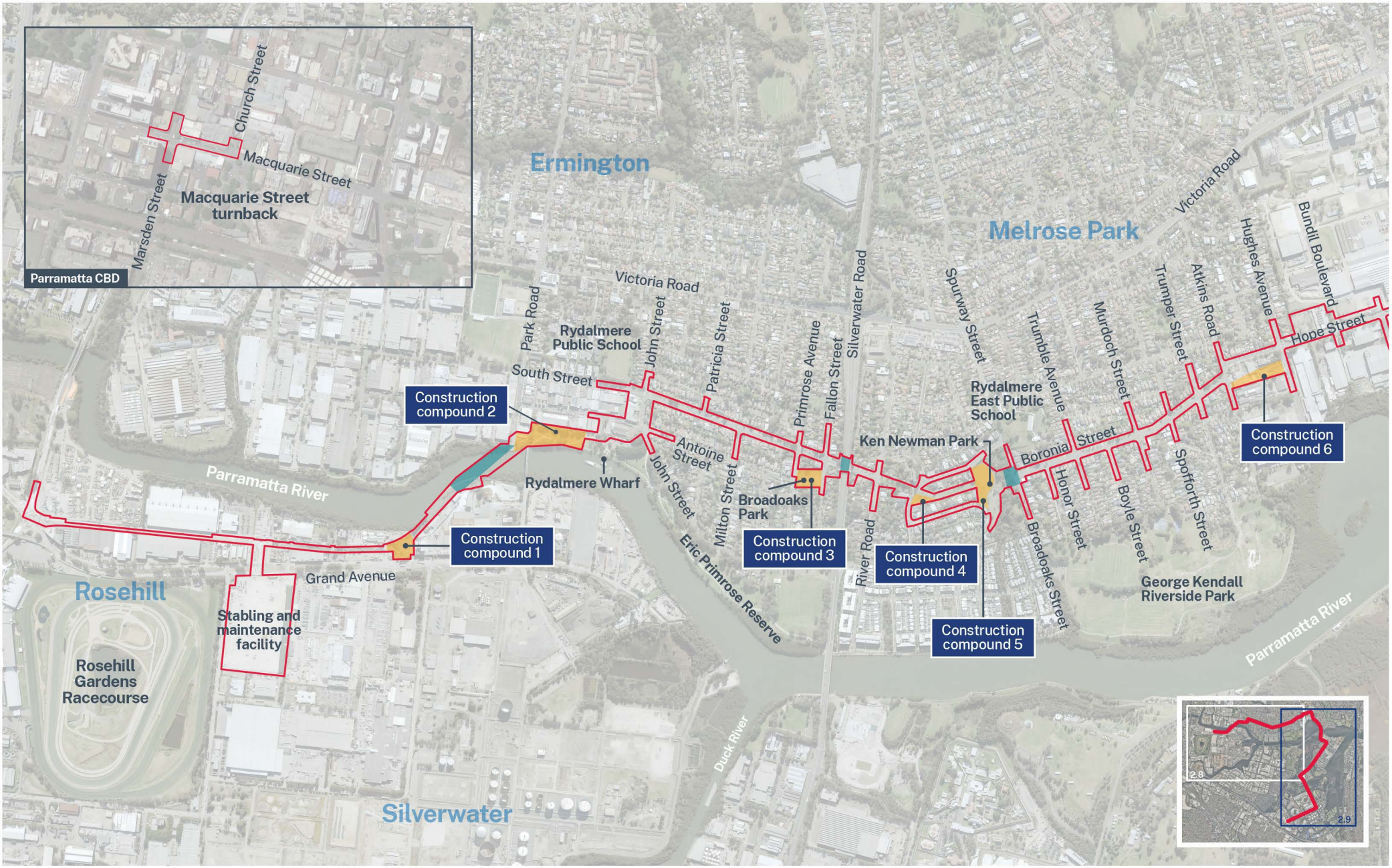


Figure 2.8 Proposed compound locations – map 1

LEGEND

Project site

Construction compounds

Bridge construction

0 0.5 km

N

Figure 2.9 Proposed compound locations – map 2

Construction compounds would generally include the following facilities:

- site offices
- staff and workforce amenities
- material storage and laydown, including stockpiling
- plant and equipment storage
- workshops and maintenance facilities
- staff and workforce parking (where sufficient space is available).

Some construction compounds would also include:

- work areas for larger infrastructure such as bridges, including at compounds 1 (Grand Avenue), 2 (John Street), 7 (Wharf Road) and 8 (Wentworth Point north)
- soil, water and groundwater treatment facilities – dewatering and water treatment plants are proposed at compounds 1 (Grand Avenue), 2 (John Street) and 7 (Wharf Road)
- erosion and sedimentation control devices, such as sedimentation basins and wheel wash facilities.

Additional or alternative compound locations (if required)

Although every endeavour has been made to identify the land likely to be required for construction (including the location of construction compounds), the construction contractor(s) may require additional or alternative construction compound locations. Additional or alternative compounds would be subject to the following criteria:

- located within or immediately adjacent to the project site
- not located next to sensitive land use(s) (such as residences), without the agreement of the landowner/landholder
- no impacts on heritage items (including areas of archaeological sensitivity), threatened species, populations or ecological communities beyond those identified by the EIS or Amendment Report
- the compound(s) can be established and used in accordance with the approach to environmental management for the project and the mitigation measures provided in the EIS (see Chapter 23 (Approach to environmental management and mitigation)).

Where possible, any additional or alternative compounds would be located within the project site.

Minor construction ancillary facilities

In addition to the proposed compounds listed in Table 2.2, minor construction ancillary facilities would be provided to support construction at other locations within the project site. Such facilities would include laydown areas, worker parking, mobile site sheds/offices, toilets and storage facilities. The locations of these facilities would be determined by the construction contractor(s) in accordance with the following criteria:

- located within or immediately adjacent to the project site
- no impacts on biodiversity, soil and water, and heritage items beyond those identified by the EIS and Amendment Report
- minimal potential for amenity impacts (including noise and vibration, traffic and access, air quality and visual impacts) beyond those identified and assessed by the EIS and Amendment Report
- minimal potential for flooding and waste impacts.

2.6.3 Estimated workforce

The construction workforce requirements would vary over the construction period in response to the activities underway and the number of active work areas. It is estimated that a peak workforce of between 750 and 1,000 people would be required.

2.6.4 Plant and equipment

A variety of plant and equipment would be used during construction. This would include a range of large machinery, such as cranes, piling rigs, ballast tampers, excavators, milling/paving machines, semitrailers/ dump trucks, compactors, suction trucks and road sweepers. Smaller plant and equipment would include generators, welding equipment, concrete saws, elevated working platforms, bobcats, linemarking machines, jackhammers and personal tools.

A full list of plant and equipment is provided in the Updated Noise and Vibration Report.

2.6.5 Construction materials

Construction materials would be confirmed further during design development and construction planning. The main materials are expected to include:

- steel – structural, rails and reinforcing
- concrete, sand and cement
- precast concrete
- asphalt and bitumen
- road base
- timber/plywood
- structural fill (where excavated material is not suitable)
- bentonite
- paving stones
- PVC conduit
- high density polyethylene (HDPE) materials
- water
- diesel
- lubricating oil
- prefabricated items such as railings, stop infrastructure, bridge components, etc.

Further details about resource use are provided in Chapter 22 (Waste and resources) of the EIS.

2.7 Transport and access

An outline of the proposed transport and access arrangements during construction is provided below. The potential impacts on transport, traffic and access, and the measures that would be implemented to manage these impacts, are described in Chapter 9 (Transport and traffic) of the EIS and section 6.2 of the Amendment Report.

2.7.1 Heavy vehicle routes

Preliminary routes for the movement of construction heavy vehicles, have been proposed and are shown on Figure 2.10 and Figure 2.11. The roads shown on the figures are those which would be used by construction heavy vehicles; however, it is noted that some of these roads would only be used for inbound or outbound movements to take into account access restrictions at certain locations.

Construction would result in additional movements of the following vehicle categories on the road network:

- heavy vehicle deliveries of construction plant, supplies and infrastructure components
- heavy vehicle transport of spoil and waste materials (including contaminated materials)

- light vehicle movements, typically associated with workers travelling to site and general construction activities.

Heavy vehicle routes have been proposed to allow these vehicles to access and egress the arterial road network in a safe and efficient manner and, wherever possible, avoid or minimise impacts on local roads and residential areas. The proposed heavy vehicle routes would be subject to confirmation by the construction contractor(s).

Construction heavy vehicle movements would be scheduled to occur outside peak periods as far as practicable. The transport of over-sized loads would need to be undertaken outside peak traffic periods.

Further information on the proposed movements along the roads shown on Figure 2.10 and Figure 2.11 is provided in Technical Paper 2 (Transport and Traffic) and section 6.2 of the Amendment Report.

2.7.2 Construction traffic volumes

Table 2.3 provides estimated average daily and peak hourly construction vehicle movements.

Table 2.3 Estimated construction traffic volumes

	Heavy vehicles		Light vehicles (construction activities)		Light vehicle (workforce)	
Precinct/location	**Daily[1]**	**Peak[2]**	**Daily[1]**	**Peak[2]**	**Daily[1]**	**Peak[2]**
Parramatta CBD	50	4	24	6	75	30
Stabling and maintenance facility	50	4	24	6	63	25
Camellia	76	5	22	5	163	65
Rydalmere	136	9	26	6	188	75
Ermington	168	12	36	9	175	70
Melrose Park	50	4	24	6	175	70
Wentworth Point	123	9	24	6	175	70
Sydney Olympic Park	41	3	24	6	175	70
Carter Street	39	3	24	6	63	25
Total	**733**	**53**	**228**	**56**	**1252**	**500**

Notes: 1. Daily vehicle movements represent combined daily inbound and outbound movements (two way) for the peak construction period.
2. Peak vehicle movements represent combined inbound and outbound hourly movements for the morning and afternoon peak periods (8-9am and 5-6pm). For light vehicles associated with construction activities, the afternoon peak has been reported as the expected worst case.

Generally, the maximum level of heavy vehicle movements is expected to be associated with concrete pours, which would typically be of short duration.

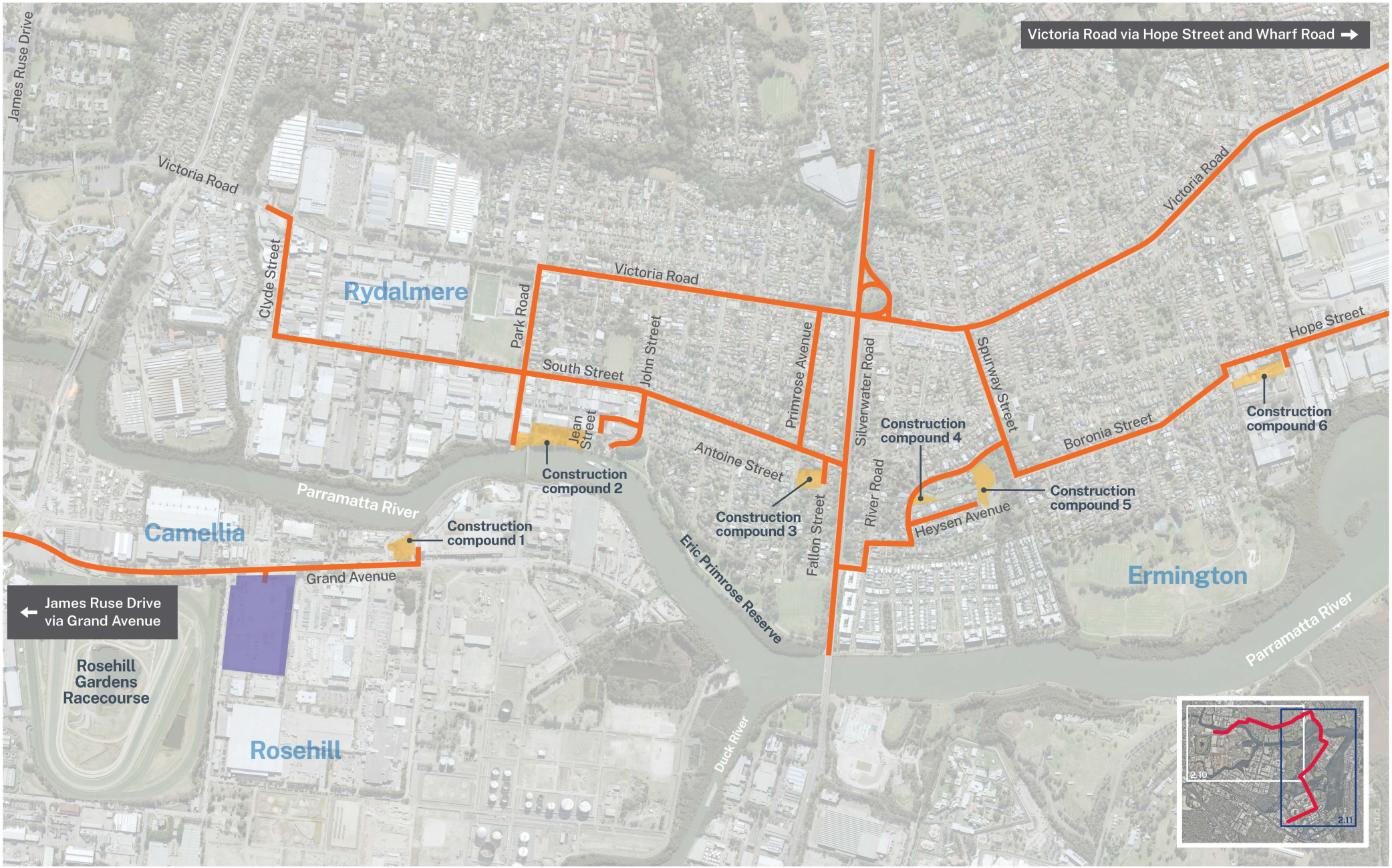


Figure 2.10 Preliminary heavy vehicle routes – map 1

LEGEND

Heavy vehicle routes

Construction compounds

Stabling and maintenance facility

0 0.5 km

N

Figure 2.11 Preliminary heavy vehicle routes–map 2

2.7.3 Construction workforce parking

Parking for the construction workforce would be provided at construction compounds, with the number of spaces to be confirmed by the construction contractor(s) during detailed construction planning based on the space available. A centralised construction workforce parking area, with space for about 200 vehicles, would also be provided as part of construction compound 12 (Holker Busway) (see section 2.6.2). Workers would be transported from this parking area to various work areas and construction compounds in the vicinity where on-street parking is limited.

The construction parking and access strategy would include measures to encourage staff to use alternative transport arrangements, including public transport (see Chapter 9 (Transport and traffic) of the EIS).

2.7.4 Changes to transport networks and facilities

The following sections outline indicative changes to road, public transport and pedestrian/cyclist infrastructure and facilities along and in the vicinity of the project site during construction. Changes to maritime infrastructure/use are considered in section 2.7.5. The location and duration of changes would be confirmed during detailed construction planning. Further information about the potential impacts of these changes and how these would be managed is provided in Chapter 9 (Transport and traffic) of the EIS and section 6.2 of the Amendment Report.

Road network and infrastructure

Construction would be subject to comprehensive traffic management measures to ensure the continuing functionality of surrounding roads, and the safety of the public, motorists and construction personnel.

Some changes to the road network would be required to accommodate construction, including:

- installation of temporary traffic signals to allow for the safe movement of construction traffic
- temporary road, access or lane closures
- temporary intersection adjustments or closures
- temporary traffic changes during removal of the existing bridge and construction of the new bridge over Silverwater Road and Hill Road.

The closures would generally be for short periods, limited to the duration of works requiring the closure. Alternative access arrangements would be provided.

Public transport

A number of bus routes that currently use South Street, Boronia Street, Atkins Road and Hope Street (and bus stops in these streets) would be affected by full and partial closures of these streets. Similarly, existing bus stops on Park Street, adjacent to Olympic Park Station, would be affected.

Bus stops would be relocated along their existing routes where practicable. Rerouting of bus services would be required where bus stops are not able to be relocated along the existing routes. The details of any changes to bus stops and/or routes would be determined in consultation with Transport for NSW, bus operators and relevant authorities and stakeholders.

Temporary closures of the navigation channel in the Parramatta River and other closures of Rydalmere Wharf (see section 2.7.5) would affect the operation of the F3 Parramatta River ferry during these periods.

Further information about potential impacts to public transport (buses and ferries) is provided in section 9.3.3 of the EIS and section 6.2 of the Amendment Report.

Pedestrian and cycle facilities

Changes to the road network and access restrictions around work areas would affect pedestrian footpaths and cycle facilities in some locations. Alternative access arrangements (such as detours) would be provided. Temporary detours or realignment would be required in the following key locations:

- Parramatta Valley Cycleway at Eric Primrose Reserve, Rydalmere
- shared use path through Koonadan Reserve
- the existing access path to Rydalmere Wharf.

The section of the Parramatta Valley Cycleway along Waratah Street and through Archer Park to Koonadan Reserve would also need to be closed for up to three years to facilitate construction of the Waratah Street stop and for bridge construction. Additionally, a portion of the River Walk located at Wentworth Point to the east of the proposed bridge between Melrose Park and Wentworth Point, would need to be closed for up two years during construction of the bridge.

All pedestrian and cycle facility adjustments would be undertaken in accordance with relevant accessibility requirements and legislation, including the *Disability Discrimination Act 1992*.

Figure 2.12 shows an example of pedestrian detour arrangements for Parramatta Light Rail Stage 1.

Further information about potential impacts to active transport is provided in section 9.3.4 of the EIS and section 6.2 of the Amendment Report.

Figure 2.12 Image showing pedestrian detour arrangements during construction of Parramatta Light Rail Stage 1

On-street parking and loading zones

On-street parking may be removed in some locations to provide sufficient space to undertake construction and maintain access along the road network. The duration of any temporary loss of parking could range from less than a day to longer periods, depending on the works required in individual locations. In some locations, on-street parking would need to be permanently removed (see section 9.3.5 of the EIS).

Loading zones, accessible parking, taxi ranks and service vehicle zones affected by the operational project would be relocated, where possible, to the permanent location proposed for these users in adjacent side streets.

2.7.5 Changes to maritime infrastructure and navigation

The temporary working platforms proposed as part of constructing the bridges over the Parramatta River (see section 2.3.2) would occupy portions of the Parramatta River waterway and foreshore. During certain periods (such as major bridge lifts for areas not proposed to be serviced from the temporary working platforms), barges would occupy the remaining waterway area. This would result in a need to close the navigation channel. It is anticipated that closures of the navigation channel would occur at the following locations and durations:

- for the bridge between Camellia and Rydalmere – two closures of about two months each
- for the bridge between Melrose Park and Wentworth Point – one closure of up to three months.

In addition, the navigation channel may need to be temporarily closed for short periods, such as when crane lifts extend over the river and have the potential to affect the safe operation of watercraft.

Use of the river by vessels upstream of the bridge work areas would be restricted during periods where the navigation channel is closed. Closures of the navigation channel would restrict access to upstream facilities, including public and private ferry wharves, boat ramps, and for recreation users and commercial operators.

Ermington Boat Ramp

Ermington Boat Ramp, located at the southern end of Wharf Road in Melrose Park, is within the project site and close to the work area for the bridge between Melrose Park and Wentworth Point. The road access to the boat ramp is also within the work area. It is therefore anticipated that the boat ramp would need to be closed for a period of up to three years.

