Part B

Sydney Olympic Park metro station

9

9.0 Sydney Olympic Park metro station

This chapter provides a description of Sydney Olympic Park metro station and its precinct during operation and construction of this proposal. This chapter also provides an assessment of potential impacts during operation and construction that relate to Sydney Olympic Park and identifies mitigation measures to address these impacts.

9.1 Overview

Sydney Olympic Park metro station would be located close to Olympic Boulevard and between Herb Elliott Avenue and Figtree Drive, and in close proximity to the Heritage Abattoir Precinct to the north.

The Sydney Olympic Park metro station precinct is characterised by mainly commercial properties – typically being office or retail, as well as educational facilities. High-density residential areas are also located nearby.

The broader Sydney Olympic Park metro station precinct is proposed to be a thriving urban centre with a vibrant mix of homes and jobs, as well as a premier destination for cultural, entertainment, recreational and sporting events.

9.1.1 Operation

The vision for Sydney Olympic Park metro station and its surrounds is for a thriving urban centre with a vibrant mix of homes and jobs and a premier destination for cultural, entertainment, recreation and sporting events.

Customers would access the metro station from the main proposed public space running north-south between Herb Elliott Avenue and Figtree Drive. In event mode, the station would also be accessed from the proposed public space to the west that would be connected to Olympic Boulevard.

When operational, Sydney Olympic Park metro station would support the creation of a new town centre and reinforce Sydney Olympic Park as a premier destination for major events. It would provide a new mass transit hub right in the heart of Sydney Olympic Park, substantially improving access for people across Sydney to major events at Sydney Olympic Park. It would also deliver new public domain integrating with the new Sydney Olympic Park town centre and substantially improve transport options and customer clearance times following major events.

A number of changes would be made to the local transport network to facilitate integration of the metro station, including new shared precinct streets and a bus interchange.

This proposal would improve the landscape character and visual amenity of the area due to the new metro station and the associated accessibility and placemaking outcomes. These improvements would also result in social benefits associated with increased accessibility to jobs, education and services and improved amenity, and some opportunities for local businesses such as increased passing trade.

The majority of intersections around Sydney Olympic Park metro station are anticipated to operate at the same level of service both with and without this proposal, however the potential for increased delays are forecast at some nearby intersections during the PM peak due to the anticipated kiss and ride trips.

Potential impacts associated with other environmental matters such as operational noise and vibration, non-Aboriginal heritage, groundwater, flooding, social and business would comply with the relevant criteria and/or be minor to negligible.

9.1.2 Construction

Major civil construction work including station excavation and tunnelling work at Sydney Olympic Park was assessed and approved under a previous Sydney Metro West planning application and does not form part of this proposal. This proposal includes the construction activities required to complete Sydney Olympic Park metro station, and associated precinct work required for the operation of Sydney Metro West.

Construction of Sydney Olympic Park metro station would require the continued use of the construction site established under the previous Sydney Metro West planning application. A minor area of additional footprint would be required for this proposal located near the Olympic Boulevard/Figtree Drive intersection to support the development of public domain. The proposed work is expected to have a total duration of about four years.

For the majority of construction there would be little change to the surrounding transport network. For example, existing pedestrian and cycle routes surrounding the Sydney Olympic Park metro station construction site would be maintained. Some sections of footpaths may require short-term closures, which may result in some minor additional travel times for pedestrians. Appropriate temporary diversions would be established to safely guide pedestrians around work zones.

During major events, key pedestrian thoroughfares would fall within the immediate vicinity of the Sydney Olympic Park metro station construction site, with the potential for conflicting desire lines between pedestrians and construction vehicles. These potential impacts would require mitigation measures or restrictions that would be determined in consultation with relevant agencies.

The M4 Western Motorway ramps/Hill Road intersection would see a temporary decline in performance during construction. Other nearby intersections would generally perform at the same level of service with or without construction traffic or operate with spare capacity with the addition of construction traffic. Potential impacts would be managed in accordance with the measures in Sydney Metro's Construction Traffic Management Framework (CTMF).

