

# Chapter 4

## Description of the amendments



## 4 Description of the amendments

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It is proposed to amend the following features of the project:

- Camellia foreshore to Rydalmere alignment and bridge
- Bridge between Melrose Park and Wentworth Point
- Bridge at Hill Road.

The proposed amendments are described in sections 4.1 to 4.3 and have also resulted in some project site adjustments.

Refinements to the project as described in the EIS have also been made as part of the ongoing development of the project since the EIS was exhibited. Refinements are changes that are consistent with the parameters of the project description in the EIS. For completeness however, these refinements have been considered in this amendment report.

The project refinements include a change to the location of the proposed traction power substation at Atkins Road and a revised estimate of the cut and fill volumes for project earthworks. Further information is provided in section 4.4.

The project with all proposed amendments and project refinements is referred to in this report as the amended project. The project description chapters provided in the EIS (Chapters 6 and 7) have been updated taking into account the proposed amendments and refinements and a consolidated, detailed description of the amended project is provided in Appendix A (Updated project description) of this report.

### 4.1 Camellia foreshore to Rydalmere alignment and bridge

#### 4.1.1 Exhibited project

In Camellia, the project alignment extended from just east of Grand Avenue North and continued east along the former freight rail (Sandown Line) corridor (the Sandown Line corridor) and Grand Avenue in Camellia. It then extended north via the proposed bridge across the Parramatta River to Rydalmere and continued north along John Street to a new light rail stop before turning into South Street. The alignment for this section was shown in Figure 6.1 and Figure 6.2 in Chapter 6 (Project description – infrastructure and operation) of the EIS.

The bridge proposed was a three-span, concrete box girder about 200 metres long with an active transport link on either side. One pier was located within the river just north of mangrove vegetation. The southern end of the bridge was located on existing industrial land to the north of Grand Avenue in Camellia. The northern end of the bridge was located within Eric Primrose Reserve and Rydalmere Wharf commuter car park to the south of John Street in Rydalmere.

A number of road and car park adjustment works were proposed, including realigning and signalling intersections on Grand Avenue and reconfiguring the Rydalmere Wharf commuter car park.

Two traction power substations were proposed in this area – one adjacent to Grand Avenue and west of Durham Street in Camellia (see Figure 6.1 of the EIS) and one near the John Street stop in Rydalmere (see Figure 6.2 of the EIS).

Land requirements in this area included council, NSW Government and privately-owned land.

The EIS also included a screening assessment for the Camellia foreshore to Rydalmere alignment option. The assessment, which is provided in Appendix D of the EIS, was undertaken to understand the potential environmental and community risks while Transport began a process of investigation and design development. This process considered urban design, constructability, land use and open space matters against the strategic directions of the final *Camellia–Rosehill Place Strategy* that was released by the Department of Planning and Environment in August 2022.

#### **4.1.2 Justification for the proposed amendment**

##### **Context of the amendment**

The development of corridor alternatives, alignment options and design development for the project has considered and responded to the various plans and strategies for the precincts as they have been prepared (see Chapter 5 (Design development, alternatives and options) of the EIS).

Camellia-Rosehill has been nominated as a State-shaping precinct, and the Department of Planning and Environment has been leading a strategic planning process to guide urban renewal over the next 20 years. The precinct is anticipated to include up to 15,400 jobs and 10,000 dwellings by 2041.

By providing improved public and active transport connections to the precinct, the project would assist in meeting the precinct's transport needs, and support strategic direction 3 of the *Camellia–Rosehill Place Strategy* to improve access and sustainable travel options. The amended alignment would provide additional interface with the river foreshore and land identified for public recreation compared with the EIS alignment. The active transport link proposed as part of the amended project in this area is consistent with the proposed land use and would deliver a component of the riverside active transport identified in the *Camellia–Rosehill Place Strategy*.

##### **What feedback did Transport receive on the exhibited project in this location?**

Feedback was received from key stakeholders and the community regarding the exhibited project and the amendment, which, as noted in section 4.1.1, was introduced in Appendix D of the EIS.

Regular interface meetings with City of Parramatta Council have been held since 2021 and are ongoing. These meetings included discussion of the Camellia foreshore to Rydalmere alignment and bridge.

In their submission Council stated that the base-case Camellia option (Camellia option 1 in section 5.4.2 of the EIS) is preferred and that the alternate Camellia to Rydalmere foreshore alignment (i.e. the amendment) would be supported by Council if it was located immediately south of Antoine Street in Rydalmere and not through Eric Primrose Reserve. Council also noted there were additional disadvantages of the proposed amendment beyond those described in Appendix D of the EIS, as described in section 6.2.2 of the Response to Submissions.

A number of submitters who own industrial properties in Camellia raised issues relating to the potential for heavy vehicle movements and proposed road closures along Grand Avenue during construction to impact on their business operations. Some submitters also raised concerns regarding access impacts on their property if the alignment was constructed along Grand Avenue.

A number of submitters supported the proposed Camellia foreshore to Rydalmere option described in Appendix D of the EIS as it would result in less impacts on industrial properties in Camellia, integrate better with Rydalmere Wharf, and avoid impacts on the Rydalmere Wharf commuter car park during construction.

Regular interface meetings with the Department of Planning and Environment team responsible for the Camellia-Rosehill precinct documents have also been held since 2015 and are ongoing to enable information sharing and integration between the project and the *Camellia-Rosehill Place Strategy*, including discussion of the Camellia foreshore to Rydalmere alignment and bridge and interactions with the strategy.

### **What further work has been undertaken since the EIS was exhibited?**

Transport has undertaken further investigations to determine the viability of the Camellia foreshore to Rydalmere option and further develop the design. These have included:

- flood modelling to inform the design of the alignment within Eric Primrose Reserve
- review of a number of bridge design options, including options associated with the location of piers within Parramatta River and Eric Primrose Reserve
- geotechnical, contamination and utility investigations
- consideration of the road geometry and intersection design particularly in Rydalmere.

### **How has Transport responded to the feedback received and further work undertaken?**

Further investigation has confirmed the viability of the Camellia foreshore to Rydalmere option and the design has been developed to a level consistent with a reference design. As such, the project has been amended to incorporate the Camellia foreshore to Rydalmere option presented in Appendix D of the EIS.