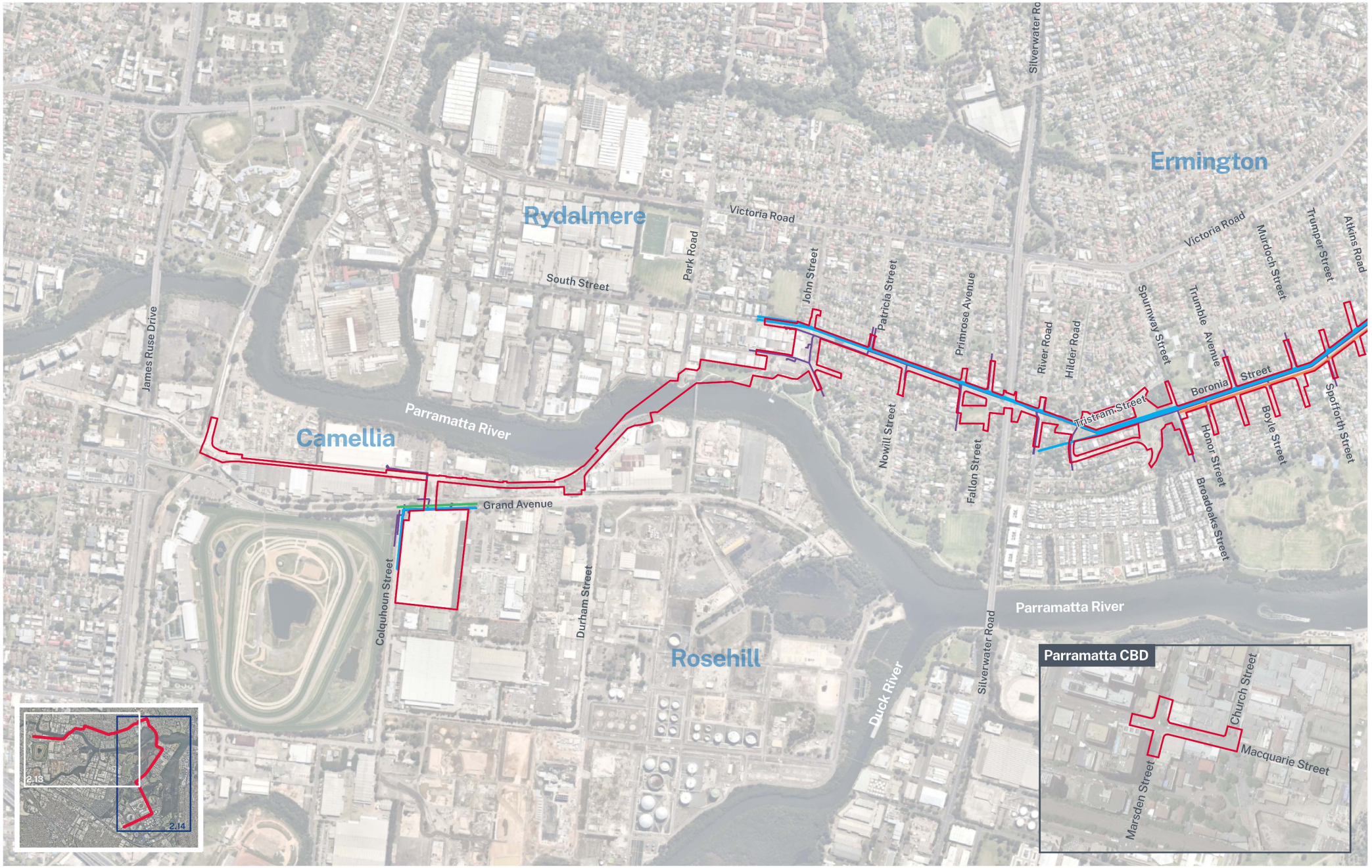
Further information and clarification about the potential impacts associated with these changes is provided in section 9.3 of the EIS and in section 4.3.4 of the Response to Submissions.

2.7.6 Special events

The construction contractor(s) would be responsible for considering known special events in the construction program and making appropriate arrangements to manage the impacts of construction (including traffic management and contingency arrangements) during these events. The traffic management requirements of special events may require adjustments to times of construction and routes used by heavy vehicles, as well as varying approved road occupancy license conditions for construction.

2.8 Utilities and services

Utilities infrastructure, such as drinking and recycled water supply, stormwater drainage, wastewater, electricity, gas, fuel and telecommunications, are located within the project site. These include critical utilities, such as the Sydney Water trunk mains, high voltage transmission lines, and high pressure gas and fuel lines (see Figure 2.13 and Figure 2.14) that form a critical function in the respective utility supply. Some of these utilities may be sufficiently aged such that works in the vicinity of the utilities may increase the risk of unexpected failures to occur.



LEGEND

Project site

Existing key utilities (indicative only)

Jemena gas mains

Sydney Water trunk mains

Ausgrid and Endeavour Energy high voltage power lines

Ampol fuel lines

VIVA fuel lines

Note: extent of utilities limited to about 20 metres beyond project site only

Figure 2.13 Location of key utilities - Map 1

0 500m

N

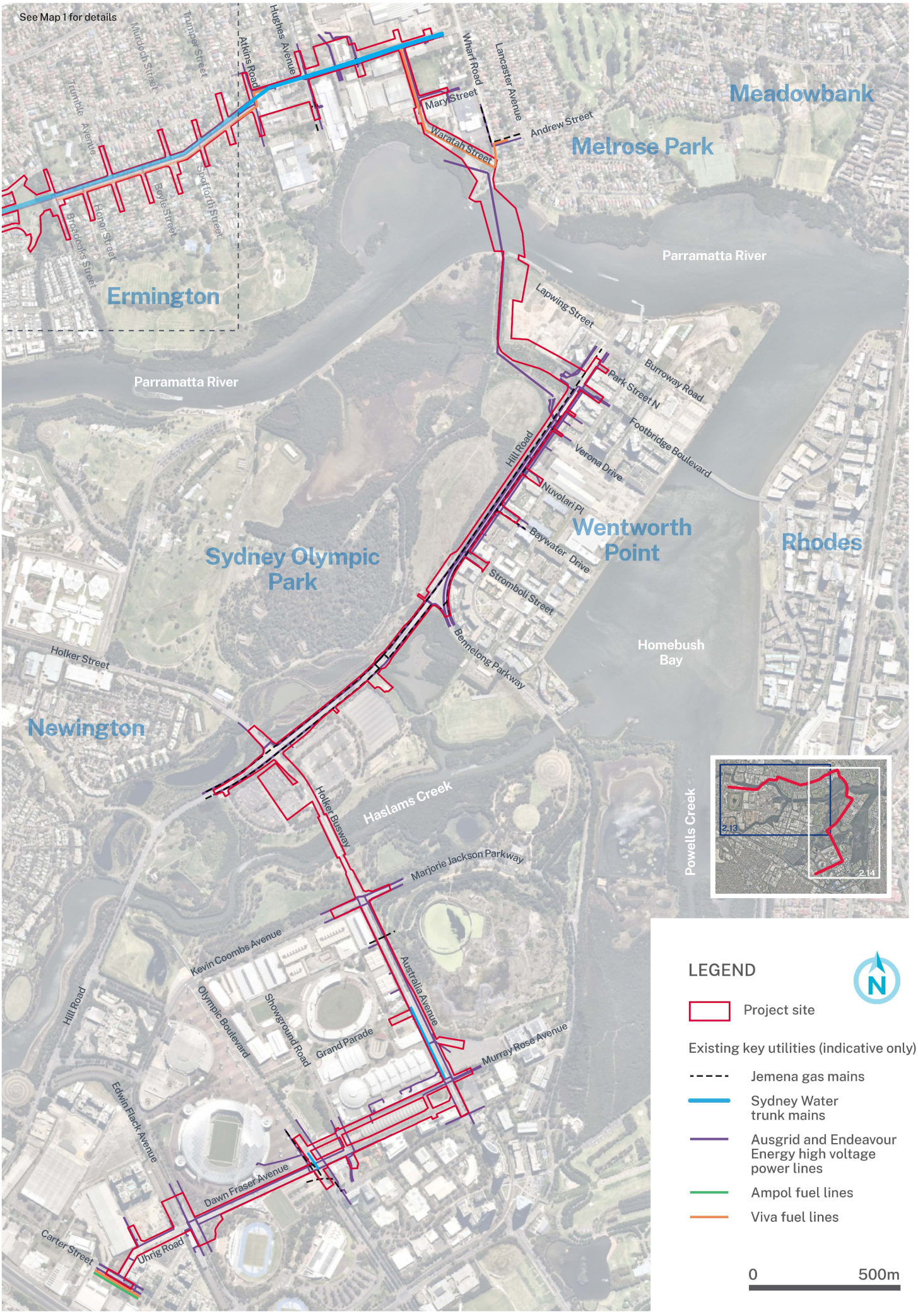


Figure 2.14 Location of key utilities - Map 2

Where utilities are located within the project site, it may be necessary to:

- relocate utilities with the potential to be directly affected by construction
- provide physical protection for utilities that may be indirectly affected by vibration or accidental impact
- modify construction methods to avoid impacting a nearby utility, such as by using smaller plant and equipment, hand excavation and compaction tools.

Appropriate treatments would be confirmed during design development and construction planning in consultation with the utility provider/asset owner, and in accordance with relevant standards and requirements.

Where utilities are identified as being of increased risk of failure, pre-condition surveys and other measures would be implemented to ensure the proper functioning and integrity of the utilities, prior to further investigation and design work taking place.

Table 2.4 provides an overview of the key utilities identified to date within the project site, and the proposed treatment of these utilities. Most of these utilities are located underground; however, some have above-ground components. Consultation with service providers has been carried out and is ongoing. Further consideration of the proposed treatment to minimise impacts would continue during design development in consultation with service providers.

Table 2.4 Indicative key utility treatment during construction

Utility	Service provider	Location (suburbs)	Proposed treatment
Water			
Drinking water trunk mains	Sydney Water	Camellia, Rydalmere, Ermington, Melrose Park	Protection and relocation[1] (see section 2.8.1). A valve set in Ken Newman Park would also be relocated.
Recycled water pipeline	Sydney Olympic Park Authority	Wentworth Point	Relocation
Drinking and recycled water	Sydney Water	Sydney Olympic Park	Relocation
Electricity			
High and low voltage transmission lines including 11 kV lines	Endeavour Energy	Camellia, Rydalmere, Ermington, Melrose Park	Relocate underground
132 kV electricity transmission line	Ausgrid	Melrose Park and Wentworth Point	Relocation (Melrose Park) and retention (Wentworth Point)
High and low voltage transmission lines including 11 kV lines	Ausgrid	Wentworth Point, Sydney Olympic Park, Lidcombe	Relocate both above and underground
Gas and fuel			
High pressure gas mains	Jemena	Camellia, Rydalmere, Ermington, Melrose Park, Wentworth Point, Sydney Olympic Park, Lidcombe	Protection and relocation
High pressure fuel line	Viva Energy Australia	Melrose Park	Protection and relocation
High pressure fuel line	Ampol	Camellia and Lidcombe	Protection

Note: 1. In some locations, there would be a need to remove aged cast iron water mains and replace them with steel.

Relocating and protecting utilities would typically involve:

- identifying utilities using surface tracing and other non-destructive methods (for example potholing)
- exposing the utility (for protection works) or excavating a new trench for relocation works
- installing appropriate bedding material and pipeline/conduit/utility (for relocation works)
- undertaking remedial works on existing utilities if required (for protection works)
- excavating and installing pits at cutover locations, including any new infrastructure (for relocation works)
- backfilling and compacting trenches and pits
- installing protection slab or other infrastructure (for protection works)
- testing and commissioning
- removing redundant utilities
- reinstating disturbed areas.

Utility works would generally be contained with the project site; however, the final treatment could include the requirement for some works (such as connection works, usually within the road reserve or easements) in locations outside the project site.

Figure 2.15 shows an example of laying a small diameter water main for Parramatta Light Rail Stage 1.

Figure 2.15 Image showing the laying of a small diameter water main in Westmead (Parramatta Light Rail Stage 1)

2.8.1 Works to Sydney Water's trunk mains

Three underground pipelines that form part of Sydney Water's trunk mains are located within and adjacent to the project site in Camellia, Rydalmere, Ermington and Melrose Park (see Figure 2.13 and Figure 2.14). These pipelines convey drinking water to Sydney's northern suburbs as part of Sydney Water's Ryde Water Delivery System. The pipelines range in diameter from 900 to 1,200 millimetres.

The pipelines traverse Ken Newman Park between Hilder Road and Boronia Street. Two of the pipelines located within the western end of park would need to be relocated to allow the light rail infrastructure to be constructed across the park. The third pipeline would need to be replaced with a new steel pipeline and protected in its current location.

The relocation works would involve building new sections of pipeline along Tristram Street within the existing road reserve. The new sections would be about 280 metres long and would connect with the existing pipelines near the intersection of Hilder Road and Tristram Street (to the west) and within Ken Newman Park (to the east) (see Figure 2.16). The existing sections of the two pipelines would be decommissioned once the new sections are connected.

The new sections of pipeline would be constructed using standard pipeline installation methods, including:

- excavating trenches along the new pipeline alignment
- installing new sections of pipeline within the trench
- installing new pits and valves
- connecting the new sections of pipeline to the existing pipelines
- decommissioning the existing sections
- commissioning and testing new sections of pipeline (if required)
- backfilling trenches and reinstatement of the ground surface.

The approach to managing other sections of the trunk mains, which are located within the project site at Grand Avenue/Thackeray Street, South Street (between John Street and River Road), Boronia Street (between Broadoaks Street and Atkins Road) and Hope Street (between Atkins Road and Waratah Street) would be confirmed during detailed construction planning. It is anticipated that this would involve protection of the existing utility rather than relocation, subject to condition assessment and further design investigations. Some sections of pipeline in Melrose Park may need to be upgraded prior to protecting them during construction.

All proposed works to Sydney Water's pipelines would be undertaken in consultation with Sydney Water.

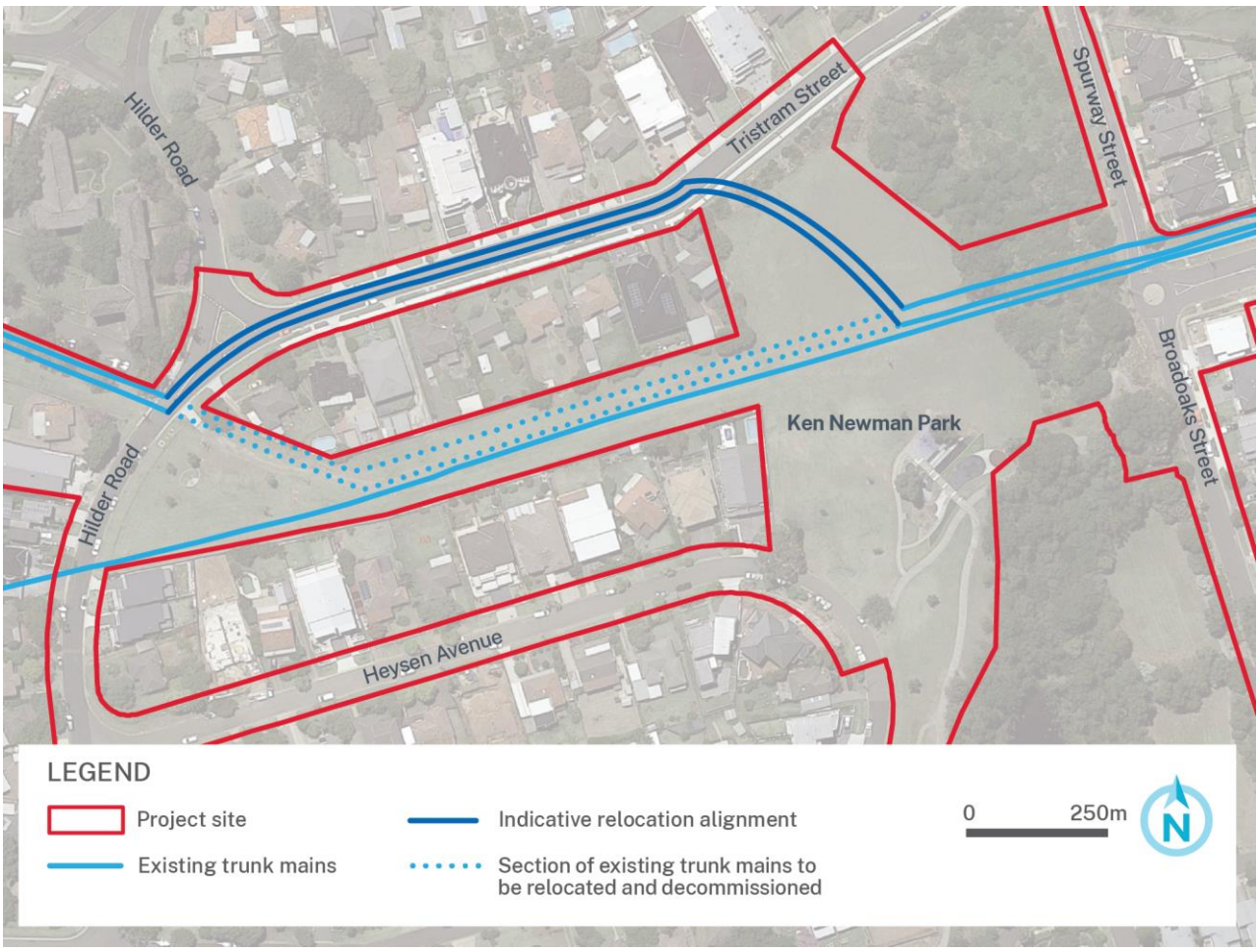


Figure 2.16 Relocation of Sydney Water trunk mains at Ken Newman Park

2.8.2 Works to Ausgrid high voltage transmission tower

An existing Ausgrid high voltage transmission tower in Archer Park, Melrose Park is required to be removed to accommodate the amended location of the bridge between Melrose Park and Wentworth Point bridge, with the overhead wiring relocated to three new poles to be established within the project site at Archer Park. The new poles would be of a similar height, in order to maintain the necessary clearances.

The works would involve:

- piling to establish the footing of the replacement poles
- installation of the replacement poles and earthing grids
- strengthening modifications to adjacent high voltage transmission towers in order to maintain the lateral loading of the cables
- temporary modifications to the existing tower to facilitate the relocation of the cables
- cutovers to transfer the cables from the existing tower, or to install new cables, to the replacement poles during electrical outage periods and already planned river closures
- installation of fibre conduits and pits
- removal of the existing high voltage transmission tower.

All proposed works would be undertaken in consultation with Ausgrid.