Noise levels at most receivers are predicted to comply with the noise management levels. Some intermittent moderate and high impacts would occur during a worst-case situation at the closest commercial and education receivers during the use of concrete saws. There would be periods when construction noise levels are much lower than the worst-case levels predicted and there would be times when no equipment is in use and no impacts occur. Low impacts are predicted at two residential receivers during the night. No sleep disturbance impacts are predicted. The Sydney Metro Construction Noise and Vibration Standard (CNVS) would be implemented to manage these temporary impacts.

Some additional vegetation clearing would be required within the additional footprint required for this proposal; however, vegetation removal would be limited to planted landscaping species, resulting in limited potential impacts to biodiversity.

Other key potential impacts during construction would include:

- temporary minor impacts to landscape character and visual amenity due to continued presence of construction work
- temporary low social impacts due to construction-related disruptions and potential amenity impacts
- temporary slight negative impacts to local businesses, mainly associated with changed traffic conditions and potential amenity impacts.

Potential impacts associated with other issues such as non-Aboriginal heritage, Aboriginal heritage, contamination, groundwater and flooding would be minor to negligible.

These impacts would be managed through the implementation of the Sydney Metro management frameworks and standard mitigation measures including the Construction Environmental Management Framework (CEMF), Overarching Community Communications Strategy (OCCS), CTMF and CNVS.

9.2 Station and precinct description

9.2.1 Design development

Development of the design has involved ongoing consultation with stakeholders and the Design Advisory Panel. This has included:

- feedback as part of submissions and consultation associated with the *Sydney Metro West Environmental Impact Statement –Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a)
- ongoing meetings and design workshops held with Sydney Olympic Park Authority and NSW Department of Planning and Environment since exhibition of the *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a)
- meetings and advice from the Design Advisory Panel.

Key features or changes to the design to avoid or minimise impacts, and respond to feedback from stakeholders and the Design Advisory Panel include:

- provision of two side platforms (in addition to an island platform) – to provide increased capacity for additional customers during major events (event mode operations)
- provision of two dedicated event mode entries – to provide increased capacity and separate customer flows during events
- a plaza – to control event mode crowds from the west of the station while also providing a fine-grained pedestrian network to the new town centre to the east. This responds to feedback from the Design Advisory Panel and Sydney Olympic Park Authority
- removal of the northern entry on Dawn Fraser Avenue with a preference for customers to make this connection aboveground on the street network. This also avoids potential impacts to the heritage listed Abattoir.

9.2.2 Station design

The indicative layout and key design elements of Sydney Olympic Park metro station are shown in Figure 9-1, with a long-section and cross-section shown in Figure 9-2 and Figure 9-3 respectively. The design of the metro station is subject to further detailed design development.

The key features of Sydney Olympic Park metro station are provided in Figure 9-1.

Table 9-1 Key features – Sydney Olympic Park metro station

Key features	Description
Proposed station entry	• main station entries between Herb Elliott Avenue and Figtree Drive • event mode entries from public space to the west of the metro station (connected to Olympic Boulevard).
Customers	• residents within walking and cycling distance • employees or visitors travelling to and from nearby residential and employment areas • visitors to events, venues, recreational facilities and parklands • customers transferring to and from other transport modes.
Primary station function	Origin, destination and interchange.
Catchment	Residential, employment, events and recreation.
Transport interchange	• walk • cycle • suburban rail (indirect connection) • bus • light rail (planned) • point-to-point transport • kiss and ride.

Sydney Olympic Park metro station would consist of an underground station with an island platform in a north-south orientation for day-to-day mode, and two additional side platforms that would provide increased capacity in event mode.

Customers would access the station from the main proposed public space running north-south between Herb Elliott Avenue and Figtree Drive. In event mode, the station would also be accessed from the proposed public space to the west that would be connected to Olympic Boulevard.

The public space running north-south between Herb Elliott Avenue and Figtree Drive would also be the main aboveground pedestrian connection to the kiss and ride area on Herb Elliott Avenue, and to the bus interchange located along Figtree Drive to the south.

Escalators and/or stairs and lifts would provide access to the Sydney Metro platforms.

Areas for station services and utilities would be provided within consolidated services buildings.

The aboveground station infrastructure (including concourse, station services and space for non-station use) would be approximately four to five storeys above Herb Elliott Avenue and stepping up to about seven to eight storeys above Figtree Drive.