The proposed amendment at this location would better meet the project objectives, providing an enhanced customer experience and a safer pedestrian and cyclist environment, whilst also avoiding direct impacts on industrial properties along Grand Avenue.

Power studies for the project confirmed the need to provide traction power substations in Camellia and Rydalmere, with indicative locations nominated and assessed in the EIS. As part of developing the amendments, Transport has revised the locations of both substations closer to the amended alignment (see Figure E.1). The substations would be located and designed in accordance with relevant Australian Standards and the updated mitigation measures (see Appendix B).

### **Other advantages of the proposed amendment**

In addition to better aligning with the *Camellia-Rosehill Place Strategy* and the project objectives the proposed amendment would:

- be consistent with the proposed land uses under the *Camellia-Rosehill Place Strategy* (i.e. light rail, active transport and open space)
- offer improved access and sustainable travel options and choices compared to the alignment as described in the EIS, by:
  - providing an enhanced interchange as a result of the light rail stop being located closer to Rydalmere Wharf
  - improving the active transport links for cyclists and pedestrians, including new paths in areas nominated in the *Camellia-Rosehill Place Strategy* for future active transport
  - allowing a shorter journey time making public transport an attractive option
- deliver high quality place outcomes through:
  - improved access to the scenic foreshore
  - open space improvements to Eric Primrose Reserve

- avoiding bisecting the reserve by locating the alignment along the edge of Eric Primrose Reserve rather than introducing a new bridge abutment through a well-used section of the reserve (as per the exhibited project)
- avoid the need for removal of mature fig trees in Eric Primrose Reserve
- minimise the potential for interactions with industrial properties in Camellia by providing separation from Grand Avenue
- avoid several major utilities
- avoid impacts on the Eric Primrose Reserve amenities buildings and the Rydalmere Wharf car park during construction
- reduce impacts on F3 Parramatta River ferry services to and from Rydalmere as Rydalmere Wharf would not be directly impacted during construction of the bridge between Camellia and Rydalmere with no closures of the wharf required in addition to those associated with navigation channel closures
- require less clearing of mangroves adjacent to Parramatta River.

### 4.1.3 Description of the proposed amendment

Figure 4.1 shows the new alignment and bridge compared to the exhibited project.

The proposed infrastructure for the amendment includes:

- light rail track, which would be located in an off-road (separated) arrangement along the Sandown Line corridor, crossing over the proposed bridge along an alignment further west (about 450 metres upstream) than shown in the EIS, extending along the northern edge of Eric Primrose Reserve on a raised embankment, continuing in an on-road (segregated) corridor along John Street before turning east onto South Street
- a five-span, concrete bridge about 260 metres long, with the northern abutment now located within the Sandown Line corridor, and the southern abutment located within Eric Primrose Reserve to the south of Park Road
- three bridge piers within the Parramatta River and a fourth pier located on the riverbank at the southern end of Park Road
- an active transport link located on the western side of the bridge with a separate exit ramp off the bridge to connect with the Parramatta Valley Cycleway and local footpaths
- a light rail stop (the John Street stop) located closer to Rydalmere Wharf than shown in the EIS
- road network changes to Park Road (adjusted turning circle) and John Street, South Street and Antoine Street (changed traffic lanes and new signalisation)
- a traction power substation in Rydalmere, located on the corner of John Street and South Street rather than on the corner of John Street and Antoine Street as shown in the EIS
- a traction power substation on Grand Avenue in Camellia, located slightly east of the location shown in the EIS, in a property already nominated as part of the land requirements for the project
- public domain and open space improvements, such as landscaped areas in Eric Primrose Reserve, recreational facilities and adjustments to existing active transport links.

Constructing the amended alignment and bridge would generally involve the same activities as described in Chapter 7 (Project description – construction) of the EIS with the following changes:

- A construction compound at the eastern end of Grand Avenue would no longer be required.
- The location of the John Street construction compound would be revised to be situated in the western section of Eric Primrose Reserve.
- Partial road closures at Grand Avenue would not be required; however, the full closure of John Street (between South Street and Antoine Street) and Antoine Street (at the John Street intersection) may be required temporarily to facilitate construction works in this area.
- Cofferdams in the river would no longer be required.
- Rydalmere Wharf would not be directly impacted during construction as the new work area would be located further away from the wharf. As a result, no closures of the wharf would be required in addition to those that would be associated with the navigation channel closures.

Further information on the proposed amendment is provided in the updated project description chapters in Appendix A of this report.