Transport for NSW

Appendix B
Updated mitigation measures

NSW GOVERNMENT

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
Transport and traffic				
Design				
Impacts on existing transport and access	TT1	TT1	The design will continue to be refined to avoid or minimise impacts on the surrounding road and transport network and property accesses as far as reasonably practicable.	Design
	TT2	TT2	Input will be sought from relevant stakeholders (including local councils, Sydney Olympic Park Authority, **Royal Agricultural Society of NSW,** bus and ferry operators) prior to finalising the design of those aspects of the project that affect the operation of road and other transport infrastructure under the management of these stakeholders. This will include confirming ongoing operation and maintenance arrangements.	Design
Maintaining permanent access to properties	TT3	TT3	Where the project permanently affects access to and from a public road, input will be sought from relevant property owners and occupants regarding alternative access arrangements prior to finalising the design. Where any legal access to a property is permanently affected and a property has no other legal means of access, alternative access to and from a public road will be provided to an equivalent standard, where feasible and reasonable. Where an alternative access is not feasible or reasonable, and a property or part of a property is left with no access to a public road, consideration will be given to acquisition of the property or part of the property in accordance with the provisions of the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW).	Design
Road user safety	TT4	TT4	Road safety audits will be undertaken where changes to the road network are proposed, in accordance with relevant Austroads guidelines, to ensure the safety of all road users is considered during design development.	Design
Impacts on ~~on-street~~ parking	TT5	TT5	Opportunities to reduce the loss of on and off street parking will be reviewed during design development.	Design
	TT6	TT6	Opportunities to ~~provide further alternative parking~~ **mitigate impacts on parking** at Ermington Boat Ramp will be reviewed during design development. ~~to offset the impacts to existing boat trailer parking~~.	Design
	TT7	TT7	A parking management strategy will be prepared to provide an overarching framework for parking management during construction and operation. The strategy will include measures to manage: • the reduction in on-street parking availability, such as provision of alternative parking arrangements for accessible and service spaces, staged removal, resident parking schemes, and managed staff parking arrangements	Design

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
			• construction worker parking, such as provision of designated parking areas within the project site, encouraging use of public transport, and shuttle bus arrangements.	
Construction				
Potential for traffic, transport and access impacts during construction	TT8	TT8	A traffic and access management plan will be prepared prior to construction and implemented as part of the CEMP. The plan will detail processes and responsibilities to minimise traffic and access delays and disruptions, and identify and respond to changes to road access and on-street parking arrangements. The plan will include, as appropriate, additional reasonable and feasible measures identified as an outcome of consultation (in accordance with mitigation measure TT12).	Pre-construction, construction
	TT9	TT9	The traffic and access management plan will include measures to manage staging of construction works to ensure that satisfactory capacity and minimum levels of service are maintained for all users.	Pre-construction, construction
Impacts on navigation and recreational use of Parramatta River	TT10	TT10	A maritime works and navigation management plan will be prepared prior to construction and implemented as part of the CEMP. The plan will detail processes and responsibilities to manage marine construction vessels and impacts on navigation during construction of the bridges over the Parramatta River. The plan will include, as appropriate, additional reasonable and feasible measures identified as an outcome of consultation (in accordance with mitigation measure TT12).	Pre-construction, construction
	TT11	TT11	Opportunities to minimise impacts to recreational use of the Parramatta River will be considered during construction planning, based on a review of the usage of the facilities at Ermington Boat Ramp and at other existing boat ramps in the vicinity of the project site.	Pre-construction
Consultation and communication	TT12	TT12	Consultation with relevant stakeholders will be undertaken regularly to facilitate the efficient delivery of the project and to minimise impacts on road, river and transport infrastructure customers and users. Stakeholders will include the City of Parramatta and City of Ryde councils, Sydney Olympic Park Authority, **Royal Agricultural Society of NSW**, bus and ferry operators, emergency services, and recreation groups. Additional measures identified as an outcome of consultation will be implemented during construction, where reasonable and feasible. This will include modifying work areas, activities and construction access arrangements to address traffic flow and access issues identified by key stakeholders, where practicable.	Pre-construction, construction
	TT13	TT13	The Community Communication Strategy (mitigation measure SE1) will include mechanisms to inform the community of the dates and durations of changes to transport services and access arrangements (including access restrictions for the Parramatta River) and proposed alternative services and access provisions.	Construction

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
Property, cyclist and pedestrian access	TT14	TT14	Access to properties, including residences, businesses and community infrastructure, will be maintained. Where temporary disruption to access cannot be avoided, consultation will be undertaken with the owners, occupants and managers of affected properties and infrastructure, to confirm their access requirements and determine alternative arrangements.	Construction
	TT15	TT15	Safe pedestrian and cyclist access will be maintained around and/or through work areas. Where disruption to access cannot be avoided, alternative routes that comply with relevant accessibility standards and guidelines will be provided, signposted and communicated. Alternative access arrangements will be established prior to implementing restrictions on existing routes.	Construction
Changes to public transport services	TT16	TT16	Modifications to existing bus stops ~~and Rydalmere Wharf~~, implementation of new stops and services, and alterations to service patterns, will be undertaken in consultation with relevant key stakeholders, including Customer Journey Management, bus and ferry operators, the City of Parramatta and City of Ryde councils, and Sydney Olympic Park Authority. Advance notification of changes to services will be provided to affected customers.	Construction
Special events management	TT17	TT17	Traffic management for special events in the Parramatta CBD, at Rosehill Gardens Racecourse and Sydney Olympic Park (including Sydney Showground) will be considered during construction. Where special events require specific traffic and pedestrian management, measures will be developed and implemented in consultation with relevant stakeholders, including event organisers, venue managers, City of Parramatta Council, ~~and~~ **Australian Turf Club,** Sydney Olympic Park Authority **and Royal Agricultural Society of NSW**.	Construction
Managing the potential for cumulative transport and traffic impacts	TT18	TT18	The potential for cumulative construction transport and traffic impacts will be reviewed and coordinated with other projects, in consultation with relevant stakeholders, including Customer Journey Management, Customer Journey Planning, Traffic and Transport Liaison Group, City of Parramatta Council, ~~and~~ Sydney Olympic Park Authority **and Royal Agricultural Society of NSW**. The review will include: • other projects with the potential to affect access and capacity • reviews of programs for traffic staging, lane, footpath, cycleway and road closures for all projects • coordinating works and identifying efficient re-routing options as appropriate.	Construction

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
Impacts on local roads	**TT19**	**n/a**	**Pre-construction condition surveys will be completed for local roads, footpaths and other Council assets within 100 metres of the project which could be affected or damaged during construction. Where damage to an asset is caused by the project it will be restored to at least the condition it was pre-works or compensation will be offered to the asset owner.** **A copy of the pre-construction condition report will be provided to the relevant Council prior to the commencement of works within the vicinity of the asset.**	**Pre-construction**
Operation				
Operational road network performance	TT20	TT19	A review of operational network performance will be carried out 12 months and three years from the opening of the project to confirm the operational impacts of the project. Appropriate changes that balance the performance outcomes for light rail and general traffic will be considered to address identified issues along the alignment. For surrounding arterial roads, feasible and reasonable mitigation measures will be identified in consultation with the Department of Planning and Environment and other relevant stakeholders (including ~~City of Parramatta Council~~ **relevant council(s)** and Sydney Olympic Park Authority) to manage identified traffic performance impacts.	Operation
Light rail operations during special events	**TT21**	**n/a**	**A light rail operations during special events management plan will be prepared and implemented as part of the project's Operational Environmental Management System. The plan will detail processes, responsibilities and measures to manage light operations during special events, including how the project will operate in 'event mode'. The plan will be prepared in consultation with event organisers, venue managers, City of Parramatta Council, Australian Turf Club, Sydney Olympic Park Authority, and Royal Agricultural Society of NSW.**	**Operation**
Noise and vibration				
Design				
Confirming the approach to operational noise mitigation as part of the design process	NV1	NV1	An operational noise and vibration review of the developed design will be undertaken to review the potential for operational impacts and confirm feasible and reasonable mitigation measures to be incorporated in the design. The review will include: • reviewing compliance monitoring for Parramatta Light Rail Stage 1 to refine the assumptions used and confirm the effectiveness of the mitigation that has been implemented • surveying relevant buildings to determine appropriate ~~internal noise trigger levels~~ **façade noise reduction performances**	Design

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
			• a road traffic noise assessment for the reconfiguration of South and Boronia streets conducted in accordance with the ***Road*** *Noise Criteria Guideline* (~~Roads and Maritime, 2015a~~ **Transport for NSW, 2022**) and the ***Road*** *Noise Mitigation Guideline* (~~Roads and Maritime, 2015b~~ **Transport for NSW, 2022**) • consideration of feedback from, and preferences of, directly affected landowners/landholders. The operational noise and vibration review will be undertaken in consultation with relevant council(s) and the NSW EPA. The review will be developed in accordance with the *Rail Infrastructure Noise Guideline* (NSW EPA, 2013), the *Noise Policy for Industry* (NSW EPA, 2017) and the ***NSW*** *Road Noise Policy* (DECCW, 2011).	
	NV2	NV2	Public address systems at stops will be designed to comply with the *Noise Policy for Industry* (NSW EPA, 2017) intrusiveness and sleep disturbance noise trigger levels at all locations.	Design
	NV3	**n/a**	**Traction power substations will be designed to comply with the *Noise Policy for Industry* (NSW EPA, 2017).**	**Design**
Construction				
Managing the potential for construction noise and vibration	NV4	NV3	Consideration will be given to implementing operational noise mitigation early in the construction program to reduce the potential for construction noise impacts, where the mitigation will not be impacted by future works.	Pre-construction, construction
	NV5	NV4	A noise and vibration management plan will be prepared as part of the CEMP and implemented during construction. The plan will detail processes, responsibilities and measures to manage noise and vibration and minimise the potential for impacts during construction, aligned with the results of community consultation and consistent with the management approach and mitigation measures in the *Construction Noise and Vibration Strategy* (Transport for NSW, 2019). Measures that mitigate potential noise and vibration at the source will be prioritised.	Pre-construction, construction
	NV6	NV5	Location and activity-specific construction noise and vibration impact assessments will be undertaken: • prior to works with the potential to generate noise levels above 75 dBA and/or exceed relevant human response and cosmetic damage criteria for vibration • prior to works that need to occur outside the primary project working hours • where any changes to heavy vehicle routes affect local roads not considered by the noise and vibration assessment (~~Technical Paper 3 (Noise and Vibration)~~ **Updated Noise and Vibration Report**)	Pre-construction, construction

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
			• **prior to works adjacent to threatened and migratory fauna and Green and Golden Bell Frog habitat within Sydney Olympic Park.** **The assessments will be based on a more detailed understanding of construction methods, including the size and type of construction equipment, duration and timing, and detailed reviews of local receivers, as required.** The results of the assessments will be documented in construction noise and vibration impact statements. Where potential exceedances are identified, the statements will define feasible and reasonable mitigation and management measures, developed in accordance with the *Construction Noise and Vibration Strategy* (Transport for NSW, 2019~~a~~), **and measures developed as part of the biodiversity management plan and the Green and Golden Bell Frog management plan in relation to potential noise and vibration impacts (see mitigation measures BD11 and BD12).** **Potentially impacted receivers will be informed of the nature of works to be carried out, the expected noise levels and duration, and will be provided with details of the complaints management system (mitigation measure SE3).** The measures will be implemented for the duration of the activity.	
Managing the potential for construction noise and vibration	NV7	NV6	A minimum of 2.4 metre high solid hoarding will be provided around construction compounds located close to residential areas, where construction noise is predicted to exceed noise management levels during recommended standard hours, including those compounds currently proposed near sensitive receivers on/around: • John Street • Broadoaks Park • Ken Newman Park west and east • Hope Street • Wharf Road • Wentworth Point north • Hill Road north • Dawn Fraser Avenue east and west.	Construction
	NV8	NV7	Appropriate respite periods will be identified, in consultation with the community and in accordance with the *Construction Noise and Vibration Strategy* (Transport for NSW, 2019), for work: • with the potential to result in noise levels above 75 dBA and/or • that needs to occur outside the primary project working hours. The following will be taken into account when determining appropriate respite: • the need to efficiently undertake construction • the communities' preferred noise and vibration management approach • the construction schedules of other major projects in close proximity to the project works.	Construction

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
	NV9	NV8	Where construction activities are predicted to exceed noise management levels at sensitive receivers, no work would be permitted in that area one weekend per month, unless it is otherwise agreed by a substantial majority of the sensitive receivers impacted by the proposed works.	Construction
Cumulative impacts	NV10	NV9	The potential for cumulative construction impacts will be reviewed during construction planning in consultation with the proponents of other projects. Where the potential for cumulative impacts is identified, feasible and reasonable mitigation and management measures will be developed and included in the noise and vibration management plan (mitigation measure ~~NV4~~**NV5**).	Construction
Out of hours work	NV11	NV10	An out-of-hours work protocol will be developed to define the process for considering, approving and managing out-of-hours work that is not ~~regulated by~~ **subject to** an environment protection licence **(i.e. works subject to exemptions under the licence, including low noise impact and emergency works).** The protocol will include implementing feasible and reasonable measures and communication requirements in accordance with the *Construction Noise and Vibration Strategy* (Transport for NSW, 2019). Measures will focus on proactive communication and engagement with potentially affected receivers, provision of respite periods and/or alternative accommodation for defined exceedance levels.	Construction
	NV12	NV11	All work outside the recommended standard hours defined by the *Interim Construction Noise Guideline* (DECC, 2009) will be scheduled using the hierarchy of preferred working hours described by Chapter 7 (Project description – construction) (section 7.5) as far as practicable, and in consultation with the community and key stakeholders (including the NSW EPA). Highly noise and vibration intensive works as defined in the *Construction Noise and Vibration Strategy* (Transport for NSW, 2019~~a~~) will be limited to recommended standard hours as far as practicable.	Construction
Construction vibration impacts	NV13	NV12	Where buildings or structures are predicted to exceed the screening criteria for structural damage, a dilapidation survey will be undertaken prior to any construction works. Where required, the vibration management level will be refined based on the type and condition of the building or structure. For heritage buildings and structures, the dilapidation survey will consider the heritage value of the structure in consultation with a structural engineer and heritage specialist.	Pre-construction

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
	NV14	NV13	A survey will be undertaken to identify vibration sensitive receivers (including buildings, structures, utilities, remediation infrastructure, heritage items or sites and equipment) within 200 metres of the project site. Vibration criteria will be identified based on relevant standards or manufacturer's data. Where vibration criteria are not available, conservative criteria will be used. Appropriate measures will be developed and implemented where potential exceedances of the criteria are identified.	Pre-construction
	NV15	NV14	Vibration generating activities will be managed to minimise the potential for impacts on vibration sensitive receivers, (identified in accordance with mitigation measure ~~NV13~~**NV14**). Prior to the commencement of vibration-intensive works within the minimum working distances for cosmetic damage, the potential for impacts will be assessed. This will include a more detailed assessment of potentially affected receivers to assess the susceptibility to damage from vibration. Where there is potential for damage, alternate methods that generate less vibration will be investigated and substituted where feasible and reasonable. For heritage items or sites, the more detailed assessment will consider the sensitivity of the receiver in consultation with a heritage specialist to ensure susceptible components are adequately monitored and managed. Where residual risks remain, vibration monitoring will be undertaken. Vibration monitors will provide real-time notification of exceedances of levels approaching cosmetic damage. Any identified vibration-related damage to the receivers will be rectified, including as recommended by a heritage specialist for heritage items.	Construction
Operation				
Operational noise and vibration impacts	NV16	NV15	Monitoring of noise and vibration will be undertaken within 12 months of the commencement of operation to compare actual noise and vibration performance against that predicted by the operational noise and vibration review (mitigation measure NV1). The results of monitoring will be documented in an operational noise and vibration compliance report. Additional feasible and reasonable mitigation measures will be considered where any additional receivers are identified as qualifying for consideration of noise mitigation in accordance with the relevant guidelines.	Operation
Aboriginal heritage				
Design				
Avoiding and minimising impacts on Aboriginal heritage	AH1	AH1	The design will continue to be refined to avoid direct impacts on identified places of Aboriginal heritage as far as reasonably practicable.	Design

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
Consultation	AH2	AH2	Aboriginal consultation will continue to be undertaken through the life of the project in accordance with the *Procedure for Aboriginal Cultural Heritage Consultation and Investigation* (Roads and Maritime Services, 2012) and the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, 2010~~b~~). This includes managing potential impacts on objects/aspects of cultural significance in consultation with registered Aboriginal parties.	Design, pre-construction, construction
Interpretation	AH3	AH3	A heritage interpretation strategy will be developed to guide incorporation of appropriate interpretation and integration of Aboriginal and non-Aboriginal heritage in the design. The strategy will be prepared and implemented in accordance with *Interpreting Heritage Places and Items: Guidelines* (NSW Heritage Office, 2005) and the *Heritage Interpretation Policy* (NSW Heritage Council, 2005). The strategy will include measures to ensure a meaningful design response to Aboriginal heritage and cultural values. It will be developed in consultation with relevant stakeholders, including registered Aboriginal parties**, and will take into account the recommendations of the Cultural Values Assessment Report (Appendix G of the Aboriginal Cultural Heritage Assessment Report)**. The design will include appropriate interpretation of Aboriginal heritage in accordance with the heritage interpretation strategy.	Design
Consultation during design	AH4	AH4	Aboriginal stakeholders will continue to be consulted and involved during design development in accordance with Transport for NSW's Aboriginal Culture and Heritage Framework, *Draft Connecting with Country* (Government Architect NSW, 2020~~c~~) and *Designing with Country* (Government Architect NSW, 2020~~d~~) and in consultation with the Design Review Panel.	Design
~~*Cultural values*~~	n/a	AH5	~~An offer to conduct detailed interviews with cultural knowledge holders will be made to confirm the cultural values associated with the project site and surrounds, and the potential impacts of the project on these values.~~ ~~Interviews will be undertaken by a suitably qualified anthropologist. Targeted interview questions will be developed based on a review of ethnographic and archaeological literature. Where practicable, and in a culturally acceptable way:~~ ~~• data collected during the literature review and interviews will be mapped and collated into a report~~ ~~• specific sites recorded as being significant to Aboriginal people (for spiritual, social, aesthetic or historical reasons) will be identified.~~ ~~Outcomes and recommendations of the cultural values assessment will be considered as part of the design (mitigation measures AH3 and AH4) and preparation of the Aboriginal cultural heritage management plan (mitigation measure AH8).~~	~~Design~~

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
Aboriginal archaeology	AH5	AH6	~~A survey will be undertaken of previously identified areas of Aboriginal archaeological sensitivity in the project site at Melrose Park (subject to arranging property access) in accordance with the requirements of the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW, 2010a).~~ Test excavations will be undertaken to confirm the nature and extent of ~~any~~ potential archaeological deposits**/shell middens at:** • **PAD1 Ermington Boat Ramp** • **PAD3 Rydalmere Wharf** • **PAD6 Ken Newman Park** • **Macquarie Street PAD3 (AHIMS 45-6-2977)** • **Church Street PAD1 (AHIMS 45-6-4015)** • **Ermington SHL01 (AHIMS 45-6-4078)** • **Ermington SHL02 (AHIMS 45-6-4079).** **The excavations will be undertaken** in accordance with ~~the~~ **a project-specific** excavation methodology ~~prepared for the project~~ **developed as described in section 12.2 of the** ~~(Appendix C of Technical Paper 4 (Preliminary~~ Aboriginal Cultural Heritage Assessment Report~~)~~). **The test excavation program will be completed prior to the commencement of construction, and any ground disturbing works in these areas.** Where testing confirms that Aboriginal objects are present: • options to modify the project will be investigated in accordance with mitigation measure AH1 • **the assessments of significance provided in the Aboriginal Cultural Heritage Assessment Report will be updated.** Unavoidable impacts will be managed in consultation with registered Aboriginal parties. Any salvage required will be undertaken in accordance with the salvage methodology (mitigation measure ~~AH7~~**AH6**).	Design
Management of salvaged objects	AH6	AH7	A detailed salvage methodology will be prepared (if required) ~~as part of the Final Aboriginal Cultural Heritage Assessment Report~~ following test excavations. The methodology will be prepared by a suitably qualified archaeologist in consultation with registered Aboriginal parties. The salvage methodology will include: • the process for consultation with Heritage NSW and registered Aboriginal parties in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, 2010~~b~~), and *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH, 2011) • requirements in relation to the short and long-term management of Aboriginal objects recovered during testing and salvage, including care agreements, where relevant.	Design

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
			Where salvage is required, registered Aboriginal parties will be engaged to assist the salvage process, which will be managed by an appropriately qualified archaeologist. Detailed analysis and reporting of cultural material collected will be provided to Heritage NSW in accordance with section 89A of the *National Parks and Wildlife Act 1974*. This will include recording salvaged objects on the NSW Aboriginal Heritage Information Management System (AHIMS) register and updating site records.	
Construction				
Protecting Aboriginal heritage and minimising impacts during construction	AH7	AH8	An Aboriginal cultural heritage management plan will be prepared prior to construction and implemented as part of the CEMP. The plan will include measures to minimise the potential for impacts and manage Aboriginal heritage, including: • outcomes of further investigations (mitigation measures AH5 ~~and AH6~~) • salvage methodology (mitigation measure ~~AH7~~**AH6**) • requirements for an induction and cultural awareness training for construction workers and supervisors (mitigation measure ~~AH9~~**AH8**) • unexpected finds procedure (mitigation measure ~~AH10~~**AH9**) • measures to protect sites from inadvertent impacts from vehicles and equipment.	Pre-construction, construction
Protecting Aboriginal heritage and minimising impacts during construction	AH8	AH9	A requirement for cultural and historic heritage awareness training will be included in the Aboriginal cultural heritage management plan. Cultural heritage awareness training will be provided by an Aboriginal representative at the commencement of substantial works for the project.	Pre-construction, construction
Unexpected finds	AH9	AH10	Where previously unidentified Aboriginal objects are encountered during construction, this will be managed in accordance with Transport for NSW's *Unexpected heritage items procedure* (2022), included in the heritage interpretation strategy (mitigation measure AH3) and Aboriginal cultural heritage management plan (mitigation measure ~~AH8~~**AH7**), and recorded on the AHIMS register.	Construction
Non-Aboriginal heritage				
Design				
Avoiding and minimising impacts on non-Aboriginal heritage	NAH1	NAH1	The design will continue to be refined to avoid direct impacts on items/sites of non-Aboriginal heritage significance and archaeological sites of State significance, and to minimise impacts on archaeological sites of local significance, as far as reasonably practicable.	Design