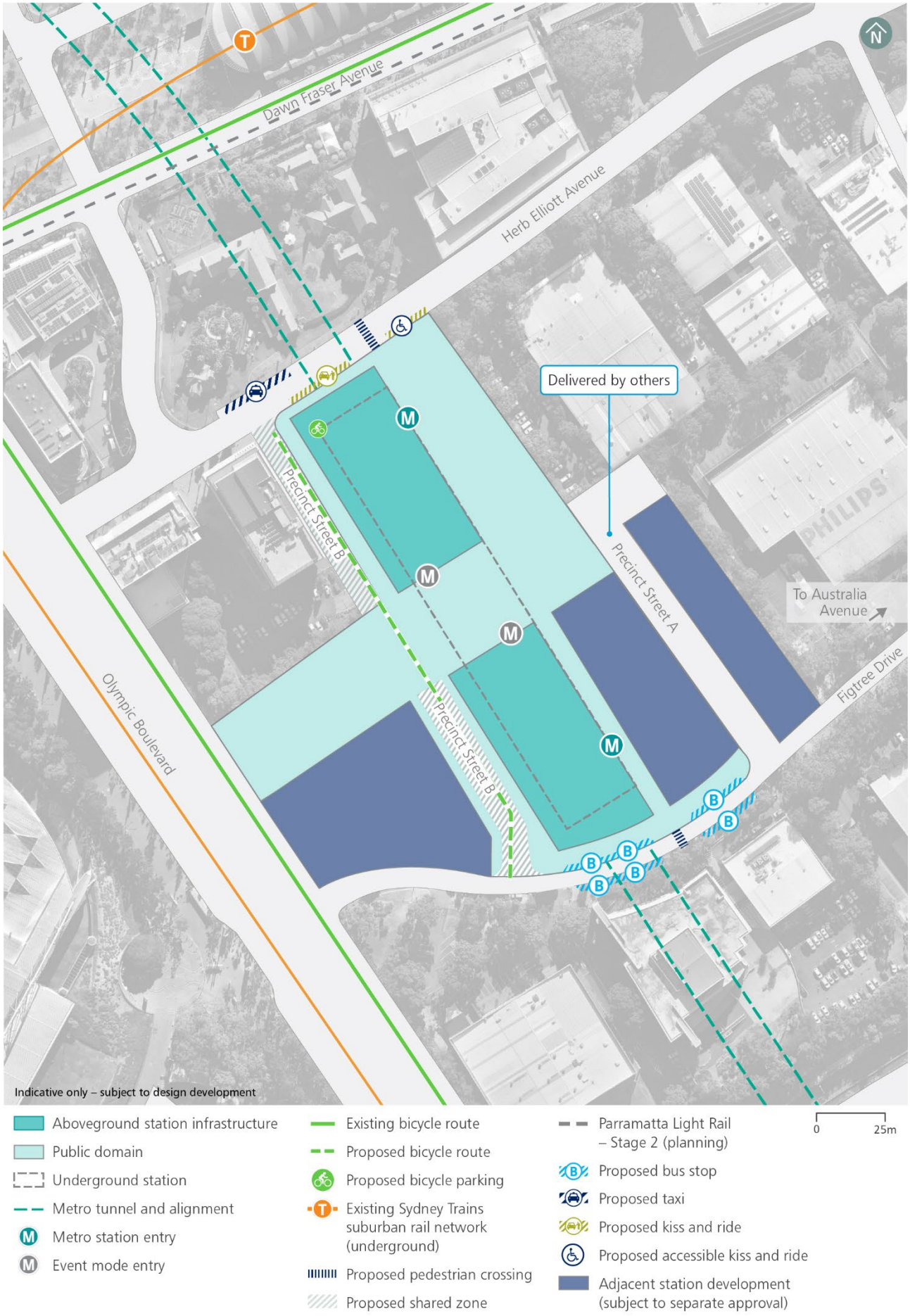

Figure 9-1 Indicative layout and key design elements – Sydney Olympic Park metro station