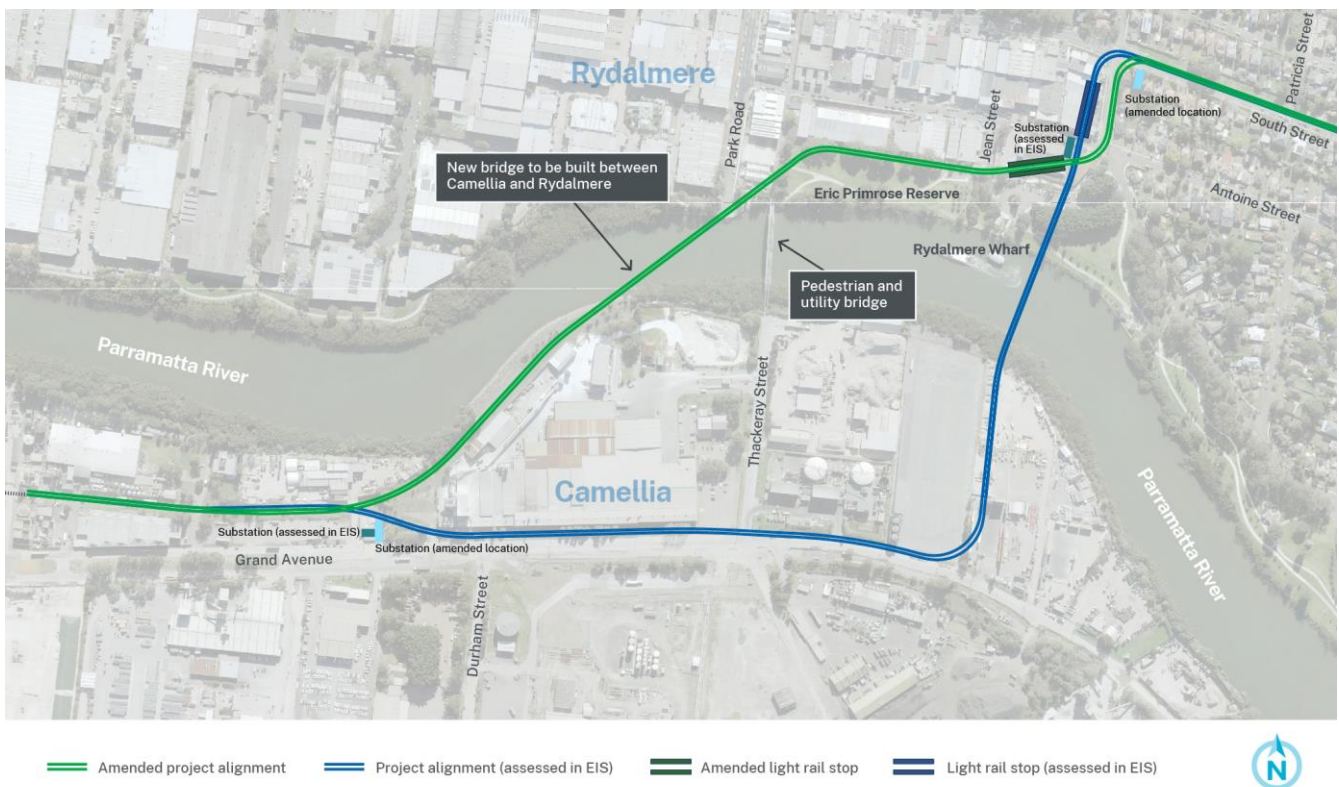


Figure 4.1 Camellia foreshore to Rydalmere alignment and bridge amendment

## 4.2 Bridge between Melrose Park and Wentworth Point

### 4.2.1 Exhibited project

In Melrose Park, the project alignment extended south from Hope Street along Waratah Street past a new light rail stop located adjacent to Archer Park, over the proposed bridge across the Parramatta River to Wentworth Point. The alignment then turned east to connect with Hill Road. The alignment for this section was shown in Figure 6.3 and Figure 6.4 in Chapter 6 (Project description – infrastructure and operation) of the EIS.

The proposed bridge described in the EIS was a six-span, concrete bridge about 320 metres long with an active transport link on either side and supported by three piers in the river. The northern end of the bridge was located at the southern end of Wharf Road to the east of the Ermington Boat Ramp in Melrose Park. The southern end of the bridge was located to the west of Sanctuary Wentworth Point and Hill Road.

A realignment of Wharf Road to connect under the new bridge structure was proposed.

It was also proposed to reconfigure the Ermington Boat Ramp car park, which would result in a loss of 10 boat trailer parking spaces.

Land requirements in this area included council land and privately owned land.

#### **4.2.2 Justification for the proposed amendment**

##### **What feedback did Transport receive on the exhibited project in this location?**

A number of submitters expressed concern about the proposed location of the bridge and a preference for it to be located further to the west. Concerns raised and comments made included:

- Residents would be greatly impacted by the bridge in its current location, particularly as a result of the need to acquire six properties.
- The proposed route would have a significant impact on residents of Melrose Park, especially those living in Wharf Road and also Lancaster Street.
- The existing downward incline on Waratah Street (towards Wharf Road) would need to be built up to allow traffic under the bridge to access Ermington Boat Ramp, which would contribute to visual impacts.
- There appears to be alternatives to enable the relocation of the bridge approaches further to the west. Our strong preference is for the bridge to be located further to the west of both the locations shown in the EIS (including in Figure 5.6).
- The alternative route is a much better planning outcome, more environmentally sensitive, less disruptive to existing public infrastructure (the boat ramp facilities and the Parramatta River pedestrian/cycleway) and existing residential development in the area.
- The proposed route would impact on property values and cause impacts such as the amplification of noise, vibration and light relating to waterfront properties located in the vicinity of a light rail bridge.
- The impacts of the bridge crossing could be partly minimised by having the bridge crossing further west of Ermington Boat Ramp. A route similar to that proposed by the Melrose Park Residents Action Group is supported. This route is also supported by a number of other boating, fishing and community groups.

Further information on issues raised in submissions is provided in sections 6.3.3 and 8.2.3 of the Response to Submissions.

##### **What further work has been undertaken since the EIS was exhibited?**

Transport has undertaken further review of feasible alignment and bridge options between Melrose Park and Wentworth Point. The review included consideration of the following:

- alignment options for an amended bridge location
- relocation options for the transmission lines, including the potential to incorporate the lines into, or as part of, the new bridge, or to underground the transmission lines
- construction options for the bridge superstructure.

## Bridge alignment options

The alignment options considered included one about 50 metres west as shown in Figure 5.25 of the EIS and one further west of Ermington Boat Ramp as suggested by some submitters during the EIS exhibition period.

The review confirmed the viability of a bridge option about 50 metres further west, as it would avoid direct property impacts to Wharf Road properties but still accommodate the southern bridge landing in a similar position to the exhibited project, which would allow for integration with the Sanctuary Wentworth Point development. This option would also maintain the desired transport outcomes and could be constructed using a methodology consistent with the exhibited project within a similar footprint.

The option for a bridge further west of the Ermington Boat Ramp was not considered viable for a range of reasons, which are discussed below.

A bridge further west of the boat ramp would have the potential for additional biodiversity, land use, heritage and property impacts, including:

- The northern bridge landing would extend through a larger area of mangrove/wetland vegetation.
- 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.
- The active transport link connections (i.e. ramp connections to the bridge) would also likely increase the project's footprint in the Millennium Parklands and/or private property that would need to be acquired.
- Construction of a bridge further west of the boat ramp would still require the use of Archer Park as a compound to construct, prefabricate and launch the bridge as there remains space constraints to the south of the river. This would likely result in major impacts on the parking area at the boat ramp.