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
Avoiding and minimising impacts on non-Aboriginal heritage	NAH2	NAH2	For areas of archaeological significance where harm cannot be avoided, ~~a~~ **the** Research Design and Excavation Methodology will be ~~prepared~~ **implemented** to ensure there is appropriate management informed by significance and relevant research questions. A management rating system will be adopted based on the approach provided in ~~Technical Paper 6 (~~**the Updated** Historical Archaeological Assessment~~)~~, which will be further refined following the outcomes of test excavations and site-specific research.	Design
	NAH3	NAH3	Test excavations will be undertaken, **prior to construction,** to clarify significance, extent and integrity of deposits in accordance with the ~~Archaeological Research and Excavation Framework~~ **Research Design and Excavation Methodology** (see Appendix B of ~~Technical Paper 6 (~~**the Updated** Historical Archaeological Assessment). Where testing confirms that archaeological resources are present, additional site-specific research will be undertaken to refine the understanding of significance to ensure future management is in line with research values.	Design
Visual impacts and heritage setting	NAH4	NAH4	The design will be prepared in accordance with the urban design requirements and recommendations in ~~Technical Paper 5 (Statement of~~ **the Updated Statement of** Heritage Impact~~ – Built Heritage)~~. The design will minimise the potential for visual impacts on heritage items by incorporating sympathetic form, fabric and colour, where feasible.	Design
Impacts to Bulla Cream Dairy (Willowmere)	NAH5	NAH5	Design refinement will be undertaken to minimise potential impacts on Bulla Cream Dairy (Willowmere) (Parramatta LEP Item No. I64) as far as practicable. This will include minimising encroachment of the curtilage, retaining significant heritage fabric (i.e. Billiards Room in addition to the Main House), and retaining or relocating significant tree plantings where practicable. Adaptive reuse options for Bulla Cream Dairy (Willowmere) will be investigated and implemented in accordance with *New Uses for Heritage Places: Guidelines for the Adaptation of Historic Buildings and Sites* (Heritage Council of NSW and Royal Australian Institute of Architects NSW Chapter, 2008). This will be undertaken in consultation with the property owner and the City of Parramatta Council.	Design
Heritage interpretation	NAH6	NAH6	A heritage interpretation strategy will be developed to guide incorporating appropriate interpretation and integration of heritage in the design. The strategy will include interpretation requirements for specific parts of the project, particularly where heritage items will be impacted, or archaeological sites are proposed to be excavated. The strategy will be prepared and implemented in accordance with *Interpreting Heritage Places and Items: Guidelines* (NSW Heritage Office, 2005) and the *Heritage Interpretation Policy* (NSW Heritage Council, 2005) and developed in consultation with relevant stakeholders, including City of Paramatta	Design

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
			Council and City of Ryde Council, and Sydney Olympic Park Authority. The strategy will provide a framework for interpreting the heritage items impacted by the project, set out the key interpretative themes and identify communication strategies, and the location and form of interpretation. These may include approaches such as interpretative signage, historical/artefact displays at local museums or visitor centres, and online media about heritage items and the history of surrounding suburbs. The design will include appropriate interpretation of non-Aboriginal heritage in accordance with the heritage interpretation strategy.	
Construction				
Archival recording of built heritage items	NAH7	NAH7	Photographic archival recording will be carried out for affected sections of the following items: • Bulla Cream Dairy (Willowmere) (Parramatta LEP Item No. I64) • House at 46 John Street, Rydalmere (unlisted). Photographic archival recording will be carried out prior to works commencing in the vicinity of the item, and in accordance with *How to Prepare Archival Records of Heritage Items* (Heritage Office, 1998~~a~~) and *Photographic Recording of Heritage Items Using Film or Digital Capture* (Heritage Office, 2006). Once complete, a report will be prepared detailing the history and significance of the item, relevant findings from the archival recording and an overview of the project.	Pre-construction
Avoiding impact to non-Aboriginal heritage (including archaeological resources) during construction	NAH8	NAH8	A heritage management plan will be prepared and implemented as part of the CEMP. The plan will include measures to manage non-Aboriginal heritage and minimise the potential for impacts during construction. The plan will be prepared in consultation with relevant heritage agencies (Heritage NSW, Sydney Olympic Park Authority, City of Parramatta Council and City of Ryde Council) and take into account the outcomes of further investigations, including test excavations and the Research Design and Excavation Methodology. The heritage management plan will define a requirement for non-Aboriginal historical heritage awareness training for site workers prior to commencement of construction works. The awareness training will promote an understanding of heritage items that may be impacted during the works.	Pre-construction, construction
	NAH9	NAH9	An unexpected finds procedure for land and maritime based archaeological resources will be developed as part of the heritage management plan, consistent with Transport for NSW's *Unexpected heritage items procedure* (2022) and *Skeletal remains: guidelines for the management of human skeletal remains under the Heritage Act 1977* (Heritage Office, 1998~~b~~).	Pre-construction, construction

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
	NAH10	NAH10	Significant heritage fabric at the Bulla Cream Dairy (Willowmere) that is proposed to be retained and the fenced preservation area of Ermington Wharf/Wharf/Former Pennant Hills Wharf (and visible remnants) will be fenced and marked on site plans within the CEMP and heritage management plan as areas to be avoided/protected during construction.	Pre-construction, construction
Potential vibration impacts on built heritage items	NAH11	NAH11	Potential vibration impacts on items of heritage significance will be managed in accordance with the *Construction Noise and Vibration Strategy* (Transport for NSW, 2019~~a~~) and mitigation measures ~~NV12~~**NV13** to ~~NV14~~**NV15**.	Construction
Land use and property				
Design				
Impacts on land use and property	LP1	LP1	The design will continue to be refined to minimise land requirements and potential impacts on land uses and properties as far as reasonably practicable. Consultation with landowners/landholders will be ongoing to confirm feasible and reasonable measures to minimise impacts on their operations/properties.	Design
Integration and interface with surrounding land uses and properties	LP2	LP2	Consultation with key stakeholders (including City of Parramatta Council, Sydney Olympic Park Authority, the Department of Planning and Environment, **Royal Agricultural Society of NSW,** and relevant developers) will be ongoing to ensure that the design of the project is integrated as far as practicable with adjoining developments, proposed developments and urban renewal areas (including those subject to the ~~*Draft* Camellia-Rosehill Place Strategy (DPIE, 2021~~ **DPE, 2022**), structure planning for Melrose Park North and Melrose Park South, **the *Parklands Plan of Management 2010* (Sydney Olympic Park Authority, 2010), the *Sydney Olympic Park Master Plan 2030* (Sydney Olympic Park Authority, 2018) (including the *Sydney Olympic Park Master Plan 2030 Interim Metro Review* (Sydney Olympic Park Authority, 2022)), the *Sydney Olympic Park Vision and Strategy 2050* (Sydney Olympic Park Authority, 2022),** and the *Carter Street Precinct Development Framework* (DPIE, 2020)). This will include identifying measures and design responses to manage the interface between the project and adjoining land uses and properties as far as reasonably practicable.	Design
	LP3	**n/a**	**The location of the turnback facility in Parramatta CBD will be further refined in consultation with City of Parramatta Council. This will include identifying measures and design responses to maximise customer experience and manage the interface between the turnback facility and adjoining land uses.**	**Design**
Residual land	LP4	LP3	A residual land management plan will be prepared to define the proposed approach to managing residual land, including consulting on proposed future uses with key stakeholders, and required actions in relation to the identified land.	Design

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
Construction				
Impacts on land use and property	LP5	LP4	Construction planning will minimise the duration that land is required to the shortest possible duration, particularly where the land requirements affect recreation/open space areas.	Pre-construction
Land requirements and property acquisition	LP6	LP5	All property acquisitions will be undertaken in accordance with the requirements of the *Land Acquisition (Just Terms Compensation) Act 1991*, the land acquisition reforms announced by the NSW Government in 2016, and the recommendations of the Auditor General's 2021 review of Transport for NSW's acquisition practices.	Pre-construction
	LP7	LP6	Transport for NSW will appoint Personal Relationship Manager(s) to assist residential landowners and tenants who may be affected by acquisition. The Personal Relationship Manager(s) will maintain regular contact with these individuals to provide assistance with the acquisition process, including updates on the project, and respond to queries. The Personal Relationship Manager(s) will work with the landowners and tenants to offer assistance and support throughout the acquisition process.	Pre-construction
Property impacts	LP8	LP7	Transport for NSW will seek to secure agreements with affected landowners/landholders, to guide property-level design requirements and the management of construction on, or immediately adjacent to, private properties. Property adjustment plans will be prepared in consultation with impacted landowners/landholders. The plans will define the works required to properties affected by acquisition and those requiring adjustments as a result of the project. Works will include, but not be limited to, adjustments to driveways, fences, trees and landscaping.	Pre-construction
Impacts on utilities	LP9	LP8	The location of all utilities and services, and requirements for access to, diversion, protection and/or support, will be confirmed prior to construction. This will include (as required) undertaking utilities investigations, including intrusive investigations, and consultation and agreement with service providers.	Pre-construction
Rehabilitation of land subject to temporary use during construction	LP10	LP9	A rehabilitation strategy will be prepared to guide rehabilitation planning, implementation, monitoring and maintenance of disturbed areas outside the operational footprint following the completion of construction. The strategy will have regard to Appendix G (Rehabilitation recommendations) of *Managing Urban Stormwater – Soils and Construction – Volume 1* (Landcom, 2004). The strategy will be consistent with the residual land management plan for land owned by Transport for NSW.	Pre-construction
	LP11	LP10	Land subject to temporary use will be rehabilitated as soon as practicable to the pre-construction condition (or as agreed with the landowner/landholder), taking into consideration the existing condition, location and land use characteristics.	Construction

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
			Rehabilitation will be undertaken in consultation with the relevant landowner/landholder, and in accordance with the rehabilitation strategy.	
Socio-economic impacts				
Construction				
Socio-economic impacts, communication and engagement	SE1	SE1	Transport for NSW will ~~prepare an overarching~~ **implement the Parramatta Light Rail Stage 2** Community Communication Strategy to guide the management and delivery of community and stakeholder engagement in the lead up to and during construction, and ensure that: • accurate and accessible information about the project is provided • feedback from the community is encouraged • opportunities for input **to design development** are provided**, where relevant** • community members and stakeholders with the potential to be affected by construction activities are notified in a timely manner about the timing of activities and potential for impacts • enquiries and complaints are managed (see mitigation measure SE3), and a timely response is provided for concerns raised. In relation to the potential for socio-economic impacts, ~~the strategy~~ **this** will include **implementing** approaches and protocols to: • communicate with potentially affected residents, other community members, businesses and other key stakeholders to provide information about the project, and the likely nature, extent and duration of changes during construction • identify and engage with vulnerable persons that might be affected by the project • communicate information about potential access changes and delays (including changes to public and active transport facilities) • engage with owners and tenants of properties that will be impacted by acquisition. Engagement plans will be developed and implemented to define the specific requirements for engagement consistent with the Community Communication Strategy. The engagement plans will define tools and activities, timing and responsibilities, and monitoring requirements.	**Design**, pre-construction, construction
	SE2	SE2	Dedicated place managers will be available in the lead up to, and during, construction to listen to concerns and answer questions from the community and businesses. Place managers will provide a single point of contact for people (including business owners/operators) wanting to find out more about the project, including the impacts of construction, and the measures that will be implemented to minimise these impacts as far as possible.	Pre-construction, construction

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
Socio-economic impacts, communication and engagement	SE3	SE3	Enquiries and complaints management systems will be developed, outlined in the Community Communication Strategy, and implemented before and during construction. The complaints management systems will be maintained throughout the construction period and for a minimum of 12 months after construction finishes.	Construction
	SE4	SE4	A social impact management plan (SIMP) will be prepared, in accordance with Section 5.2 of the *Social Impact Assessment Guideline for State Significant Projects* (DPIE, 2021~~f~~), to manage the implementation of the proposed socio-economic mitigation measures, and detail the specific management actions and targets that will be developed in response to these measures. The SIMP will define specific actions, roles and responsibilities, and a monitoring, reporting and adaptive management framework for construction.	Construction
Impacts on community facilities and infrastructure	SE5	SE5	Access to community facilities and infrastructure will be maintained during construction as far as practicable. Where alternate access arrangements need to be made, including changes to access for public and active transport facilities, these will be developed in consultation with relevant stakeholders and service providers, and communicated to users in accordance with the engagement plan. Changes to access arrangements will be managed in accordance with the traffic and access management plan (mitigation measure TT8).	Construction
	SE6	SE6	Transport for NSW will continue to consult with relevant key stakeholders (including facility managers) in relation to community infrastructure with the potential to be directly affected (by the project's land requirements) and/or indirectly affected (for example, as a result of amenity impacts or access changes). Consultation will be undertaken in accordance with the engagement plan **(mitigation measure SE1)** and will assist with identifying measures to minimise the potential impacts of the project on community infrastructure as far as possible. Stakeholders to be consulted will include, but not be limited to, City of Parramatta Council, City of Ryde Council, NSW Maritime, Melrose Park Public School and the Department of Education, and Sydney Olympic Park Authority.	Pre-construction, construction
	SE7	SE7	Transport for NSW will continue to consult with relevant councils and Sydney Olympic Park Authority to offset the direct impacts of the project's land requirements on open space (parks and reserves) through the provision of **a net increase in open space, including** active transport infrastructure **and** ~~new and~~ improved open spaces and recreation facilities~~, and repurposing some residual land~~.	Pre-construction, construction

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
Employment and training benefits	SE8	SE8	A project-specific social procurement and workforce development strategy will be developed and implemented to • nominate workforce development and social procurement targets and outcomes • define approaches to achieve nominated targets and outcomes • support job creation and skill development opportunities for the project.	Pre-construction, construction
Impacts on businesses	SE9	SE9	A business management and activation plan will be prepared and implemented for businesses with the potential to be affected by the project, including those located on roads impacted by construction. The plan will identify businesses with the potential to be impacted by the project. It will detail feasible and reasonable measures, developed in consultation with affected business owners/operators to: • minimise disruption for customers and deliveries as far as possible • maintain vehicular and pedestrian access during business hours, including alternative arrangements for times when access cannot be maintained • maintain visibility of the business to potential customers during construction, including alternative arrangements for times when visibility cannot be maintained • respond to other identified impacts as far as possible, including specific measures to assist small businesses with the potential to be adversely affected during construction. The plan will also include: • measures identified as an outcome of the small business support program (measure SE11) • maintaining a phone hotline that enables businesses to find out about the project or register any issues • establishment of business reference groups to provide information on the project and assist with the development of management measures • a feedback and monitoring mechanism to assess the effectiveness of measures.	Pre-construction, construction
Impacts on access to businesses	SE10	SE10	Alternative arrangements, including for pedestrian and vehicular access, will be developed in consultation with affected businesses and implemented before any changes are made to existing access. Adequate wayfinding to businesses will be provided before, and for the duration of, any disruption. Wayfinding will be provided in consultation with the City of Parramatta Council, City of Ryde Council, Sydney Olympic Park Authority, **Royal Agricultural Society of NSW** and/or relevant road authority, and as outlined in the business management and activation plan (mitigation measure SE9).	Pre-construction, construction

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
Supporting small business during construction	SE11	SE11	A small business support program will be established to provide assistance to small business owners with the potential to be impacted by construction. The program will assist local businesses develop proactive business strategies, including: • marketing and promotion • business diversification and business planning • engagement of specialists to provide training.	Pre-construction, construction
Minimising impacts on Aboriginal culture	**SE12**	**n/a**	**An Aboriginal community and stakeholder engagement strategy and action plan will be prepared to define the strategies that will be implemented to minimise impacts on cultural values and ensure that:** • **information about the project is shared with Aboriginal stakeholders and communities in a timely manner** • **local Aboriginal cultural and community values are identified and understood** • **opportunities to reflect Aboriginal community and cultural values are identified and implemented.**	**Design, pre-construction, construction**
Landscape and visual impacts				
Design				
Minimising visual impacts	LV1	LV1	The urban design requirements will be finalised in accordance with the vision, principles and outcomes defined in Technical Paper 1 (Design, Place and Movement) **and the Supplementary Design, Place and Movement Report**, to provide detailed urban design guidelines and key requirements for the project, including individual design elements. The urban design requirements will be finalised in consultation with key stakeholders, the operator, the rail regulator, and the Design Review Panel.	Design
	LV2	LV2	Design development will be undertaken in accordance with the urban design requirements and with advice from the Design Review Panel.	Design
	LV3	**n/a**	**Opportunities to incorporate additional wire-free sections will be investigated in consultation with relevant stakeholders, including in visually sensitive environments, areas where existing above-ground infrastructure and significant street trees need to be retained and areas adjoining significant habitat in accordance with mitigation measure BD4.**	**Design**
Managing impacts on trees	LV4	LV3	A tree register will be prepared by a qualified arborist to identify all trees with the potential to be impacted by the project, and the proposed impacts to trees, including: • definitions of tree and canopy • definition of what constitutes an impact (generally more than minor crown or root pruning of more than 10 per cent) • location of each tree • tree ~~values and~~ condition **and values, including ecological screening functions**	Design, construction

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
			• where a tree requires removal, whether, in the opinion of the arborist, it can be successfully transplanted • the extent of the proposed impact (complete removal or extent of pruning).	
Managing impacts on trees	LV5	LV4	The design will continue to be refined to avoid or minimise impacts on trees**. Any tree within the project site boundary, that will not be directly impacted by infrastructure or utility works, will be assessed for retention through careful consideration of design and construction methods. This will include**~~, and will include~~ consideration of **the following** options: ~~to reduce impacts on trees, including:~~ • operational requirements in relation to tree locations • adjustments to the design to avoid impacting trees (such as opportunities for localised narrowing of footpaths, use of porous pavement) • reduction in the standard offset distances required for underground services • consideration of the health of each tree, including its vigour and likely ability to survive in-situ pruning or transplanting.	Design
	LV6	LV5	A tree offset strategy will be developed to offset the loss of trees and achieve a net increase in tree **number and** canopy. The strategy will **be prepared in accordance with the *Biodiversity Policy* (Transport for NSW, 2022) and the *Tree and hollow replacement guidelines* (Transport for NSW, 2022) to** define and identify: • how impacts on trees will be offset • **the tree replacement ratios that would apply to offset the removal of trees** • locations for replacement trees • species and trees sizes to ensure a mix of species and a range of mature heights to provide visual diversity as appropriate to proposed planting locations • requirements for monitoring and maintenance. **The strategy will also demonstrate how lessons learned from the preparation and implementation of the tree offset strategy for Parramatta Light Rail Stage 1 have been incorporated.** The strategy will be developed, and locations of replacement trees confirmed, in consultation **and/or partnership** with City of Parramatta Council, City of Ryde Council and Sydney Olympic Park Authority.	Design
Lighting	LV7	LV6	Lighting will be designed and sited to minimise glare and light spill into adjoining areas in accordance with Australian/New Zealand Standard *AS/NZS 4282:2019 Control of the obtrusive effects of outdoor lighting* and relevant standards in the series *AS/NZS 1158:2005 Lighting for roads and public spaces*.	Design

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
Visual impacts to Wharf Road properties	**LV8**	**n/a**	**Opportunities to mitigate the high-moderate and high visual impacts to residential properties on Wharf Road south of Andrew Street (such as planting to provide screening of views to the bridge) would be investigated in consultation with property owners.**	**Design**
Construction				
Managing impacts on trees	LV9	LV7	Construction planning will demonstrate consideration of all practicable options to avoid or minimise impacts on trees, including: • review of the construction methodology and layout of work sites, compounds, access, ancillary infrastructure and fencing • consideration of alternative construction methods and equipment. Trees to be retained will be protected prior to the commencement of construction in accordance with Australian Standard *AS 4970–2009 Protection of trees on development sites*.	Pre-construction, construction
	LV10	LV8	Any tree pruning that is more than minor will be undertaken by a qualified arborist in accordance with *AS 4373–2007 Pruning of amenity trees*.	Construction
Construction site management	LV11	LV9	Construction site hoarding and fencing will be designed, erected and maintained to minimise visual impacts. This will include: • erecting hoarding/fencing as early as possible in the site establishment phase to provide visual screening • using high quality materials suitable for parks and public spaces where sites are located close to sensitive receivers and public open space • featuring graphics, artwork or project information at appropriate locations in consultation with Transport for NSW • maintaining hoarding/fencing regularly, including the prompt removal of graffiti.	Construction
	LV12	LV10	Lighting of work areas, compounds, and work sites will be oriented to minimise glare and light spill impact on adjacent receivers.	Construction
Site restoration and rehabilitation	LV13	LV11	Following completion of construction, site restoration will be undertaken in accordance with the rehabilitation strategy (mitigation measure ~~LP9~~ **LP10**). Temporary impacts on public open space will be rehabilitated in consultation with the relevant local council or Sydney Olympic Park Authority.	Construction
	LV14	LV12	Early planting and revegetation works will be undertaken where practicable to provide a screening buffer that has time to mature before the project is operational.	Construction
	LV15	LV13	Construction programming will provide for the progressive rehabilitation of disturbed areas as far as practicable, to minimise the duration and extent of temporary visual and landscape character impacts.	Construction