A bridge further west of the boat ramp would likely require the removal of the Waratah Street stop, as there would be no space available to the north of the river for a stop within the road reserve of Waratah Street or within the mangrove area to the south. This would result in a distance of about 1.5 kilometres between the Melrose Park and Footbridge Boulevard stops and a poor transport outcome, particularly noting the growth predicted as part of the Melrose Park South Precinct.

The significant interface with the overhead high voltage electricity transmission lines, along with the need to maintain the necessary navigational channel clearance, would present construction challenges and operational risks. For example:

- working below the transmission lines in two locations would increase safety risks during construction
- the bridge would extend through a larger area of an existing electrical easement at Wentworth Point, which would create access issues for Ausgrid.

A bridge further west of the boat ramp would also need to be longer than the proposed bridge length and require more piers in the river, which would:

- extend the construction program by about one year
- increase the potential for impacts on navigation and river access
- increase the potential for flooding – a high level flooding assessment indicated that flooding impacts (afflux) could be greater than 10 millimetres as a result of the additional piers.



## Transmission lines

As part of the review, options to underground or incorporate electrical wiring into the bridge design were also considered but are not preferred at this stage. However, an option to relocate the existing transmission tower and replace it with three poles was confirmed, allowing for the 50 metres further west bridge option to be progressed.

## Construction options for the bridge superstructure

Further information regarding the outcomes of Transport's investigations into construction methods for the bridge is provided in section 4.2.2 of the Response to Submissions.

## How has Transport responded to the feedback received and further work undertaken?

Transport is proposing to amend the alignment and locate the bridge further to the west (50 metres further west of the location described in the EIS) to avoid direct impacts (i.e. acquisition) on six residential properties on Wharf Road.

## Other advantages of the proposed amendment

Other advantages of this amendment compared to the exhibited project include:

- it would avoid ground disturbing works in an area identified in the EIS as having the potential for State significant archaeology
- it would reduce the amount of clearing of mangroves and saltmarsh vegetation and would reduce indirect impacts from shading
- it would result in a reduced gradient of the bridge resulting in an improved experience for pedestrians and cyclists.

## 4.2.3 Description of the proposed amendment

Figure 4.2 shows the new location of the bridge compared to the exhibited project.

The proposed infrastructure for the amendment includes:

- light rail track, which would be located in on-road (segregated) corridor along Waratah Street, continuing through Archer Park in an off-road (separated) corridor, crossing over the proposed bridge along an alignment further west than shown in the EIS, and extending around Sanctuary Wentworth Point in off-road (separated) corridor before connecting to Hill Road
- a six-span, concrete bridge about 320 metres long between abutments, with the northern abutment now located within Archer Park to the north of the Ermington Boat Ramp, and the southern abutment remaining to the west of Sanctuary Wentworth Point
- three bridge piers within the Parramatta River, located slightly upstream of the locations shown in the EIS
- an active transport link located on the eastern side of the bridge
- a light rail stop (the Waratah Street stop) located slightly north of the location shown in the EIS.

To accommodate the amended alignment and bridge the following adjustments are also proposed:

- car park configuration and access changes to Ermington Boat Ramp resulting in a reduction of 10 boat trailer parking spaces and the permanent closure of Waratah Street between the existing boat ramp parking and Wharf Road (about 110 metres)
- removing and replacing 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

- relocating the existing amenities building to a new location within Archer Park (if required).

Constructing the amended bridge would generally involve the same activities described in Chapter 7 (Project description – construction) of the EIS with the following changes:

- Cofferdams in the river would no longer be required.
- Works associated with removing and replacing the existing high voltage transmission tower in Melrose Park would now be required.
- The section of the Parramatta Valley Cycleway along Waratah Street and through Archer Park to Koonadan Reserve would need to be closed for up to three years to facilitate construction of the Waratah Street stop and the bridge. During the closure, a detour about 300 metres long would be provided for pedestrian and cyclists via Mary Street, Wharf Road, Andrew Street and Lancaster Avenue.
- A section of the River Walk at Wentworth Point would need to be closed for up to two years to establish a temporary work platform for bridge works. During the closure, a detour about 515 metres long would be provided for pedestrian and cyclists via Hill Road and Louise Sauvage Pathway.

Further information on the proposed amendment is provided in the updated project description chapters in Appendix A of this report.



Figure 4.2 Melrose Park to Wentworth Point bridge amendment

## 4.3 Bridge at Hill Road

### 4.3.1 Exhibited project

The bridge at Hill Road was proposed be retained and duplicated, with a new bridge provided for light rail vehicles on the western side of the existing bridge. The bridge proposed was a single span, concrete structure, about 20 metres long and 12 metres wide, of a similar height to the existing bridge.

The light rail running corridor was to be angled slightly from Hill Road over about 130 metres on either side of the bridge. The running corridor would have operated in an off-road (separated) arrangement. Retaining structures on the western side were required to manage the differences between the existing ground level and light rail alignment.

Minor works may have been required to the existing bridge to comply with relevant standards.

### **4.3.2 Justification for the proposed amendment**

#### **What feedback did Transport receive on the exhibited project in this location?**

In meetings with Transport and in their agency advice Sydney Olympic Park Authority expressed concern regarding the potential impacts on Narawang Wetland and mapped Green and Golden Bell Frog habitat, including impacts on the constructed breeding ponds located west of the bridge at Hill Road. Sydney Olympic Park Authority requested that the project seek to avoid a footprint that intrudes into Green and Golden Bell Frog habitat.

In addition, DPE Environment and Heritage Group required further information and confirmation regarding whether the bridge works at Hill Road would result in any temporary and permanent impacts on Green and Golden Bell Frog habitat, due to the removal of Narawang Wetland ponds N22 and N17. It is noted that removal of the ponds was not proposed as part of the exhibited project; however, the biodiversity assessment undertaken as part of the EIS (Technical Paper 9 (Biodiversity Development Assessment Report)) assessed potential impacts on the ponds due to the proximity of the proposed works and recommended that impacts on the Narawang Wetland and Green and Golden Bell Frog habitat be minimised.

#### **What further work has been undertaken since the EIS was exhibited?**

Transport has undertaken further consultation with Sydney Olympic Park Authority with the aim of minimising impacts on Green and Golden Bell Frog habitat. With this aim in mind Transport investigated alternative options for the bridge at Hill Road that would provide the level of infrastructure needed within a reduced footprint. Options considered included:

- duplication of the bridge to the east of the existing bridge
- removal of the existing bridge and replacement with a new bridge.

Transport has also undertaken a constructability review of the works associated with the bridge at Hill Road, with the aim of minimising potential impacts on traffic during construction. The review considered two road closure scenarios (a full road closure of about four months, or partial closures of about one year with some instances of full road closures). As a result of this review, it is expected that traffic arrangements during construction would consist of a combination of road closures at the bridge and contraflow arrangements.

#### **How has Transport responded to the feedback received and further work undertaken?**

Transport is amending the project to include removing the existing bridge at Hill Road and constructing a new bridge. The new bridge would accommodate road traffic and light rail vehicles in an on-road (segregated) running corridor.

The project site boundary has been revised with a reduced area of impact on the western side of Hill Road (at Narawang Wetland) and a small increase on the eastern side (at Nuwi Wetland) to accommodate the new bridge arrangement. This amendment would avoid direct impacts on existing ponds at Narawang Wetland, which are an important habitat for the Green and Golden Bell Frog, Latham's Snipe and other local fauna.

#### **Other advantages of the proposed amendment**

Other advantages of this amendment compared to the exhibited project include:

- The new bridge would have a 100-year design life, which is longer than what would have been for the modified bridge (as described in the EIS) along with a reduced risk of non-compliance to engineering standards compared with modifying an existing bridge.
- The new bridge would achieve compliance on flood immunity and performance.

- The new bridge would avoid direct impacts on an existing flood control weir located on the western side of the bridge.

A minor increase to the project site boundary at the Hill Road and Holker Busway intersection is also proposed to allow for flexibility during design development to progress an intersection arrangement that would minimise operational impacts on the local road network (for example providing space for an additional left turn lane).

### **4.3.3 Description of the proposed amendment**

Figure 4.3 shows the new bridge compared to exhibited project.

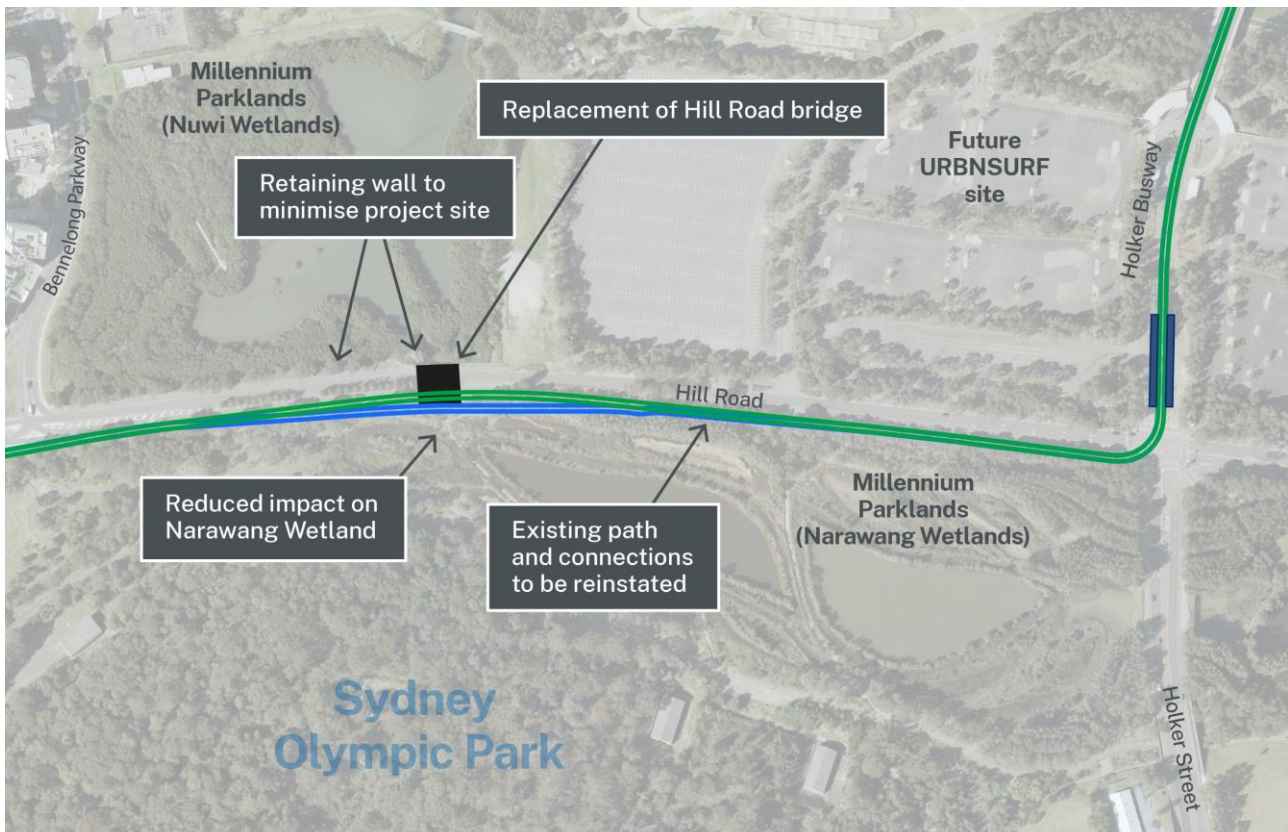
The proposed infrastructure for the amendment includes:

- construction of a new single span, concrete bridge structure, about 20 metres long and 29 metres wide
- light rail tracks in each direction on the western side of the bridge, with two traffic lanes in each direction in the centre of the bridge and an active transport link on the eastern side
- a retaining structure on the eastern side of Hill Road to manage the differences between the existing ground level and light rail alignment (up to about 2.7 metres high)
- reinstatement of existing active transport connections
- utility relocation and adjustments.