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
Biodiversity				
Design				
Avoiding impacts on biodiversity	BD1	BD1	Vegetation clearing will be limited to the minimum necessary to construct the project. The design and location of infrastructure will be further refined during each design phase to minimise or avoid impacts on native vegetation**,** ~~and~~ fauna **movement and** habitat as far as practicable.	Design
Offsetting impacts on native vegetation and threatened species	BD2	BD2	Biodiversity offsets will be finalised in accordance with the NSW Biodiversity Offsets Scheme and the NSW Assessment Bilateral Agreement under the EPBC Act, in consultation with the NSW Department of Planning and Environment (Environment, Energy and Science Directorate). Offsets required under the *Fisheries Management Act 1994* will be finalised in consultation with DPI Fisheries.	Design
Habitat connectivity impacts – Sydney Olympic Park	BD3	BD3	Design development in Sydney Olympic Park and the Millennium Parklands will ensure that habitat connectivity and quality for the Green and Golden Bell Frog is maintained in consultation with Sydney Olympic Park Authority **and a suitably qualified and experienced ecologist**.	Design
	BD4	BD4	The use of overhead wiring will be minimised as far as practicable in areas adjoining Grey-headed Flying-fox foraging habitat and the flight paths of the White-bellied Sea-eagle and migratory waders, particularly on the bridges over the Parramatta River, adjacent to Newington Nature Reserve **and Narawang Wetland**, and ~~around Hill Road and~~ the Holker Busway.	Design
Impacts on habitat values	BD5	BD5	The planting of feed trees for the Grey-headed Flying-fox will be considered to improve habitat values ~~at Wentworth Point and Sydney Olympic Park~~, with a particular focus on locally indigenous winter-flowering species, such as Forest Red Gum (*Eucalyptus tereticornis*), Spotted Gum (*Corymbia maculata*) and Broad-leaved Paperbark (*Melaleuca quinquenervia*).	Design
	BD6	BD6	Landscaping will use locally indigenous species to buffer the light rail alignment adjacent to vegetated areas, including Newington Nature Reserve, and along Hill Road and the Holker Busway**, determined in consultation with Sydney Olympic Park Authority**.	Design
	BD7	BD7	Opportunities to minimise light **and noise** pollution to ecologically sensitive areas, particularly the Parramatta River, Newington Nature Reserve and the Millennium Parklands will be investigated~~,~~ and implemented ~~where reasonable and feasible~~, with regard to the *National Light Pollution Guidelines for Wildlife* (Department of the Environment and Energy, 2020), **and in consultation with Sydney Olympic Park Authority**.	Design

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
Impacts on habitat values	BD8	BD8	The design of the proposed bridges over the Parramatta River, and works to bridges in Sydney Olympic Park, will include provision for **micro**bat-friendly roost features. ~~Bat-friendly roost features, and t~~ **T**he use of nest boxes appropriate for use by microbats~~,~~ **and other small fauna** will also be investigated and installed at other locations, ~~where appropriate~~ **in consultation with Sydney Olympic Park Authority and NSW National Parks and Wildlife Service**.	Design
Construction				
	n/a	BD9	~~Habitat connectivity and quality for the Green and Golden Bell Frog maintained during construction. This will include replacing any Green and Golden Bell Frog underpasses with the potential to be affected during construction with an equivalent structure, in consultation with Sydney Olympic Park Authority.~~	~~Construction~~
Habitat impacts – Sydney Olympic Park	BD9	BD10	Construction measures to avoid impacts on breeding of ~~threatened~~ fauna, **including threatened and migratory fauna** such as the White-bellied Sea-eagle, ~~and~~ Southern Myotis **and migratory waders**, will be implemented ~~where feasible and reasonable~~. Such measures, including timing of construction, quieter construction methods, **appropriate siting of lighting** and/or the use of temporary noise barriers, will be implemented ~~where feasible and reasonable~~, for works at: • Holker Busway (to minimise impacts on the breeding of the Southern Myotis during October to April) • Hill Road near the White-bellied Sea-eagle nest (breeding season from July to January) • **Hill Road adjacent to** Narawang **Wetland, Newington Nature Reserve Wetland and Kronos Hill (to minimise impacts on migratory waders and the Green and Golden Bell Frog during spring and summer).**	Construction
	n/a	BD11	~~Where existing frog-proof fencing within Sydney Olympic Park is impacted by the project, temporary frog-proof fencing will be installed around work areas. Permanent frog-proof fencing will be reinstated following construction.~~	~~Construction~~
Impacts on mangrove vegetation	BD10	BD12	Impacts on estuarine mangrove vegetation at Haslams Creek will to be avoided or minimised as far as practicable. Works on the Holker Busway bridge will be undertaken via scaffolding attached to the bridge where practicable, rather than from the ground, to minimise impacts on estuarine mangrove vegetation.	Construction
General biodiversity impacts and management	BD11	BD13	A biodiversity management plan will be prepared prior to construction and implemented as part of the CEMP. The plan will include measures to protect biodiversity and minimise the potential for impacts during construction. The plan will include but not be limited to: • **measures to manage potential impacts on the Green and Golden Bell Frog (see mitigation measure BD12)**	Construction

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
			• **measures to manage potential light, noise and vibration impacts on threatened and migratory fauna, such as the Green and Golden Bell Frog, within Sydney Olympic Park** • measures to manage biosecurity risks (including pathogens and weeds) in accordance with the *Biosecurity Act 2015* (NSW) • locations and requirements for pre-clearing surveys, including where clearing is required within Sydney Olympic Park and areas of mangrove, saltmarsh or other riparian vegetation (see mitigation measure ~~BD14~~ **BD13**) • an unexpected finds procedure • hygiene controls in relation to chytrid fungus, cinnamon fungus (*Phytophthora cinnamomi*) and myrtle rust (*Pucciniales fungi*) • locations and procedures for monitoring (see mitigation measures ~~BD16 to BD18~~ **BD15, BD16 and BD18**). The plan will be developed in accordance with the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (Roads and Traffic Authority (RTA), 2011) **and the *Policy and guidelines for fish habitat conservation and management (update 2013)* (DPI, 2013)**. Management measures**, including changes to measures to respond to monitoring outcomes,** for works within Sydney Olympic Park and the Millennium Parklands will be developed in consultation with Sydney Olympic Park Authority.	
	BD12	**n/a**	**A Green and Golden Bell Frog management plan will be prepared as part of the biodiversity management plan by a qualified herpetologist, in consultation with Sydney Olympic Park Authority ecologists. The plan will define measures to:** • **ensure that habitat connectivity and quality is maintained during construction** • **minimise direct impacts during construction (such as from noise and lighting).** **The plan will include requirements for:** • **temporary frog-proof fencing to be installed around work areas in Sydney Olympic Park where existing frog-proof fencing is impacted** • **permanent frog-proof fencing to be reinstated following construction** • **temporary noise barriers to be installed near Newington Nature Reserve wetland, Narawang Wetland, and Kronos Hill during construction.**	**Construction**
	BD13	BD14	Pre-clearing surveys will be completed prior to any works (including minor works) within sensitive areas, including at the following locations: • vegetated land within Sydney Olympic Park • areas of mangrove, saltmarsh or other riparian vegetation~~.~~ • areas identified by the project ecologist as supporting known or potential habitat, for ground-dwelling and arboreal species~~.~~	Pre-construction

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
			• **buildings/structures to be removed (for roosting microbats).** Pre-clearing surveys **and relocation of native fauna** will be undertaken in accordance with Guide 1 (Pre-clearing process) **and Guide 9 (Fauna handling)** of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA, 2011). **Pre-clearing surveys of vegetated land within Sydney Olympic Park will be conducted in accordance with the *Sydney Olympic Park Biodiversity Strategy and Management Plan* (SOPA, 2022), in particular Section 3 (Frog habitat clearance) of Environmental Procedure 3 (Works in and near habitats).**	
Rehabilitation and revegetation	BD14	BD15	~~The rehabilitation strategy (mitigation measure LP9) will include a~~ **A habitat restoration and** revegetation plan **will be** prepared and implemented **as a key part of the rehabilitation strategy (mitigation measure LP10)** in consultation with relevant stakeholders, including **City of Parramatta Council,** Sydney Olympic Park Authority and landowners. The **habitat restoration and** revegetation plan will **be prepared by a habitat restoration specialist and will** include: • clear objectives for rehabilitation and re-establishment of native vegetation **of local provenance** in temporary disturbance areas, in accordance with Guide 3 (Re-establishment of native vegetation) of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA, 2011) • active revegetation of mangroves at the proposed bridges over the Parramatta River**, taking into account future shading impacts** • **reuse of removed trees would be considered, in consultation with Sydney Olympic Park Authority ecologists and the NSW National Parks and Wildlife Service** • requirements for ongoing monitoring.	Construction
Monitoring	BD15	BD16	A fauna monitoring program, including monitoring locations, methods and timing, will be developed and implemented in consultation with **the Environment and Heritage Group,** Sydney Olympic Park Authority ecologists and Birdlife Australia, using available baseline data. The program will include monitoring during construction of: • frog fencing • microbat roosts (for any works along the Holker Busway during the microbat breeding season**, and any roosts identified in buildings/structures to be removed**) • the response of the White-bellied Sea-eagle **and Green and Golden Bell Frog** to construction noise.	Construction
	BD16	BD17	Monitoring of indirect impacts on mangroves, saltmarsh and the Narrow-leafed Wilsonia (*Wilsonia backhousei*) population will be undertaken during and following construction.	Construction

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
			If an incident occurs in these areas, monitoring by a suitably qualified expert is required to determine the severity and potential need for additional offsets under the *Biodiversity Assessment Method* (DPIE, 2020).	
Operation				
Management	**BD17**	**n/a**	**The operational environmental management system will define measures to manage potential operational risks to biodiversity in the Millennium Parklands (including maintenance, cleaning and lighting considerate of the protection of the Green and Golden Bell Frog populations) in consultation with Sydney Olympic Park Authority.**	**Operation**
Monitoring	BD18	BD18	The behavioural response of the White-bellied Sea-eagle **and Green and Golden Bell Frog** to operations will be monitored in consultation with **the Environment and Heritage Group,** Sydney Olympic Park Authority ecologists, **NSW National Parks and Wildlife Service** and**/or** Birdlife Australia during the first two years of operation**, with an option to extend for a further three years, based on advice from the ecologist, as to whether sufficient data has been obtained**. **The monitoring methods, (including the need for baseline data), reporting requirements, and adaptive management will be set out in the biodiversity management plan (BD11).**	Operation
Water				
Design				
Flooding impacts	W1	W1	A flood management strategy will be prepared, building on the results of the assessment presented in Technical Paper 10 (Hydrology, Flooding and Water Quality) to inform further design development and demonstrate how: • the project will achieve the Flood Management Objectives and Flood Immunity Standards • the risk of flooding to the project will be minimised • the potential impacts of the project on flood behaviour (under pre-project conditions) will be managed such that flooding characteristics will not be adversely impacted**.** The flood management strategy will: • **be based on revised flood modelling taking into account further design development and construction planning** • confirm the project's level of flood immunity • confirm the impacts of the project on flood behaviour in accordance with the *NSW Floodplain Development Manual* (DIPNR, 2005) • identify design responses and management measures **in consultation with affected landowners/landholders** to minimise: – flooding impacts above the one per cent AEP by adopting climate change adaptation measures	Design

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
			– flooding impacts to flood sensitive areas and infrastructure within Sydney Olympic Park, including the Narawang Wetland, the Brick Pit and the existing leachate system – **address** potential impacts to the flood capacity and potential for scour as a result of the bridge piers. The strategy will be prepared by a suitably qualified and experienced specialist in consultation with City of Parramatta Council, City of Ryde Council, Sydney Olympic Park Authority, NSW State Emergency Service and the Department of Planning and Environment.	
	W2	W2	Drainage and flood management infrastructure will be designed with regard to relevant drainage design requirements and guidelines, including the *Development Engineering Design Guidelines* (City of Parramatta Council, 2018) and *Sydney Olympic Park Authority Policy – Stormwater Management and Water Sensitive Urban Design* (Sydney Olympic Park Authority, 2016).	Design
Water quality impacts	W3	W3	The location and specification of water quality treatment measures will be determined with reference to the NSW and project-specific water quality objectives and existing water quality.	Design
Impacts on bores	W4	W4	Further investigations and consultation with the owner of groundwater bore GW107659 will be undertaken to identify the potential for the project to affect existing water extraction and to identify appropriate management measures in accordance with the *NSW Aquifer Interference Policy* (Department of Primary Industries, 2012).	Design
	W5	W5	Further investigations and consultation with the owner of groundwater bore GW063660 will be undertaken to identify if the bore can be retained. Any decommissioning required will be undertaken in accordance with the *Minimum Construction Requirements for Water Bores in Australia* (National Uniform Drillers Licensing Committee, 2012). Decommissioning will be developed in consultation and agreement with the bore owner.	Design
Construction				
Flooding impacts	W6	W6	Construction planning and the layout of construction work sites and compounds will be undertaken with consideration of overland flow paths and flood risk, avoiding flood liable land as far as practicable.	Pre-construction
	W7	W7	A flood and emergency response plan will be prepared and implemented. The plan will include measures, process and responsibilities to minimise the potential impacts of construction activities on flood behaviour as far as practicable. It will also include measures to manage flood risks and address flood recovery during construction.	Pre-construction, construction
	W8	W8	Ongoing consultation will occur with the NSW State Emergency Service and relevant councils in relation to potential impacts to existing community emergency management arrangements for flooding.	Design, pre-construction, construction operation

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
Water quality impacts	W9	W9	A soil and water management plan will be prepared as part of the CEMP and implemented during construction. The plan will detail processes, responsibilities and measures to manage potential soil and water quality impacts during construction, including measures to minimise the potential for pollutants to enter surface water and groundwater. The plan will be prepared in accordance with relevant guidelines and standards, including *Managing Urban Stormwater – Soils and Construction* - Volume 1 (Landcom, 2004) and Volume 2D *Main Road Construction* (DECC, 2008~~b~~) (the Blue Book), *Best Practice Erosion and Sediment Control* (International Erosion Control Association (Australasia), 2008), and *Sydney Olympic Park Authority Policy - Stormwater Management and Water Sensitive Urban Design* (Sydney Olympic Park Authority, 2016) (for works in Sydney Olympic Park).	Pre-construction, construction
	W10	W10	Discharge to surface water will be undertaken in accordance with ~~*Transport for NSW*~~ *Water Discharge and Reuse Guideline DMS-SD-024 version ~~4.0~~ 4.1* (**Transport for NSW**, 2019~~b~~), and project specific objectives.	Construction
Water quality monitoring	W11	W11	A water quality monitoring program will be developed and implemented as part of the soil and water management plan to monitor potential surface water quality impacts. The program will define: • monitoring parameters • monitoring locations • frequency and duration of monitoring. The monitoring program will include monitoring prior to the commencement of construction to validate the baseline water quality of potential receiving waters and confirm project-specific water quality criteria. Water quality monitoring will continue for a minimum of 12 months following the completion of construction, or until affected watercourses are rehabilitated to an acceptable condition (or as otherwise required by any project conditions of approval). The monitoring program will assess compliance with the project-specific water quality objectives and the efficacy of the mitigation measures **and will include a trigger response action plan**. It will be developed in consultation with the NSW EPA, City of Parramatta Council and Sydney Olympic Park Authority.	Pre-construction, construction
Work within the Parramatta River	W12	W12	Hydrodynamic modelling will be undertaken to inform the final bridge construction methodology and features of the temporary jetties to minimise the risk of river bank destabilisation or additional flooding to nearby areas. The modelling will also identify if additional measures, such as scour protection are required.	Pre-construction

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
	W13	W13	The soil and water management plan will detail measures to manage potential changes to hydrodynamic processes within the Parramatta River and ensure appropriate mitigation measures are implemented to minimise erosion, scour and destabilisation of the river banks.	Pre-construction, construction
Works within watercourses	W14	W14	Works within or near watercourses will be undertaken with consideration of the *Guidelines for watercourse crossings on waterfront land* (DPI, 2012) and *Guidelines for controlled activities on waterfront land – Riparian corridors* (~~NRAR, 2018~~ **DPE, 2022**).	Construction
Groundwater impacts	W15	W15	Impacts on groundwater during construction will be minimised as far as practicable by: • avoiding the need to extract groundwater • minimising groundwater inflows and volumes into excavations.	Construction
	W16	W16	A dewatering management strategy will be prepared as part of the soil and water management plan and implemented during construction. The plan will detail measures for the appropriate management of extracted groundwater, including leachate.	Pre-construction, construction
Operation				
Emergency management	W17	W17	Emergency management arrangements will be developed to manage flood risks to people and vehicles accessing stops and facilities.	Operation
Soils and contamination				
Design				
Investigation of data gaps	CS1	CS1	Additional investigations will be undertaken to inform the design, construction planning, and preparation of remediation action plan(s) (RAP(s)) (if required). The investigations will include ~~further characterising the existing contamination status of the project site~~ **targeted investigation in the north of Wentworth Point.** The results of site investigations will be assessed against the criteria contained with the *National Environment Protection (Assessment of Site Contamination) Measure 1999* (NEPC, 2013) to determine the need for any remediation. An independent site auditor accredited under the site auditor scheme under the CLM Act will review the scope and results of the further investigation, including any recommendations for further assessment, and provide a written opinion on the contamination risk and the appropriateness of the reports and any proposed recommendations.	Design
Management of contaminated sites	CS2	CS2	**The location, layout and functioning of the asbestos containment cells at 13A Grand Avenue, Camellia and the former Sandown Line will be confirmed.** Where the project has the potential to affect the remediation systems in the stabling and maintenance facility, and the asbestos containment cells at 13A Grand Avenue and the former Sandown Line, the controls and protocols outlined in the existing long-term environmental management plan will be implemented such that the systems continue to operate effectively.	Design

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
	CS3	CS3	**The location, layout and functioning of the leachate management systems in Sydney Olympic Park will be confirmed.** Where the project has the potential to affect the leachate management systems in Sydney Olympic Park, negotiation will be undertaken with Sydney Olympic Park **Authority** to understand the extent of the potential interaction. ~~and~~ **The** controls and protocols outlined in the existing management plan will be implemented such that the systems continue to operate effectively.	Design
Management of contaminated sites	CS4	CS4	Where the potential for disturbance of existing remediation systems in Camellia and Sydney Olympic Park is not consistent with the existing management plans, a remediation action plan(s) will be prepared in consultation with the landowners and NSW EPA. The plan(s) will describe how these systems will be managed during construction, and/or how these systems will be reinstated such that they continue to operate effectively after construction is complete.	Design
	CS5	CS5	Where a remediation action plan(s) is/are determined to be required following further investigation ~~at 37A Grand Avenue, Camelia (and any other areas within the project site)~~ it will be prepared and implemented in accordance with the *National Environment Protection (Assessment of Site Contamination) Measure 1999*. The remediation action plan(s) will be **prepared in consultation with the landowner/s and** reviewed by an independent site auditor (accredited under the site auditor scheme under the CLM Act), to certify the appropriateness of the plan(s) and that the site can be made suitable for the proposed use.	Design
Construction				
Demolition of structures containing hazardous materials	CS6	CS6	Hazardous materials surveys will be undertaken to inform construction planning.	Pre-construction
Potential impacts of soil disturbance	CS7	CS7	The soil and water management plan (mitigation measure W9) will detail processes, responsibilities and measures to manage potential soil impacts during construction, including potential impacts associated with the presence of existing contamination, stockpile management, saline soils and acid sulfate soils.	Pre-construction, construction
Potential impacts of contaminated sediment disturbance	CS8	CS8	Physical controls (such as sediment curtains) will be implemented during works within the Parramatta River to minimise the disturbance and migration of contaminated sediments.	Pre-construction, construction
Disposal of contaminated soil and groundwater	CS9	CS9	The preferred methods to manage and dispose of contaminated materials and groundwater will be confirmed following further geotechnical and contamination investigations and incorporated into the waste and resource management plan (mitigation measure WR3).	Pre-construction