Construction of the new bridge at Hill Road would generally involve the same activities described in Chapter 7 (Project description – construction) of the EIS with the following changes:

- The existing Hill Road bridge would be removed.
- Additional temporary traffic changes would be required to facilitate bridge works (combination of short-term closures and contraflow arrangements).

Further information on the proposed amendment is provided in the updated project description chapters in Appendix A of this report.



- Amended project alignment
- Project alignment (assessed in EIS)
- Bridge
- Light rail stop



Figure 4.3 Bridge at Hill Road amendment

## 4.4 Project refinements

### 4.4.1 Substation location at Atkins Road stop

#### Exhibited project

Five traction power substations would be constructed to transform the electricity supplied by the existing distribution network to the required voltage. The EIS proposed a substation in Melrose Park, immediately south-east of the Atkins Street stop (see Figure 6.3 of the EIS).

#### Description of the proposed refinement

As part of design development, the substation in Melrose Park is proposed to be relocated to provide more direct access for maintenance vehicles, improve pedestrian connectivity, and avoid future conflicts with pedestrian links proposed as part of the *Melrose Park Southern Structure Plan* (City of Parramatta Council, 2019).

The proposed substation location is now about 50 metres further east, adjacent to Hughes Avenue. The relocated substation is within the project site boundary. The substation's purpose and infrastructure remains the same as described in section 6.7.4 of the EIS.

The substation location assessed in the EIS and the proposed refinement to this location are shown in Figure 4.4.

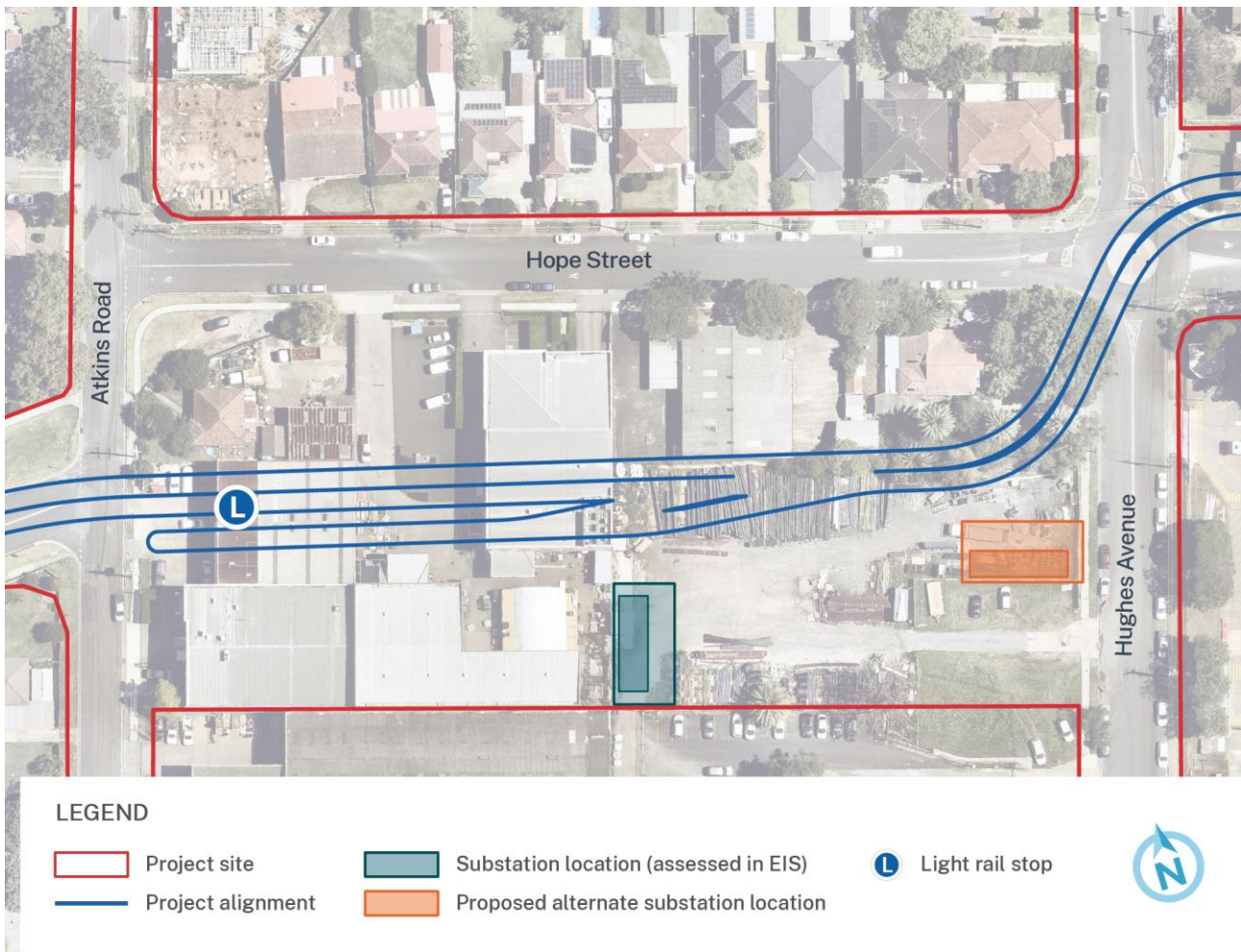


Figure 4.4 Refinement of substation location at Atkins Road stop

#### 4.4.2 Estimate of cut and fill volumes

##### Exhibited project

Section 7.3.5 of the EIS discussed earthworks for the project that would be required to construct various infrastructure. Table 7.1 of the EIS provided an estimate of the cut and fill material by precinct. Overall, there was estimated to be a surplus of about 73,000 cubic metres.

##### Description of the proposed refinement

As a result of further design development, the estimated cut and fill volumes have been revised and are presented in section 2.3.5 of Appendix A (Updated project description) of this report. This included updating cut and fill calculations, which were previously based on a two-dimensional design, with an updated three-dimensional design. The updated volumes have also considered the proposed amendments.

It is now estimated that there would be a deficit of about 91,600 cubic metres of structural fill that would need to be imported during construction.

## 4.5 Comparison against the project as exhibited

### 4.5.1 Design features and operation

A summary of the amended project's operational features compared with those of the exhibited project (as listed in Table 6.1 of the EIS) is provided in Table 4.1. The key features of the amended project are shown on Figures 1.1 to 1.6 in Appendix A (Updated project description) of this report.

Table 4.1 Summary comparison of amendments against the project as exhibited

Project feature	Summary of the project as exhibited <sup>1</sup>	Summary of the amendments	Figure reference in Appendix A
<b>Infrastructure</b>			
Light rail track	<ul style="list-style-type: none"> <li>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</li> </ul>	<p>The amended project involves the construction of about 10 kilometres of dual light rail track; however, the alignment is proposed to be relocated at the following locations:</p> <ul style="list-style-type: none"> <li>Camellia foreshore to Rydalmere (including bridge over Parramatta River)</li> <li>bridge between Melrose Park and Wentworth Point</li> <li>bridge at Hill Road.</li> </ul>	Figure 1.1 to Figure 1.6
Light rail stops	<ul style="list-style-type: none"> <li>14 light rail stops</li> </ul>	<p>The amended project provides 14 light rail stops; however two stops are proposed to be relocated:</p> <ul style="list-style-type: none"> <li>the John Street stop is proposed to be relocated closer to Rydalmere Wharf</li> <li>the Waratah Street stop is proposed to be relocated slightly north of the location shown in the EIS.</li> </ul>	Figure 1.2 and Figure 1.4
Bridges over the Parramatta River	<ul style="list-style-type: none"> <li>bridge between Camellia and Rydalmere (about 200 metres long)</li> <li>bridge between Melrose Park and Wentworth Point (about 320 metres long)</li> </ul>	<p>The location of the bridge between Camellia to Rydalmere is proposed to be relocated about 450 metres west (upstream) of the location shown in the EIS. The bridge would be about 260 metres long.</p> <p>The location of the bridge between Melrose Park and Wentworth Point is proposed to be relocated about 50 metres west (upstream) of the location shown in the EIS. The bridge would be about 320 metres long between abutments.</p>	Figure 1.2 and Figure 1.4
Road overbridge	<ul style="list-style-type: none"> <li>bridge over Silverwater Road between Rydalmere and Ermington</li> </ul>	No change.	Figure 1.2
Other bridge works	<ul style="list-style-type: none"> <li>bridge in Ken Newman Park connecting to Boronia Street</li> </ul>	It is proposed to remove the existing bridge at Hill Road and construct a new bridge.	Figure 1.5



Project feature	Summary of the project as exhibited <sup>1</sup>	Summary of the amendments	Figure reference in Appendix A
	<ul style="list-style-type: none"> <li>• duplication of the existing bridge on Hill Road in Sydney Olympic Park</li> <li>• strengthening of the bridge on the Holker Busway in Sydney Olympic Park</li> </ul>		
Active transport links	<ul style="list-style-type: none"> <li>• about 8.5 kilometres of new active transport links (footpaths, cycleways or shared paths)</li> <li>• connections to existing active transport links, including to the Parramatta Valley Cycleway at Rydalmere and Melrose Park, and to Louise Sauvage Pathway at Wentworth Point</li> </ul>	About 9.5 kilometres of new active transport links is proposed as a result of the amendments. This includes an additional connection via the River Walk at Wentworth Point to the Louise Sauvage pathway.	Figure 1.1 to Figure 1.6
Public transport	<ul style="list-style-type: none"> <li>• 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</li> <li>• provision for bus access to the proposed bridge between Melrose Park and Wentworth Point</li> </ul>	The location of the John Street stop is proposed to be relocated closer to Rydalmere Wharf.	Figure 1.2
Changes to the road network	<ul style="list-style-type: none"> <li>• 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</li> <li>• 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</li> </ul>	<p>The Camellia foreshore to Rydalmere alignment and bridge would involve a change in the proposed alterations to the local road network. These include:</p> <ul style="list-style-type: none"> <li>• one new signalisation in Camellia would not be required</li> <li>• road network changes in Rydalmere (including to Park Road adjusted turning circle) and John Street, South Street and Antoine Street (changed traffic lanes and new signalisation)</li> </ul> <p>Waratah Street in Melrose Park would also be closed between the existing boat ramp parking and Wharf Road, about 110 metres west of its existing intersection with Wharf Road.</p>	Figure 1.1, Figure 1.2 and Figure 1.4
Other facilities and infrastructure to support operation	<ul style="list-style-type: none"> <li>• turnback facilities at Macquarie Street in the Parramatta CBD, at the Atkins Road stop in Melrose Park, near Jacaranda Square stop and at the Carter Street stop in Lidcombe</li> <li>• adjustments to the Parramatta Light Rail Stage 1 stabling and maintenance facility in Camellia</li> </ul>	<p>The locations of the traction power substations in Camellia and Rydalmere are proposed to be relocated to accommodate the proposed amendments.</p> <p>The Atkins Road traction power substation is also proposed to be refined to a location about 50 metres further east than shown in the EIS.</p>	Figure 1.1, Figure 1.2 and Figure 1.3

Project feature	Summary of the project as exhibited <sup>1</sup>	Summary of the amendments	Figure reference in Appendix A
	<p>to increase its operational capacity</p> <ul style="list-style-type: none"> <li>• five traction power substations (to convert electricity to a form suitable for use by light rail vehicles)</li> <li>• overhead wiring along most of the alignment</li> <li>• driver facilities within the Parramatta CBD and at the Carter Street stop</li> <li>• communications equipment, including poles with heights between 12 and 25 metres</li> </ul>		
Other public domain works and open space	<ul style="list-style-type: none"> <li>• public domain improvements at stop locations</li> <li>• open space improvements at Ken Newman Park and Archer Park, and new public open space around the Atkins Road stop</li> </ul>	<p>Open space improvements are proposed at Eric Primrose Reserve as a result of the Camellia foreshore to Rydalmere alignment and bridge amendment.</p> <p>Due to the amended alignment and reduced land requirements of the Melrose Park to Wentworth Point bridge, there is reduced opportunity for open space improvements in Archer Park.</p>	Figure 1.2 and Figure 1.4
<b>Operation</b>			
Alignment	<ul style="list-style-type: none"> <li>• 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</li> <li>• shared running with Parramatta Light Rail Stage 1 services for about three kilometres between Camellia and the Parramatta CBD</li> </ul>	The project would have travel times of around 29 minutes from the Carter Street stop in Lidcombe to the proposed Sandown Boulevard stop in Camellia, compared to 31 minutes for the exhibited project.	N/A
Hours of operation	<ul style="list-style-type: none"> <li>• light rail vehicles would operate from 5am to 1am, seven days a week</li> </ul>	No change.	N/A
Vehicle frequency	<ul style="list-style-type: none"> <li>• vehicles would arrive between every 7.5 and 15 minutes on weekdays, and between every 10 and 15 minutes on weekends and public holidays</li> </ul>	No change.	N/A

Note: 1. Features and description as per Table 6.1 in the EIS.