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
Landfill gas intrusion	CS10	CS10	Protocols to address and manage the potential for landfill gases along Hill Road and in Sydney Olympic Park will be developed as part of the air quality management plan (mitigation measure AQ1) and implemented during construction. The protocols will consider confined and/or enclosed spaces and appropriate controls as required (e.g.~~,~~ forced ventilation) and will include appropriate occupational monitoring.	Pre-construction, construction
Acid sulfate soils	CS11	CS11	An acid sulfate soils management plan will be prepared as part of the soil and water management plan in accordance with the *Acid Sulfate Soils Assessment Guidelines* (ASSMAC, 1998). The plan will define the process and measures to manage actual and potential acid sulfate soil and sediment disturbed during construction. The plan will include a summary of available acid sulfate soil information relevant to the project site and identify any further soil/water analysis required as a precursor to implementing the management plan. Acid sulfate soils will be disposed off-site (where required) in accordance with the *Waste Classification Guidelines - Part 1: Classifying waste* (NSW EPA, 2014~~a~~) and *Part 4: Acid sulfate soil*s (NSW EPA, 2014~~b~~).	Pre-construction, construction
Stockpile management and handling	CS12	CS12	Temporary storage and containment systems for the stockpiling of contaminated material during construction will be designed to be impervious to the materials stored, resistant to fire (where required), prevent cross contamination of clean fill, covered to prevent contact with rainfall (when required), and managed and maintained to prevent any release of liquids and contaminated run-off to stormwater drains, waters and land.	Pre-construction, construction
Management of previously unidentified contaminated material	CS13	CS13	The discovery of previously unidentified contaminated material will be managed in accordance with an unexpected contaminated finds procedure, which will be included in the soil and water management plan.	Pre-construction, construction
Operation				
Contamination during operation	CS14	CS14	Spills and leaks of vehicles or maintenance plant and equipment will be managed in accordance with Transport for NSW's standard operating procedures.	Operation
	CS15	CS15	Ongoing management and monitoring measures will be implemented for any areas where minor, residual contamination remains following construction.	Operation

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
Hazards and risks				
Design				
Electro-magnetic fields	HR1	HR1	The project will be designed in accordance with *Non-Ionising Radiation Protection Guidelines for Limiting Exposure to Time Varying Electric and Magnetic Fields* (ICNIRP, 2010) and Australian Standard *AS 2067:2016 Substations and high voltage installations exceeding 1 kV* to minimise the risk associated with electro-magnetic field exposure. Wiring, tracks and other infrastructure will be designed to mitigate risks associated with high voltage cabling and potential earth leakage.	Design
Public safety	HR2	HR2	Ongoing design development will be subject to detailed safety reviews through the Safety in Design process, to identify measures to mitigate, manage and reduce the risk of incidents arising from collisions during operation.	Design
Construction				
Managing the potential for hazards during construction	HR3	HR3	The CEMP will detail incident management and emergency response processes, responsibilities and measures to manage hazards, and incident and emergency situations during construction.	Pre-construction, construction
	HR4	HR4	The soil and water management plan will include a spill response procedure. The procedure will detail measures to manage hazardous substances and dangerous goods, including storage, handling and spill response, in accordance with legislative requirements.	Pre-construction, construction
Impacts on services and utilities	HR5	HR5	Valve shut downs on the Sydney Water drinking water trunk mains will be undertaken to confirm the condition and functionality of the nearest valves to the project site and whether any repairs or rectification works are required to the existing assets.	Pre-construction
	HR6	HR6	An incident and emergency response plan will be prepared to include the process to be followed in the event of an incident involving critical utilities such as the Sydney Water drinking water trunk mains, Jemena high pressure gas pipelines and ~~VIVA~~ fuel **pipe**lines. The plan will be developed in consultation with the service providers and incorporate the findings from the utility investigations, ~~and~~ **the condition assessment of the** Sydney Water ~~condition assessment~~ **drinking water trunk mains, and the safety management study (mitigation measure HR7)**.	Pre-construction, construction
	HR7	HR7	A safety management study will be undertaken ~~for~~ **to identify potential risks, including those associated with** proposed alterations, to the gas and fuel pipelines in accordance with Australian and New Zealand Standard *AS/NZS 2885.6:2018 Pipelines – Gas and liquid petroleum, Part 6: Pipeline safety management*. The outcomes of the safety management study will be incorporated in construction planning **and design development**. ~~Management measures identified will be included in the incident and emergency response plan and implemented during construction.~~	**Design,** ~~P~~**p**re-construction~~, construction~~

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
Transport of dangerous goods and hazardous materials	HR8	HR8	The transport of dangerous goods will be undertaken in accordance with the Dangerous Goods (Road and Rail Transport) Regulation 2009 and the Australian Code for the *Transport of Dangerous Goods by Road and Rail* (National Transport Commission, 2017).	Construction
Operation				
Public safety during operation	HR9	HR9	Targeted safety campaigns to raise awareness about the operation of light rail vehicles will be undertaken in the lead up to the opening of the project and during operation to promote safe operation. This will focus on raising awareness and promoting safe behaviours around light rail vehicles.	Operation
Air quality				
Design				
Energy use and greenhouse gases	GHG1	GHG1	An energy and greenhouse gas strategy will be prepared to document the greenhouse reduction targets for the construction and operational stages of the project. The strategy will: • be prepared in accordance with Infrastructure Sustainability Council and NSW Government Resource Efficiency Policy (OEH, 2014) requirements • identify the key initiatives that will be explored further to meet these targets in accordance with the carbon emissions management hierarchy • be reviewed throughout the project lifecycle.	Design, construction, operation
	GHG2	GHG2	Opportunities to reduce construction and operational greenhouse gas emissions will be investigated including, but not limited to: • purchasing electricity derived from a renewable energy source • the use of biodiesel in plant and equipment • connecting compound sites to grid electricity, where available • the use of low embodied energy and recycled materials • promoting the selection of energy efficient rolling stock, electrical equipment and maintenance vehicles. Preferred measures will be defined in the energy and greenhouse gas strategy.	Design
Construction				
General air quality impacts	AQ1	AQ1	An air quality management plan will be prepared as part of the CEMP and implemented during construction. The plan will detail processes, responsibilities and measures to manage air quality, odour and landfill gas and minimise the potential for impacts during construction. The plan will include an air quality, odour and landfill gas monitoring program, which will be undertaken for the duration of construction.	Pre-construction, construction

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
Odour emissions	AQ2	AQ2	An odour management strategy will be developed prior to construction and implemented for the duration of works involving ground disturbance **and the potential generation of landfill gases** in Camellia, near the Parramatta River and in Sydney Olympic Park. The strategy will include: • proposed work methods and mitigation measures that aim to limit odour at sensitive receivers • routine observation of weather conditions • regular odour surveys at receptor locations by appropriately qualified professionals (mitigation measure ~~AQ4~~**AQ3**) • measures to minimise the generation of odour at the end of each work day/shift • mechanisms for investigating odour complaints, including conduct of additional odour surveys (mitigation measure ~~AQ4~~**AQ3**) • contingency and rectification measures should significant odour issues occur at sensitive receivers in the vicinity of the project site.	Pre-construction, construction
	AQ3	AQ3	Odour surveys will be undertaken at downwind receivers during works involving ground disturbance in Camellia, near Parramatta River and in Sydney Olympic Park in accordance with *Determination of odorants in ambient air by field inspection* (VDI 3940, 1993). The odour surveys will be undertaken: • daily, for one hour when works commence, and prior to works completing • if wind conditions drop below three metres per second • if an odour complaint is received. If significant odour issues are observed in the vicinity of sensitive receivers, the contingency and rectification measures defined by the odour management strategy will be implemented (see AQ2).	Construction
Climate change				
Design				
Climate change risk assessment	CC1	CC1	The climate change risk assessment will continue to be refined in accordance with Australian Standard *AS 5334-2013 Climate change adaptation for settlements and infrastructure – A risk based approach* and the *Transport for NSW Climate Risk Assessment Guidelines* (Transport for NSW, 2021~~a~~). Adaptation measures will be confirmed, and actions implemented, to address very high, high and medium risks where reasonable and feasible.	Design
Operation				
Emergency management planning	CC2	CC2	Operational procedures for emergency planning and management will be prepared and implemented to consider the increased risk of flooding, storm surges and heatwaves.	Operation

Impact/issue	New ID	EIS ID	Mitigation measure	Timing
Climate change risk management	CC3	CC3	Operational procedures will be developed and implemented to appropriately respond to extreme climate events (temperature, winds or rainfall), as identified in the updated climate change risk assessment.	Operation
Waste and resources				
Design				
Waste generation and recycling	WR1	WR1	Measures to minimise spoil generation will be confirmed during design development. This will include a focus on optimising the design to minimise spoil volumes, and the reuse of material on site.	Design
Sustainable procurement and resource use	WR2	WR2	Material procurement and resource use planning will be undertaken in accordance with the *Sustainable Design Guidelines* (Transport for NSW, 2020~~e~~).	Design
Construction				
Construction waste and spoil management	WR3	WR3	A waste and resource management plan will be prepared as part of the CEMP and implemented during construction. The plan will adopt the circular economy principles and the waste hierarchy contained in the *Waste Avoidance and Resource Recovery Act 2001* and the *Infrastructure Sustainability Rating Scheme Technical Manual* (Infrastructure Sustainability Council, 2021). It will detail processes, responsibilities and measures to manage waste and resource use, and minimise the potential for impacts during construction. The plan will include strategies to manage spoil, including preferred reuse options.	Pre-construction, construction
	WR4	WR4	All waste will be classified in accordance with the *Waste Classification Guidelines* (NSW EPA, 2014~~a~~) and managed in accordance with the POEO Act and associated regulations.	Construction
	WR5	WR5	The disturbance, movement and disposal of special waste, including hazardous building materials such as asbestos containing materials, will be carried out in accordance with the Work Health and Safety Regulation 2011 and relevant guidelines.	Construction
Management of unexpected waste materials	WR6	WR6	Suitable areas will be identified to allow for contingency management of unexpected waste materials, including contaminated materials. Such areas will be hardstand or lined, appropriately stabilised and bunded, with sufficient space for stockpile storage.	Construction
Operation				
Operational waste management	WR7	WR7	Operational waste, including general litter clean up, will be managed consistent with the Parramatta Light Rail Stage 1 Operations Environmental Management Plan and the waste hierarchy principles contained in the *Waste Avoidance and Resource Recovery Act 2001*.	Operation

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Appendix C
Updated statutory compliance table

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Updated statutory compliance table

Table C.1 provides a description of how the project (as amended), EIS and Amendment Report (where relevant) complies with the relevant statutory requirements summarised in Chapter 4 (Statutory context).

Table C.1 Statutory compliance table

Statutory requirement	Detail	Where addressed in the EIS/ Amendment Report
***Environmental Planning and Assessment Act 1979* and Regulation**		
Environmental Planning and Assessment Act 1979 (EP&A Act) Section 2 Objects of Act	The objects of the EP&A Act are guiding principles that need to be considered by planning authorities when making decisions under the Act.	Table C.3 of the EIS.
EP&A Act Division 5.2	Section 5.14(1) provides that the approval of the Minister for Planning is required to carry out State significant infrastructure. Section 5.17(1) provides that the proponent must submit an EIS for approval to carry out the State significant infrastructure.	Chapter 4 (Statutory context) of the EIS and Chapter 2 (Approval framework) of this report. The EIS and this report have been prepared in accordance with the requirements of Division 5.2.
Environmental Planning and Assessment Regulation 2000 Part 3 of Schedule 2 (Environmental impact statements)	The SEARs (General SEARs, item 1) require the EIS to be prepared in accordance with Part 3 of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 (see Appendix A (SEARs compliance table)). Part 3 of Schedule 2 provides requirements in terms of the form and contents of the EIS.	Table C.1 of the EIS documents where the requirements of Part 3 of Schedule 2 have been addressed in the EIS. The updated assessment reports (see section 4.2 of the Response to Submissions) have been prepared in accordance with the SEARs as documented in Chapter 1 of each report. The EIS is consistent with the form and content requirements of the current Environmental Planning and Assessment Regulation 2021 as defined by sections 190 and 192 of Division 5 of Part 8, with the exception of the requirement for a declaration under section 190(3), which does not apply to the project by virtue of a savings and transitional provision contained in Schedule 8 to the Environmental Planning and Assessment Regulation 2021.
Biodiversity Conservation Act 2016	Clauses 7.9(1) and 7.9(2) provide that an application for approval of State significant infrastructure must be accompanied by a biodiversity development assessment report unless the proposed development is not likely to have any significant impact on biodiversity values. Clause 7.14(2) provides that, when determining an application in accordance with the EP&A Act, the Minister for Planning must take into account the likely impact of a proposed development on biodiversity values as assessed in the biodiversity development assessment report.	A biodiversity development assessment report was prepared (see Technical Paper 9) for the exhibited project, and potential biodiversity impacts are considered in Chapter 16 (Biodiversity) of the EIS. An Updated Biodiversity Development Assessment Report has been prepared as described in section 4.2 of the Response to Submissions. Potential biodiversity impacts of the amended project are considered in section 6.9 of this report.

Statutory requirement	Detail	Where addressed in the EIS/ Amendment Report
Other relevant Acts		
Marine Safety Act 1998	License under clause 97 of the Marine Safety Regulation 2016.	Section 4.2.1 of the EIS
Protection of the Environment Operations Act 1997	Environment protection licence to construct railway infrastructure.	Section 4.2.1 of the EIS
Roads Act 1993	Consent under section 138(1) to construct the bridge over Silverwater Road.	Section 4.2.1 of the EIS
Sydney Olympic Park Authority Act 2001	Roads within Sydney Olympic Park, which are not roads for the purposes of the *Roads Act 1993*, must be treated under section 40 of the *Sydney Olympic Park Authority Act 2001*.	Section 4.2.1 of the EIS

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Appendix D

Key issues raised during engagement on the amendments

NSW GOVERNMENT

Summary of key issues and findings from engagement for the proposed amendments

Table D.1 provides a summary of the key issues raised and the findings of engagement activities in relation to the proposed amendments.

Table D.1 Summary of key issues and findings from stakeholder and community engagement

Stakeholder or community group	Category	Finding or issue raised	Response
Camellia foreshore to Rydalmere alignment and bridge			
City of Parramatta Council	Amendment features	Recommendations for active transport connections to be provided as part of the project for Eric Primrose Reserve, including provision of a consolidated cycle and pedestrian path closer to the river foreshore.	Transport has incorporated Council's active transport link connections in the design presented in Figure 1.2 of Appendix A (Updated project description) of this report.
	Potential impacts – land use	Concern about the impact to the open space at Eric Primrose Reserve and support for an alternative alignment which runs immediately south of Antoine Street.	Transport considered a light rail alignment immediately south of Antoine Street during development of the Camellia to Rydalmere foreshore option and has presented the outcomes of this options analysis to the City of Parramatta Council. The suggested alignment south of Antoine Street would affect additional commercial and industrial properties, with the potential for full acquisition of about six additional commercial properties. The supply of commercial and industrial land in the area is limited, and it is unlikely that this number of businesses would be able to relocate locally, resulting in additional business impacts. This option was not preferred due to the land requirements and associated business impacts, which would not be consistent with Council planning documents, including the *City of Parramatta Employment Lands Strategy – Review and Update* (City of Parramatta Council, 2020). Design development has focused on minimising impacts on open space where possible, as well as improving the quality of open space directly affected by the project. Despite the loss of existing open space in Eric Primrose Reserve, there would be an increase in open space in Rydalmere overall as a result of the project, with additional areas provided around Antoine, Jean and John streets. The open space improvements proposed for the reserve include active transport links, landscaping and recreation facilities. The amended design balances offsetting the project's impacts on open space with minimising private land acquisition (including commercial properties), impacts on business operations, and impacts upon biodiversity.

Stakeholder or community group	Category	Finding or issue raised	Response
	Potential impacts – land use	Council plans to retain land between Eric Primrose Reserve and Antoine Street as part of Council's commercial land strategy.	The amended alignment would generally not directly impact the commercial / industrial properties between Eric Primrose Reserve and Antoine Street. However, the project's land requirements include three commercial / industrial properties east of Jean Street, which would impact Council's commercial land strategy.
	Potential impacts – flooding	Concern about the flooding immunity of the amended alignment and bridge location and mitigation proposed.	The project would result in some changes to flood behaviour, with impacts mostly limited to properties immediately adjacent the Parramatta River and nearby waterways. In accordance with mitigation measure W1, Transport has committed to undertaking further design refinement and modelling to achieve the flood management objectives and the flood immunity standards defined in section 5 of Technical Paper 10 (Hydrology, Flooding and Water Quality). Mitigation measure W1 has also been amended to confirm that the flood management strategy will be based on revised flood modelling, taking into account further design development and construction planning, and that design responses and management measures will be developed in consultation with affected landowners/landholders.
	Potential impacts – non-Aboriginal heritage	Opportunity for heritage interpretation in this area to include heritage columns which council has salvaged.	In accordance with mitigation measure NAH6, a heritage interpretation strategy will be developed to guide incorporating appropriate interpretation and integration of heritage in the design. The strategy will be developed in consultation with relevant stakeholders, including City of Parramatta Council. Further information is provided in mitigation measure NAH6 (see Appendix B (Updated mitigation measures) of this report).
	Justification and evaluation	Council supports the creation of an opportunity for people to connect with the river. Council advised they value contiguous areas of the park with flexibility for future improvements.	The amended light rail alignment follows the western and northern border of Eric Primrose Reserve, with a new contiguous area of open space provided east of Jean Street and south of Antoine Street.
Department of Planning and Environment (DPE)	Amendment features / Strategic context	Concern that the amended alignment in Camellia would service a smaller catchment and may necessitate the need for an additional stop further east, as heavy industrial land transitions to lighter industrial uses and urban services.	The Camellia foreshore to Rydalmere alignment and bridge amendment does not include changes to stop locations in Camellia; therefore, the stop catchment for the amended project is the same as the exhibited project. As described in section 6.3.1 of the EIS, the project has futureproofed space for a possible future stop at Camellia East. This stop may be constructed after the project commences operation based on demand and surrounding development.

Stakeholder or community group	Category	Finding or issue raised	Response
	Potential impacts – land use	Concern about reduced amount of open space along the foreshore, noting an opportunity for residual land to be repurposed as open space.	Design development has focused on minimising impacts on open space where possible, as well as improving the quality of open space directly affected by the project. Despite the loss of existing open space in Eric Primrose Reserve, there would be an increase in open space in Rydalmere overall as a result of the project, with additional areas provided around Antoine, Jean and John streets (see Figure 24 in Technical Paper 1 (Design, Place and Movement)). The open space improvements proposed for the reserve (see section 1.8.2 in the updated project description in Appendix A of this report) include active transport links, landscaping and recreation facilities. Along the Parramatta River foreshore the project would provide open space in the form of an active transport link that connects to the bridge between Camellia and Rydalmere and the Parramatta Valley Cycleway, which is consistent with the *Camellia-Rosehill Place Strategy* (DPE, 2022). The project would not result in residual land in the Camellia area.
	Amendment features	The interface between the project and active transport is critical.	The project would provide about 9.5 kilometres of new active transport links (footpaths, cycleways or shared paths) and connections to existing active transport links, including to the Parramatta Valley Cycleway at Rydalmere and Melrose Park, and to Louise Sauvage Pathway via the River Walk at Wentworth Point. In Camellia, the project would provide a new active transport link which would connect with the James Ruse Drive bridge in the west and the proposed bridge between Camellia and Rydalmere in the east.
	Potential impacts – biodiversity	Recommendation that the project consider the provision of a riparian buffer for the foreshore area.	The Camellia foreshore to Rydalmere alignment and bridge amendment would maintain a continuous corridor of mangrove vegetation along the southern foreshore, avoiding connectivity impacts on riparian vegetation in this area. The project has committed to the development of a habitat restoration and rehabilitation strategy which will include active revegetation of mangroves at the proposed bridges over the Parramatta River.
	Potential impacts – flooding	Recommendation that flooding impacts are managed to ensure operation of the project is not affected.	The project would result in some changes to flood behaviour, with impacts mostly limited to properties immediately adjacent the Parramatta River and nearby waterways. In accordance with mitigation measure W1, Transport has committed to undertaking further design refinement and modelling to achieve the flood management objectives and the flood immunity standards defined in section 5 of Technical Paper 10 (Hydrology, Flooding and Water Quality). Mitigation measure W1 has also been amended to confirm that the flood management strategy will be based on revised flood modelling, taking into account further design development and construction planning, and that design responses and management measures will be developed in consultation with affected landowners/landholders.