## 4.5.2 Construction

A summary of the amended project’s construction methodology compared with that of the exhibited project (as described in Chapter 7 (Project description – construction) of the EIS) is provided in Table 4.2. Unless otherwise stated in the amendments column of Table 4.2, the construction methodology would be the same as the exhibited project.

An updated project description chapter for construction is provided in Appendix A (Updated project description) of this report.

Table 4.2 Summary comparison of amended construction methodology against the project as exhibited

Project feature	Summary of the project as exhibited <sup>1</sup>	Summary of the amendments	Figure reference in Appendix A
Staging	N/A	Two stages now proposed: <ul style="list-style-type: none"> <li>• Stage A – bridge between Melrose Park</li> <li>• Stage B – main alignment.</li> </ul>	N/A
Program	<ul style="list-style-type: none"> <li>• construction would start in 2025</li> <li>• first passenger services in 2030/2031</li> </ul>	<ul style="list-style-type: none"> <li>• Stage A – early works and site establishment would start in 2024 and main construction would start in 2025</li> <li>• Stage B – construction would start in 2026</li> </ul>	Figure 2.1
Preparatory investigations	<ul style="list-style-type: none"> <li>• 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</li> </ul>	No change	N/A
Site establishment	<ul style="list-style-type: none"> <li>• installing environmental management controls</li> <li>• removing redundant buildings and structures</li> <li>• salvage Aboriginal objects</li> <li>• establishing compounds</li> <li>• supplying power, water, etc</li> <li>• vegetation removal</li> <li>• relocating, adjusting and protecting utilities and services</li> <li>• establishing temporary road, pedestrian and cyclist diversions</li> <li>• preparing work areas</li> <li>• remediation of contaminated land</li> </ul>	No change	N/A

Project feature	Summary of the project as exhibited <sup>1</sup>	Summary of the amendments	Figure reference in Appendix A
Main construction works	<ul style="list-style-type: none"> <li>light rail infrastructure – track work (civil works, track installation, overhead wiring, poles and street lighting) and stops</li> <li>bridge construction and strengthening works</li> <li>road works</li> <li>active transport links</li> <li>earthworks</li> <li>other infrastructure (modifications to stabling and maintenance facility, Macquarie Street turnback facility, substations, retaining walls)</li> </ul>	<ul style="list-style-type: none"> <li>coffer dams no longer required for bridges over Parramatta River</li> <li>change to the estimate of cut and fill volumes associated with earthworks (see Table 2.1 of Appendix A)</li> </ul>	N/A
Finishing, testing and commissioning	<ul style="list-style-type: none"> <li>finishing works (demobilising compounds; removing materials, waste, temporary fencing; rehabilitation of disturbed areas, landscaping; erecting signage and roadside furniture)</li> <li>testing and commissioning (testing infrastructure, electrical systems, substations, assembly and testing of light rail vehicles, line-wide testing, rectification of defects, operations tests)</li> </ul>	No change	N/A
Construction timing	<p>Primary project working hours:</p> <ul style="list-style-type: none"> <li>Monday to Friday: 7am to 7pm</li> <li>Saturday: 7am to 7pm</li> <li>Sundays and public holidays: 7am to 7pm</li> </ul> <p>Works outside the primary project working hours managed through an out-of-hours work protocol.</p>	No change	N/A
Construction resources and ancillary facilities	<ul style="list-style-type: none"> <li>temporary land requirements estimated at about 12.9 hectares</li> <li>15 construction compounds</li> <li>estimated workforce between 750 and 1,000 people</li> <li>plant and equipment</li> <li>construction materials</li> </ul>	<ul style="list-style-type: none"> <li>temporary land requirements estimated at about 12.1 hectares</li> <li>14 construction compounds (one compound at Grand Avenue east no longer required, and a change in location of the John Street compound to a location further west within Eric Primrose Reserve rather than using Rydalmere Wharf car park)</li> </ul>	Figure 2.8 and Figure 2.9

Project feature	Summary of the project as exhibited <sup>1</sup>	Summary of the amendments	Figure reference in Appendix A
Transport and access	<ul style="list-style-type: none"> <li>• heavy vehicle routes</li> <li>• construction traffic volumes</li> <li>• construction workforce parking</li> <li>• changes to transport networks and facilities</li> <li>• changes to maritime infrastructure and navigation</li> </ul>	<ul style="list-style-type: none"> <li>• changes to heavy vehicle routes at Rydalmere and Sydney Olympic Park</li> <li>• changes to construction traffic volumes</li> <li>• additional temporary traffic changes required to facilitate construction of the bridge at Hill Road</li> <li>• detour and realignment of the Parramatta Cycleway in Melrose Park and the River Walk in Wentworth Point for extended periods</li> <li>• closure of Rydalmere Wharf, commuter car park and adjacent footpaths no longer required</li> </ul>	Figure 2.10 and 2.11
Utilities and services	<ul style="list-style-type: none"> <li>• relocation of utilities</li> <li>• provide physical protection of utilities</li> <li>• modify construction methods to avoid impacts on nearby utilities</li> </ul>	<ul style="list-style-type: none"> <li>• the 132 kV electricity transmission line would be relocated at Melrose Park and retained at Wentworth Point</li> <li>• removal of high voltage tower in Archer Park at Melrose Park with the overhead wiring relocated to three new poles</li> </ul>	Figure 2.13 and 2.14