Stakeholder or community group	Category	Finding or issue raised	Response
	Outside scope	Concern that future developers in Camellia may advocate that a vehicle bridge be collocated with the light rail bridge.	The Camellia foreshore to Rydalmere alignment and bridge is consistent with the *Camellia-Rosehill Place Strategy* (DPE, 2022). Any future road connections in this area will be required to consider integrated transport solutions. Combining light rail with other modes in the same area would likely reduce the efficiency of light rail. The light rail alignment has been designed to service a local residential catchment and runs through industrial areas in Camellia and Rydalmere. These areas often have narrow streets that do not suit transport modes generating significant movements like roads and for private vehicles. In accordance with mitigation measure LP2, consultation with key stakeholders (including City of Parramatta Council and relevant developers) will be ongoing to ensure that the design of the project is integrated as far as practicable with adjoining developments, proposed developments and urban renewal areas. This will include identifying measures and design responses to manage the interface between the project and adjoining land uses and properties as far as reasonably practicable.
	Potential impacts – contamination	Recommendation that the project consider foreshore remediation works in Camellia, including the treatment of groundwater.	In accordance with mitigation measure CS1, additional investigations will be undertaken to inform the design, construction planning, and preparation of remediation action plan(s) (RAP(s)) (if required). Where a remediation action plan is required, it will be prepared and implemented in accordance with the *National Environment Protection (Assessment of Site Contamination) Measure 1999*¸ and reviewed by an independent site auditor to certify the appropriateness of the plan and that the site can be made suitable for the proposed use, in accordance with mitigation measure CS5.
Maritime NSW	Amendment features	No concerns were raised regarding this amendment.	Nil.
Residential property owners	Alternatives and options	Oppose property impacts as a result of the amended alignment. Suggested alternate alignments involving Park Road and South Street.	Information regarding route selection and refinement has been provided in Chapter 5 (Design development, alternatives and options) of the EIS and section 4.1 of the Amendment Report.
Antoine Street (commercial) property owners	Alternatives and options	Oppose property impacts as a result of the amended alignment and refutes benefits of this option. Suggested alternate alignments through Park Road, Eric Primrose Reserve and South Street.	Information regarding route selection and refinement has been provided in Chapter 5 (Design development, alternatives and options) of the EIS and section 4.1 of the Amendment Report.

Stakeholder or community group	Category	Finding or issue raised	Response
Guide Dogs NSW & ACT	Potential impacts – active transport	Request for separate cycle and pedestrian lanes. Request to be consulted through design phase.	Active transport links would be designed in accordance with the principles outlined in Technical Paper 1 (Design, Place and Movement), the project's urban design requirements, relevant guidelines and standards (including the *Guide to Road Design Part 6A: Paths for Walking and Cycling* (Austroads, 2017) and *AS 1428.1-2009 Design for access and mobility*), and crime prevention through environmental design principles. Further information regarding active transport links can be found in section 8.2.4 of the Response to Submissions.
Active transport groups	Potential impacts – active transport	Feedback on path width and separation. Request for active transport links to be on the waterside of the bridge.	
DPE Environment Heritage Group	Potential impacts – flooding	Request for additional Probable Maximum Flood (PMF) background to be included.	Flood modelling, addressing the PMF, is documented in Appendix A3 of Technical Paper 10 (Hydrology, Flooding and Water Quality). Amendment design impacts including the PMF for the reference design and proof of concept is incorporated in the Supplementary Flooding Report.
Bridge between Melrose Park and Wentworth Point			
City of Parramatta Council	Amendment features	Recommendation for further clarity regarding the active transport links within Archer Park.	A concept design for the Archer Park open space, including the active transport links that would be provided by the project, is provided in Figure 32 of the Supplementary Design, Place and Movement Report. These active transport links include a shared path on the bridge between Melrose Park and Wentworth Point, ramp connection to the Parramatta Valley Cycleway, and upgrades to a section of the cycleway.
		Concern that infrastructure, including extensive ramps and car parking spaces, will take over the open space at Archer Park.	The project would result in a net increase in open space, including active transport infrastructure, and would also provide improved open spaces and recreation facilities. The amended concept design for Archer Park includes improvements to this open space that focus on the main function of the park as providing access to the Parramatta River via Ermington Boat Ramp. These improvements include better access to and from the boat ramp, which would be consolidated with the road, improved access to trailer parking, a new amenities building, places for people to rest, and improved active transport connectivity, including upgrades to a section of the Parramatta Valley Cycleway. In developing the amendment design Transport has also sought to balance offsetting the project's impacts on open space with minimising private land acquisition, impacts on business operations, and impacts on biodiversity.
	Amendment features	Concern that shared user paths are narrow, with a request for two paths which are more than 4 metres wide or one path more than 5.5 metres wide.	The design of the amended bridge between Melrose Park and Wentworth Point includes a shared user path on the eastern side of the bridge that is more than 5.5 metres wide.

Stakeholder or community group	Category	Finding or issue raised	Response
	Potential impacts – hazards	Recommendation for further clarity regarding stormwater and other utilities in the vicinity of the works.	The location of all utilities, including stormwater, with the potential to be affected by the project would be confirmed in accordance with mitigation measure LP9. Where they are located within the project site, it may be necessary to: • relocate utilities with the potential to be directly affected by construction • provide physical protection for utilities that may be indirectly affected by vibration or accidental impact • modify construction methods to avoid impacting a nearby utility, such as by using smaller plant and equipment, hand excavation and compaction tools. Appropriate treatments would be confirmed during design development and construction planning in consultation with the utility provider/asset owner, and in accordance with relevant standards and requirements.
Sydney Olympic Park Authority	Amendment features	No direct concerns were raised regarding this amendment: however, Sydney Olympic Park Authority made recommendations regarding active transport connectivity, and environmental and contamination management in general.	Transport will ensure compliant environmental and contamination management by implementing the measures provided in Appendix B (Updated mitigation measures) of the Amendment Report. Further information regarding active transport links can be found in section 8.2.4 of the Response to Submissions.
Maritime NSW	Amendment features	Key features of the bridge were agreed between Maritime NSW and Transport, including the location of the bridge, bridge span lengths and the minimum clearance provided.	These features have been incorporated into the design and assessment as presented in this Amendment Report.
	Amendment features	Recommendations for Ermington Boat Ramp parking, including turning radii, and the length and width of parking.	Transport has further consulted with and sought Maritime NSW's agreement on the design specifications for Ermington Boat Ramp parking.
City of Ryde Council	Amendment features	Questions about bridge design, impacts to open space (Archer Park) and connectivity to the Parramatta Valley Cycleway.	Transport will continue to engage with City of Ryde on matters that relate to them and their constituents.

Stakeholder or community group	Category	Finding or issue raised	Response
	Outside scope	Recommendations for ongoing engagement between Transport and City of Ryde through detailed design and construction phases.	Transport will continue to engage with City of Ryde on matters that relate to them and their constituents.
Local community groups (Melrose Park Residents Action Group, Waterfront Action Group, Lancaster Environment Group)	Amendment features	Request for the bridge to be relocated further west of Ermington Boat Ramp.	Transport representatives have met with local community members on several occasions to discuss their concerns and preference for an alternate alignment. At a technical briefing on 25 August 2023, Transport provided reasons why the bridge could not be located further to the west, including: • The potential for greater impacts on biodiversity as the northern bridge landing would extend through a larger area of mangrove/wetland vegetation and the southern bridge landing would directly encroach on the Newington Nature Reserve (gazetted under the *National Parks and Wildlife Act 1979*) and the State heritage-listed Newington Armament Depot and Nature Reserve. • Active transport connections to the north and south of the river (ramps to/from the bridge) would increase the project's footprint in the Millennium Parklands and/or private property that would need to be acquired. • Working below the high voltage electricity transmission lines in two locations would increase safety risks during construction. • The proposed Waratah Street light rail stop may need to be removed, which would be a poor transport outcome, particularly noting the growth predicted as part of the Melrose Park South Precinct. • The bridge would extend through a larger area of an existing electrical easement at Wentworth Point, which would create access issues for Ausgrid. • The bridge would also need to be longer resulting in an extended construction program. • An increased potential for flooding as a result of additional piers. Section 4.2.2 of the Amendment Report provides information on the justification for this amendment. Further information on the bridge between Melrose Park and Wentworth Point can also be found in section 8.2.3 of the Response to Submissions.

Stakeholder or community group	Category	Finding or issue raised	Response
	Amendment features	Questions around the viability of relocating the existing overhead high voltage electricity transmission lines and tower in Archer Park to improve visual amenity. Suggestions to incorporate this into the bridge or underground it beneath the Parramatta River.	Transport representatives have met with local community members on several occasions to discuss their concerns and considerations to relocate the existing overhead high voltage electricity transmission lines and tower. At a technical briefing on 25 August 2023, Transport provided the reasons why the overhead high voltage electricity transmission lines could not be incorporated into the bridge or installed underground beneath the Parramatta River. Section 4.2.3 of the Amendment Report provides information on the amended design where it proposed to remove and relocate the existing high voltage transmission tower in Melrose Park with three new poles of a similar height to the south and west of the existing tower. Further information can be found in section 8.2.3 of the Response to Submissions.
	Outside scope	Concern that the level of detail in the proposed amendments collateral was not detailed enough to make an informed decision.	Transport provided information in addition to the collateral through community engagement pop-up sessions and maintained open lines of communications through the project hotline for the community to ensure they were heard and provided with sufficient detail.
	Amendment features	Disputes some benefits and design aspects of the proposed bridge alignment including environmental (mangrove) impacts and bridge length / shape.	Further information on bridge alignment and impacts can be found in section 8.2.3 of the Response to Submissions.
	Outside scope	Claims that the EIS was misleading and the amended alignment was the Government's preferred option before EIS exhibition.	Further information on Transport's response to the adequacy of the EIS can be found in section 8.5.2 of the Response to Submissions.
Maritime stakeholders and the boating community	Outside scope	Oppose the closure of the Ermington Boat Ramp and car park.	Further information on the closure of the Ermington Boat Ramp can be found in sections 4.3.4 and 8.3.3 of the Response to Submissions.
	Outside scope	If the car park has to close, seeking clarity on the actions Transport is taking to offset the impacts or details of the exact mitigation measures.	Further information on the closure of Ermington Boat Ramp can be found in sections 4.3.4 and 8.3.3 of the Response to Submissions.
Guide Dogs NSW & ACT	Potential impacts – active transport	Request for separate cycle and pedestrian lanes. Request to be consulted through design phase.	Active transport links would be designed in accordance with the principles outlined in Technical Paper 1 (Design, Place and Movement), the project's urban design requirements, relevant guidelines and standards (including the *Guide to Road Design Part 6A: Paths for Walking and Cycling* (Austroads, 2017) and AS

Stakeholder or community group	Category	Finding or issue raised	Response
Active transport groups	Potential impacts – active transport	Feedback on path width and separation. Request for active transport links to be on the waterside of the bridge.	1428.1-2009 Design for access and mobility), and crime prevention through environmental design principles. Further information regarding active transport links can be found in section 8.2.4 of the Response to Submissions.
Property developer	Open space	Request to minimise the impact to open space at Archer Park.	The Supplementary Design, Place and Movement Report provides an update to the open space concepts. Further information on impacts to open space can be found in section 8.2.6 of the Response to Submission.
Wentworth Point resident	Bridge use	Suggests private vehicles should be allowed on the bridge.	Transport note that there is no current proposal for the bridge to be used by private vehicles.
Melrose Park resident	Visual impacts	Suggests incorporating green track and wire-free options on the bridge.	Transport note that a multi criteria analysis would be undertaken to assess the priority areas for wire free options. This would be done in conjunction with key stakeholders.
Hill Road - adjustments to bridge			
City of Parramatta Council	Amendment features	No concerns or recommendations were raised regarding this amendment	Nil
Sydney Olympic Park Authority	Potential impacts – biodiversity	Concerns about the impacts of the Hill Road bridge duplication (EIS project) on an existing frog pond to the west. Preference for the amended bridge design.	The amended Hill Road bridge results in a smaller project site footprint to the west of Hill Road. Sydney Olympic Park Authority's preference for the amended bridge design is noted.
	Amendment features	Advised that drainage to the west of Hill Road is more significant than that to the east	The amended Hill Road bridge design results in a smaller project site footprint to the west of Hill Road and a lesser impact upon the drainage and pond system to the west.
Wentworth Point resident	Alignment and traffic impacts	Suggestion to avoid Hill Road altogether or terminate the project on Grand Avenue.	Information regarding route selection and refinement has been provided in Chapter 5 (Design development, alternatives and options) of the EIS.

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Appendix E
Updated preliminary land requirements

NSW GOVERNMENT

E-1 Preliminary land requirements

As described in Chapter 13 (Land use and property) of the EIS and section 6.6 (Land use and property) of the Amendment Report, the project would require the use of land temporarily (during construction only) and permanently.

Table E.1 summarises the preliminary land requirements for the amended project, together with an indication ofhow land would be used. The land requirements have been estimated based on the design work undertaken to date, as described in Chapter 1 (Project description – infrastructure and operation) and Chapter 2 (Project description – construction) in Appendix A of the Amendment Report and have been updated to include the proposed amendments described in Chapter 4 the Amendment Report. The land requirements would continue to be refined during design development, construction planning and acquisition negotiations.

The table shows the updated preliminary permanent land requirements, which is land that would be required for the project's functional and operational infrastructure (as described in Chapter 1 of Appendix A (Updated project description) of the Amendment Report). This excludes land already owned by Transport for NSW and land that does not need to be acquired, such as land in existing road reserves that does not have a Lot/DP number. The permanent land requirements would commence prior to construction as land is acquired, to enable the project to be constructed. Table E.3 provides a list of properties previously required for the EIS that were listed in Appendix E (Preliminary land requirements) that have now been removed for the amended project.

As described in section 13.4.2 of the EIS, not all of the properties located within the project site would be affected by the project's land requirements. Properties that fall within the amended project site that are not affected by the project's land requirements (based on the current stage of the design process), are listed in Table E.2

Similar to other transport projects, the land that is acquired (as an outcome of the property acquisition process) to meet the project's land requirements could be more than the amount of land that is required to construct and operate the project's permanent infrastructure. The amount of land that needs to be acquired to meet the project's land requirements would be confirmed once the project isapproved and subject to acquisition negotiations.

In addition to the permanent land requirements, some land would be required during construction only to facilitate the construction process. The temporary land requirements are also shown in Table E.1.

Further information about the project's land requirements, the potential impacts of these requirements, and the property acquisition process, is provided in Chapter 13 of the EIS and in section 6.6 of the Amendment Report.

Table E.1 Updated indicative land requirements (preliminary – subject to confirmation)

Property details					Permanent land requirements		Temporary land requirements for construction only	
Ownership	**Lot details (Lot/DP unless specified)**	**Address**	**Zoning**	**Existing land use**	**Proposed future use**	**Type of requirement (partial/full)**	**Proposed use during construction**	**Type of requirement (partial/ full)**
Camellia/Rosehill								
NSW Govt	1/1248549	1R Grand Ave, Camellia	IN3 Heavy Industrial	Transport reserve	Active transport link	Partial	Construction activities	Partial
NSW Govt	11/603547	13a Grand Ave, Camellia	SP2 Infrastructure	Transport reserve	Track alignment	Partial	Construction compound	Partial
Private	1/421086	23 Grand Ave, Camellia	IN3 Heavy Industrial	Industrial	Permanent infrastructure	Full	Construction compound	Full
	2/421086	23 Grand Ave, Camellia	IN3 Heavy Industrial	Industrial			Construction compound	Full
Private	3/421086	27 Grand Ave, Camellia	IN3 Heavy Industrial	Transport reserve			Construction compound	Full
NSW Govt	1/1158371	27C & 27D Grand Ave, Camellia	B5 Business Development IN3 Heavy Industrial SP2 Infrastructure	Transport reserve	Active transport link	Partial	Construction activities	Partial
Rydalmere								
Council	2/623854	5 Park Road, Rydalmere	RE1 Public Recreation	Open space (Reid Park)	Track alignment and bridge	Partial	Construction activities	Partial
Private	676/15160	3 Park Road, Rydalmere	IN1 General Industrial	Industrial	Track alignment and open space	Full	Construction compound	Full
	677/15160	3 Park Road, Rydalmere	IN1 General Industrial	Industrial	Track alignment and open space	Full	Construction compound	Full
	678/15160	3 Park Road, Rydalmere	IN1 General Industrial	Industrial	Track alignment and open space	Full	Construction compound	Full
	679/15160	3 Park Road, Rydalmere	IN1 General Industrial	Industrial	Track alignment and open space	Full	Construction compound	Full

Property details					Permanent land requirements		Temporary land requirements for construction only	
Ownership	**Lot details (Lot/DP unless specified)**	**Address**	**Zoning**	**Existing land use**	**Proposed future use**	**Type of requirement (partial/full)**	**Proposed use during construction**	**Type of requirement (partial/ full)**
	680/15160	3 Park Road, Rydalmere	IN1 General Industrial	Industrial	Track alignment and open space	Full	Construction compound	Full
NSW Govt	968/752028	1A Jean Street, Rydalmere	W2 Recreational Waterways	Open space (Eric Primrose Reserve)	-	-	Construction compound	Partial
NSW Govt	969/752028	1A Jean Street, Rydalmere	RE1 Public Recreation	Open space (Eric Primrose Reserve)	-	-	Construction compound	Full
NSW Govt	681/15160	1 Park Road, Rydalmere	RE1 Public Recreation	Open space (Eric Primrose Reserve)	Track alignment and open space	Full	Construction compound	Full
NSW Govt	1/575846	1 Park Road, Rydalmere	W2 Recreational Waterways	Open space (Eric Primrose Reserve)	Track alignment, bridge and open space	Partial	Construction compound and activities	Partial
Council[1]	570/15160	62 John St, Rydalmere	RE1 Public Recreation	Open space (Eric Primrose Reserve)	Active transport link and open space	Full	–	–
Council[1]	1/235759	1 Jean St, Rydalmere	RE1 Public Recreation	Open space (Eric Primrose Reserve)	Track alignment and open space	Partial	Construction compound and activities	Partial
Private	100/776785	36 Antoine St, Rydalmere	IN1 General Industrial	Industrial	Track alignment and open space	Full	-	-
Private	1/776984	48 Antoine St, Rydalmere	IN1 General Industrial	Industrial	Track alignment, stop and open space	Full	-	-
NSW Gov	358/15160	49 Antoine St, Rydalmere	R2 Low Density Residential	Residential	Open space	Full	-	-
Private	571/15160	50 Antoine St, Rydalmere	IN1 General Industrial	Industrial	Track alignment	Full	-	-
Private	357/15160	13a John St, Rydalmere	R2 Low Density Residential	Residential	Active transport link, open space	Full	-	-

Property details					Permanent land requirements		Temporary land requirements for construction only	
Ownership	**Lot details (Lot/DP unless specified)**	**Address**	**Zoning**	**Existing land use**	**Proposed future use**	**Type of requirement (partial/full)**	**Proposed use during construction**	**Type of requirement (partial/ full)**
Private	625/15160	50 John St, Rydalmere	IN1 General Industrial	Industrial	Track alignment	Partial	-	-
Private	624/15160	52 John St, Rydalmere	IN1 General Industrial	Industrial	Track alignment	Partial	-	-
Private	620/15160	54 John St, Rydalmere	IN1 General Industrial	Industrial	Track alignment	Partial	-	-
	621/15160	54 John St, Rydalmere	IN1 General Industrial	Industrial	Track alignment	Partial	-	-
	622/15160	54 John St, Rydalmere	IN1 General Industrial	Industrial	Track alignment	Partial	-	-
	623/15160	54 John St, Rydalmere	IN1 General Industrial	Industrial	Track alignment	Partial	-	-
Private	619/15160	60 John St, Rydalmere	IN1 General Industrial	Industrial	Track alignment	Partial	-	-
NSW Govt	36/36565	93 South St, Rydalmere	R2 Low Density Residential	Residential	Road corridor	Partial	-	-
Private	351/1111782	95 South St, Rydalmere	R2 Low Density Residential	Residential	Road corridor	Partial	-	-
Private	352/1111782	95a South St, Rydalmere	R2 Low Density Residential	Residential	Road corridor	Partial	-	-
Private	34/36565	97 South St, Rydalmere	R2 Low Density Residential	Residential	Road corridor	Partial	-	-
Private	356/15160	98 South St, Rydalmere	R2 Low Density Residential	Residential	Track, active transport link, open space	Full	-	-

Property details					Permanent land requirements		Temporary land requirements for construction only	
Ownership	**Lot details (Lot/DP unless specified)**	**Address**	**Zoning**	**Existing land use**	**Proposed future use**	**Type of requirement (partial/full)**	**Proposed use during construction**	**Type of requirement (partial/ full)**
Private	32/36565	99 South St, Rydalmere	R2 Low Density Residential	Residential	Road corridor	Partial	-	-
NSW Gov	355/15160	100 South St, Rydalmere	R2 Low Density Residential	Residential	Substation	Full	-	-
Private	334/15160	140 South St, Rydalmere	R2 Low Density Residential	Residential	Road corridor	Partial	-	-
Private	333/15160	142 South St, Rydalmere	R2 Low Density Residential	Residential	Road corridor	Partial	-	-
NSW Govt	E/36567	166 South St, Rydalmere	R2 Low Density Residential	Residential	Road corridor	Partial	-	-
Private	304/15160	30 Dorothy St, Rydalmere	R2 Low Density Residential	Residential	Road corridor	Partial	-	-
Council	H/36567	31 Primrose Ave, Rydalmere	RE1 Public Recreation	Open space (Broadoaks Park)	-	-	Construction compound	Full
NSW Govt	65/36565	44 Primrose Ave, Rydalmere	R2 Low Density Residential	Residential	Road corridor	Partial	-	-
Council	33/36565	47a Fallon St, Rydalmere	R2 Low Density Residential	Vacant	Road corridor	Partial	-	-
Council	139/36565	47b Fallon St, Rydalmere	R2 Low Density Residential	Vacant	Active transport link	Full	-	-
NSW Govt	140/36565	49 Fallon St, Rydalmere	R2 Low Density Residential	Residential	Active transport link	Full	-	-
NSW Govt	141/36565	49 Fallon St, Rydalmere	R2 Low Density Residential	Residential	Active transport link	Full	-	-
Ermington								
Private	29/36566	172 South St, Ermington	R2 Low Density Residential	Residential	Active transport link	Full	-	-
NSW Govt	52/36566	35 River Rd, Ermington	R2 Low Density Residential	Residential	Track alignment	Full	-	-

Property details					Permanent land requirements		Temporary land requirements for construction only	
Ownership	**Lot details (Lot/DP unless specified)**	**Address**	**Zoning**	**Existing land use**	**Proposed future use**	**Type of requirement (partial/full)**	**Proposed use during construction**	**Type of requirement (partial/ full)**
NSW Govt	B/36566	28a Hilder Rd, Ermington	R2 Low Density Residential	Residential	Track alignment and stop	Partial	-	-
Private	134/36566	30 Hilder Rd, Ermington	R2 Low Density Residential	Residential	Track alignment	Full	-	-
Council	A/36566	31a Hilder Rd, Ermington	RE1 Public Recreation W1 Natural Waterways	Open space (Ken Newman Park)	Track alignment	Partial	Construction compound and activities	Partial
Private	100/ 1229686	32 Hilder Rd, Ermington	R2 Low Density Residential	Residential	Stop	Full	-	-
Private	101/ 1229686	32a Hilder Rd, Ermington	R2 Low Density Residential	Residential	Stop	Full	-	-
Private	11/1229563	31 Broadoaks St, Ermington	R2 Low Density Residential	Residential	Road corridor	Full	-	-
Private	1/1247639	4 Boronia St, Ermington	R2 Low Density Residential	Residential	Road corridor	Partial	-	-
NSW Govt	456/16184	6 Boronia St, Ermington	R2 Low Density Residential	Residential	Road corridor	Partial	-	-
Private	12/35502	30 Boronia St, Ermington	R2 Low Density Residential	Residential	Road corridor	Partial	-	-
Private	532/16184	38 Boronia St, Ermington	R2 Low Density Residential	Residential	Road corridor	Partial	-	-
Private	423/16170	45 Boronia St, Ermington	R2 Low Density Residential	Residential	Road corridor	Partial	-	-
NSW Govt	604/16170	66 Boronia St, Ermington	R2 Low Density Residential	Residential	Road corridor	Partial	-	-
NSW Govt	2/1036134	61 Atkins Rd, Ermington	IN1 General Industrial	Residential	Track alignment and stop	Full	-	-

Property details					Permanent land requirements		Temporary land requirements for construction only	
Ownership	**Lot details (Lot/DP unless specified)**	**Address**	**Zoning**	**Existing land use**	**Proposed future use**	**Type of requirement (partial/full)**	**Proposed use during construction**	**Type of requirement (partial/ full)**
NSW Govt	1/1036134	61a Atkins Rd, Ermington	IN1 General Industrial	Vacant	Track alignment and stop	Full	-	-
Private	2/339645	63 Atkins Rd, Ermington	IN1 General Industrial	Industrial	Track alignment and stop	Full	-	-
Private	2/1061032	2b Hope St, Ermington	IN1 General Industrial	Industrial	Stop and open space	Full	-	-
	3/1061032	65 Atkins Rd, Ermington	IN1 General Industrial	Industrial	Stop and open space	Partial	Construction compound	Partial
Private	1/128574	64 Hughes Ave, Ermington	IN1 General Industrial	Residential	Track alignment	Full	-	-
Private	F/369480	77 Hughes Ave, Ermington	R2 Low Density Residential	Residential	Track alignment	Full	-	-
Private	11/3370	78 Hughes Ave, Ermington	IN1 General Industrial	Industrial	Road	Partial	Construction compound and activities	Full
Private	1/1061032	2c Hope St, Ermington	IN1 General Industrial	Commercial	Stop and open space	Partial	Construction compound	Partial
Melrose Park								
Private	G/369480	19 Hope St, Melrose Park	IN1 General Industrial	Industrial	Track alignment	Partial	-	-
Private	7/232929	27 Hope St, Melrose Park	IN1 General Industrial	Industrial	Track alignment	Partial	-	-
Private	E/376231	29 Hope St, Melrose Park	IN1 General Industrial	Industrial	Track alignment	Partial	-	-
Private	F/376231	31 Hope St, Melrose Park	IN1 General Industrial	Industrial	Track alignment	Partial	-	-

Property details					Permanent land requirements		Temporary land requirements for construction only	
Ownership	**Lot details (Lot/DP unless specified)**	**Address**	**Zoning**	**Existing land use**	**Proposed future use**	**Type of requirement (partial/full)**	**Proposed use during construction**	**Type of requirement (partial/ full)**
NSW Govt	1/528878	2 Waratah St, Melrose Park	W2 Recreational Waterways RE1 Public Recreation	Open space (Archer Park)	Track alignment and bridge	Partial	Construction compound	Partial
	35/86234	2 Waratah St, Melrose Park	IN1 General Industrial W2 Recreational Waterways	Open space (Archer Park)	Stop and open space	Partial	Construction compound	Partial
	34/86234	2 Waratah St, Melrose Park	IN1 General Industrial W2 Recreational Waterways	Open space (Archer Park)	Stop and open space	Partial	Construction compound	Partial
Private	100/853170	30 Waratah St, Melrose Park	IN1 General Industrial	Industrial	Track alignment	Partial	-	-
Private	101/1249762	84 Wharf Rd, Melrose Park	IN1 General Industrial	Residential	Track alignment	Partial	-	-
	100/1249762	Hope St, Melrose Park	IN1 General Industrial	Residential	Track alignment and stop	Partial	-	-
Wentworth Point								
Private	1/270778	Wentworth Point	DM Deferred Matter	Transport reserve	Road corridor	Partial	-	-
Sydney Olympic Park								
Private	3/735149	9 Hill Road, Sydney Olympic Park	C2 Environmental Conservation	Open space	Road corridor	Partial	-	-
Private	3/271278	Hill Rd, Sydney Olympic Park	B4 Mixed Use R4 High Density Residential RE1 Public Recreation	Residential	Track alignment and stop	Partial	Construction compound	Partial

Property details					Permanent land requirements		Temporary land requirements for construction only	
Ownership	**Lot details (Lot/DP unless specified)**	**Address**	**Zoning**	**Existing land use**	**Proposed future use**	**Type of requirement (partial/full)**	**Proposed use during construction**	**Type of requirement (partial/ full)**
SOPA	3020/ 879226	Hill Rd, Sydney Olympic Park	C2 Environmental Conservation C3 Environmental Management	Open space (Millennium Parklands (Woo-la-Ra and Narawang Wetland))	Track alignment and stops	Partial	Construction compound	Partial
SOPA	8/735225	Bennelong Pkwy, Sydney Olympic Park	C2 Environmental Conservation	Open space (Millennium Parklands (Parklands Junction))	Road corridor	Partial	-	-
SOPA	2006/ 878356	Holker Street, Sydney Olympic Park	C2 Environmental Conservation	Transport reserve	Road corridor	Partial	-	-
SOPA	71/1191648	Australia Ave, Sydney Olympic Park	RE1 Public Recreation B4 Mixed Use C2 Environmental Conservation	Open space (Millennium Parklands (Parkland Junction Haslams Reach, Kronos Hill, The Brick Pit))	Road corridor, permanent infrastructure and stop	Partial	Construction compound	Partial
SOPA	77/1134933	Australia Ave, Sydney Olympic Park	B4 Mixed Use	Open space (Jacaranda Square)	Track alignment	Partial	-	-
NSW Govt	3/234663	Australia Ave, Sydney Olympic Park	C2 Environmental Conservation	Open space (Millennium Parklands (Parklands Junction))	Track alignment	Partial	Construction activities	Partial

Property details					Permanent land requirements		Temporary land requirements for construction only	
Ownership	**Lot details (Lot/DP unless specified)**	**Address**	**Zoning**	**Existing land use**	**Proposed future use**	**Type of requirement (partial/full)**	**Proposed use during construction**	**Type of requirement (partial/ full)**
Council	1025/ 875723	Australia Ave, Sydney Olympic Park	C2 Environmental Conservation B4 Mixed Use RE1 Public Recreation	Transport reserve	Track alignment	Partial	-	-
SOPA	16/1125680	11 Olympic Blvd, Sydney Olympic Park	B4 Mixed Use	Commercial (Novotel)	Road corridor	Partial	-	-
SOPA	2/1256423	13 Olympic Blvd, Sydney Olympic Park	B4 Mixed Use	Transport reserve (Station Square, Yulong Square, Cathy Freeman Park)	Track alignment and stop	Partial	-	-
SOPA	11/1125680	Olympic Blvd, Sydney Olympic Park	B4 Mixed Use	Transport reserve	Track alignment	Partial	-	-
SOPA	4/1259510	Dawn Fraser Ave, Sydney Olympic Park	B4 Mixed Use	Open space (Athletic Centre forecourt)	Track alignment	Partial	Construction compound and activities	Partial
SOPA	150/1108154	Herb Elliott Ave, Sydney Olympic Park	B4 Mixed Use	Mixed use (Abattoir Gardens)	Road corridor	Partial	-	-
SOPA	60/1191648	Sarah Durack Ave, Sydney Olympic Park	B4 Mixed Use	Transport reserve	Track alignment	Partial	Construction activities	Partial
SOPA	67/1191648	4 Edwin Flack Ave, Sydney Olympic Park	B4 Mixed Use	Transport reserve	Road corridor	Partial	-	-
SOPA	101/1191651	Edwin Flack Ave, Sydney Olympic Park	B4 Mixed Use	Transport reserve	Road corridor, permanent infrastructure	Partial	Construction compound	Partial

Property details					Permanent land requirements		Temporary land requirements for construction only	
Ownership	**Lot details (Lot/DP unless specified)**	**Address**	**Zoning**	**Existing land use**	**Proposed future use**	**Type of requirement (partial/full)**	**Proposed use during construction**	**Type of requirement (partial/ full)**
SOPA	102/1191651	Edwin Flack Ave, Sydney Olympic Park	B4 Mixed Use	Transport reserve	Road corridor	Partial	-	-
SOPA	4001/1004512	Edwin Flack Ave, Sydney Olympic Park	B4 Mixed Use	Open space (Stadium Australia Forecourt)	Track alignment	Partial	-	-
SOPA	20/1228905	Sydney Olympic Park	B4 Mixed Use	Transport reserve	Track alignment	Partial	-	-
Lidcombe								
Private	12/1217641	15 Carter St, Lidcombe	B2 Local Centre	Industrial	Road corridor	Partial	-	-
Council	730/1282166	2r Uhrig Rd. Lidcombe	B2 Local Centre	Transport reserve	Road corridor	Full	-	-
Private	9/1228764	4 Uhrig Rd, Lidcombe	RE1 Public Recreation	Mixed use	Road corridor	Partial	-	-
	8/1228764	6 Uhrig Rd, Lidcombe	B2 Local Centre RE1 Public Recreation	Mixed use	Stop and road corridor	Partial	-	-
	5/1228764	8 Uhrig Rd, Lidcombe	B2 Local Centre	Mixed use	Road corridor	Partial	-	-
Private	101/1239610	5 Uhrig Rd, Lidcombe	B2 Local Centre	Mixed use	Road corridor	Partial	-	-
Council	1/1121474	Uhrig Rd, Lidcombe	B2 Local Centre	Transport reserve	Road corridor	Partial	-	-
Council	2/1121474	Uhrig Rd, Lidcombe	B2 Local Centre	Transport reserve	Road corridor	Partial	-	-

Note:1. These lots form part of a single property (Eric Primrose Reserve). Lots within the reserve are owned by different land owners including Council and State government agencies

Table E.2 Properties within the amended project site not affected by the project's land requirements

Ownership	Lot details (Lot/DP unlessspecified)	Address
NSW Govt	1/910837	Grand Ave, Camellia
Private	218/15160	44 John St, Rydalmere
Private	219/15160	46 John St, Rydalmere
Private	561/16184	40 Boronia St, Ermington
Private	1/519737	32 Waratah St, Melrose Park
Private	7/511531	112 Wharf Rd, Melrose Park
	1/127049	112 Wharf Rd, Melrose Park
	2/127049	112 Wharf Rd, Melrose Park
	3/127049	112 Wharf Rd, Melrose Park
Private	1/270113	Wentworth Point
Private	1/270844	Wentworth Point
Private	SP90076	Wentworth Point
Private	1/270320	Wentworth Point
Private	1/271278	14 Hill Rd, Sydney Olympic Park
SOPA	4/1130359	2 Dawn Fraser Ave, SydneyOlympic Park
Council	102/1239610	5 Uhrig Rd, Lidcombe

Table E.3 Properties previously required for the EIS that are no longer part of the project's land requirements for the amended project

Property details					Permanent land requirements		Temporary land requirements for construction only	
Ownership	**Lot details (Lot/DP unless specified)**	**Address**	**Zoning**	**Existing land use**	**Proposed future use**	**Type of requirement (partial/full)**	**Proposed use during construction**	**Type of requirement (partial/ full)**
Camellia/Rosehill								
Private	3/542208	12 Grand Ave, Rosehill	IN3 Heavy Industrial	Industrial	Road corridor	Partial	-	-
Council	102/809340	14A Grand Ave, Camellia	IN3 Heavy Industrial	Transport reserve	Road corridor	Partial	-	-
Private	A/109063	16 Grand Avenue, Camellia	IN3 Heavy Industrial	Industrial	Road corridor	Partial	-	-
Private	B/347122	21 Grand Ave, Camellia	IN3 Heavy Industrial	Commercial	Permanent infrastructure	Full	-	-
Private	4/421086	29 Grand Ave, Camellia	SP2 Infrastructure	Transport reserve	Track alignment	Full	-	-
Private	1/856266	35 Grand Ave, Camellia	IN3 Heavy Industrial	Industrial	Track alignment	Partial	-	-
	23/874055	2-8 Thackeray St, Camellia	IN3 Heavy Industrial	Industrial	Track alignment	Partial	-	-
Private	1/539890	37 Grand Ave, Camellia	IN3 Heavy Industrial	Industrial	Track alignment	Partial	-	-
Private	2/539890	37a Grand Ave, Camellia	IN3 Heavy Industrial	Industrial	Track alignment and bridge	Partial	Construction compound and activities	Partial
NSW Govt	1/615549	41 Grand Ave, Camellia	IN3 Heavy Industrial	Transport reserve	Road corridor	Partial	-	-
Private	23/793243	3 Thackeray St, Camellia	IN3 Heavy Industrial	Industrial	Track alignment	Partial	-	-
Council	1/845322	12a Grand Ave, Rosehill	IN3 Heavy Industrial	Industrial	Road and corridor	Partial	-	-

Property details					Permanent land requirements		Temporary land requirements for construction only	
Ownership	**Lot details (Lot/DP unless specified)**	**Address**	**Zoning**	**Existing land use**	**Proposed future use**	**Type of requirement (partial/full)**	**Proposed use during construction**	**Type of requirement (partial/ full)**
Rydalmere								
NSW Govt[1]	561/15160	64 John St, Rydalmere	RE1 Public Recreation	Open space (Eric Primrose Reserve)	-	-	Construction compound	Partial
NSW Govt[1]	562/15160	64 John St, Rydalmere	RE1 Public Recreation	Open space (Eric Primrose Reserve)	-	-	Construction compound	Partial
NSW Govt[1]	563/15160	64 John St, Rydalmere	RE1 Public Recreation	Open space (Eric Primrose Reserve)	-	-	Construction compound	Partial
NSW Gov[t1]	564/15160	62A John St, Rydalmere	RE1 Public Recreation	Open space (Eric Primrose Reserve)	-	-	Construction compound	Partial
NSW Govt[1]	565/15160	62a John St, Rydalmere	RE1 Public Recreation	Open space (Eric Primrose Reserve)	-	-	Construction compound	Full
NSW Govt[1]	566/15160	62a John St, Rydalmere	RE1 Public Recreation	Open space (Eric Primrose Reserve)	-	-	Construction compound	Full
NSW Govt[1]	567/15160	62a John St, Rydalmere	RE1 Public Recreation	Open space (Eric Primrose Reserve)	-	-	Construction compound	Full
NSW Govt[1]	568/15160	62a John St, Rydalmere	RE1 Public Recreation	Open space (Eric Primrose Reserve)	-	-	Construction compound	Full
Council[1]	569/15160	62 John St, Rydalmere	RE1 Public Recreation	Open space (Eric Primrose Reserve)	-	-	Construction compound	Full
NSW Govt[1]	970/752028	John St, Rydalmere	RE1 Public Recreation W1 Natural Waterways	Open space (Eric Primrose Reserve)	Track alignment and bridge	Partial	Construction compound and activities	Partial

Property details					Permanent land requirements		Temporary land requirements for construction only	
Ownership	**Lot details (Lot/DP unless specified)**	**Address**	**Zoning**	**Existing land use**	**Proposed future use**	**Type of requirement (partial/full)**	**Proposed use during construction**	**Type of requirement (partial/ full)**
Ermington								
Melrose Park								
Private	1/519737	32 Waratah St, Melrose Park	IN1 General Industrial	Industrial	Track alignment and stop	Partial	-	-
Private	7/511531	112 Wharf Rd, Melrose Park	IN1 General Industrial	Industrial	Track alignment and stop	Partial	-	-
	1/127049	112 Wharf Rd, Melrose Park	IN1 General Industrial	Industrial	Track alignment and stop	Partial	-	-
	2/127049	112 Wharf Rd, Melrose Park	IN1 General Industrial	Industrial	Track alignment and stop	Partial	-	-
	3/127049	112 Wharf Rd, Melrose Park	IN1 General Industrial	Industrial	Track alignment and stop	Partial	-	-
Private	131/11903	151 Wharf Rd, Melrose Park	R2 Low Density Residential	Residential	Road corridor	Partial	-	-
Private	132/11903	153 Wharf Rd, Melrose Park	R2 Low Density Residential	Residential	Road corridor	Full	-	-
Private	133/11903	155 Wharf Rd, Melrose Park	R2 Low Density Residential	Residential	Road corridor	Full	-	-
Private	3/535959	157 Wharf Rd, Melrose Park	R2 Low Density Residential	Residential	Road corridor	Partial	Construction activities	Partial
Private	2/535959	159 Wharf Rd, Melrose Park	R2 Low Density Residential	Residential	Road corridor	Full	-	-

Property details					Permanent land requirements		Temporary land requirements for construction only	
Ownership	**Lot details (Lot/DP unless specified)**	**Address**	**Zoning**	**Existing land use**	**Proposed future use**	**Type of requirement (partial/full)**	**Proposed use during construction**	**Type of requirement (partial/ full)**
Private	SP50559	161 Wharf Rd, Melrose Park	R2 Low Density Residential	Residential	Road corridor	Full	-	-
Council	4/535959	163 Wharf Rd, Melrose Park	RE1 Public Recreation	Open space (Koonadan Reserve)	Track alignment and bridge	Partial	Construction activities	Partial
Transport for NSW	894/48459	Wharf Rd, Melrose Park	RE1 Public Recreation	Open space (Koonadan Reserve)	Track alignment and bridge	Full	-	-
Council	1/533323	84 Lancaster Ave, Melrose Park	RE1 Public Recreation	Open space (Koonadan Reserve)	Track alignment and bridge	Partial	Construction activities	Partial
Wentworth Point								
Sydney Olympic Park								
Lidcombe								

Note: 1. These lots form part of a single property (Eric Primrose Reserve). Lots within the reserve are owned by different land owners including Council and State government agencies

Transport
for NSW

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