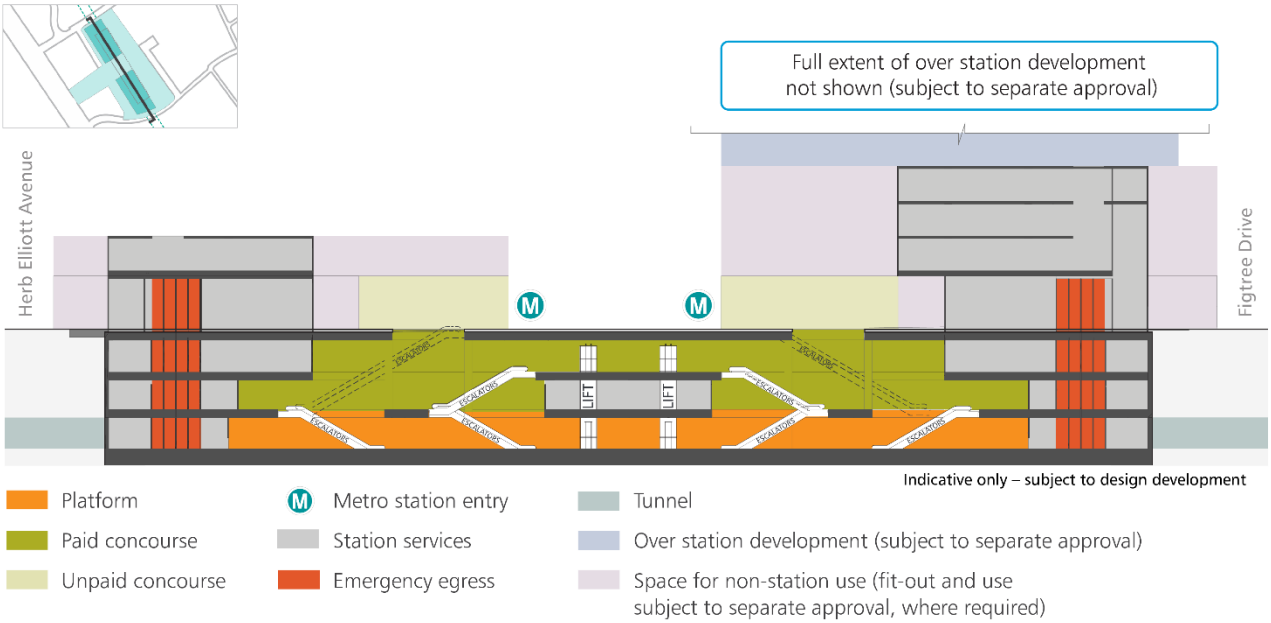

Figure 9-2 Indicative long-section – Sydney Olympic Park metro station

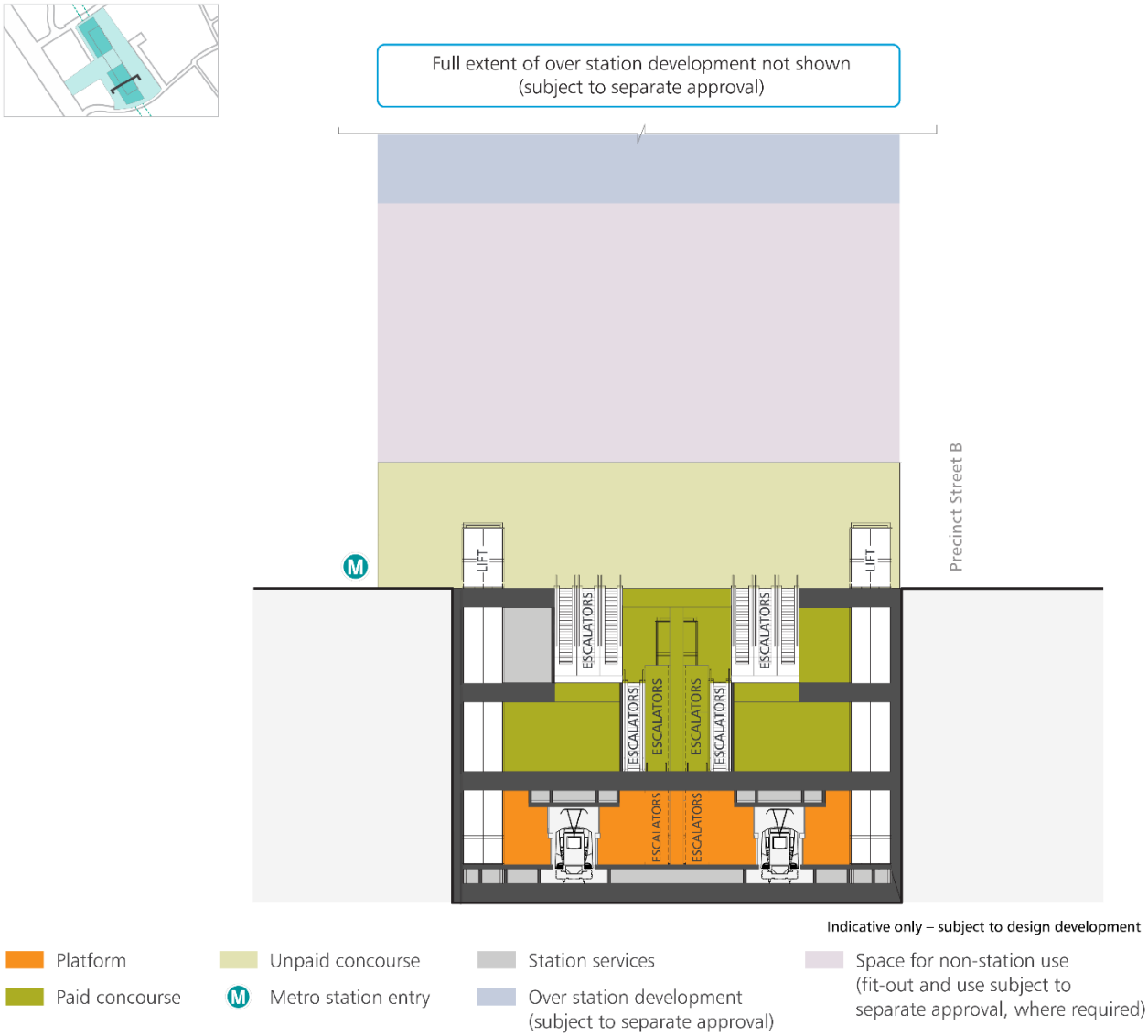

Figure 9-3 Indicative cross-section – Sydney Olympic Park metro station

9.2.3 Station precinct and interchange facilities

Sydney Olympic Park metro station would include a series of precinct and interchange elements such as:

- bicycle parking
- bus interchange and shelters located on Figtree Drive
- kiss and ride and point-to-point vehicle facilities on Herb Elliot Avenue
- provision of a new street within the vicinity of the proposed station
- two new pedestrian crossings on Herb Elliott Avenue and Figtree Drive, and creation of new public spaces adjacent to the proposed station entrances
- public domain area connecting Olympic Boulevard, Herb Elliott Avenue and Figtree Drive to the metro station, to allow for marshalling and crowd management during major events (refer to Figure 9-1 for indicative extent)
- the structural elements and provision for utilities and services for non-station uses (e.g. retail, commercial and/or community facilities), including structures:
  - connected to the northern station services building to about the same height as the station services building
  - connected to the southern station services building to about the same height as the station services building
  - fit-out and use of these spaces would be subject to separate approval, where required. Refer to Section 5.4.3 (Structures and spaces for non-station uses) for further detail.

9.2.4 Provisioning for over station and adjacent station development

This proposal would include and has assessed the following to support the future over station and adjacent station development:

- structural elements to enable the construction of future over station development, up to a podium level that future development would be constructed above
- space for future lobbies, lift cores, access, parking, loading docks and building services for future over station development
- road intersection upgrades at the intersection of Australia Avenue and Figtree Drive, and the intersection of Olympic Boulevard and Figtree Drive, to support access to both the metro station and future adjacent development
- utility connections to support future developments, where required
- subdivision.

As shown in Figure 9-1, adjacent station development is proposed on the residual land required for construction, to the east of the metro station (on either side of Precinct Street A), and to the west of the metro station (at the corner of Olympic Boulevard and Figtree Drive). Access to the metro station would be maintained around these spaces and may be temporarily activated to provide public spaces and local community facilities.

Over station development is proposed on the southern end of the metro station. The potential extent of the over station development is provided on Figure 9-4 and is discussed further in Section 5.4.5 (Related development) of this Environmental Impact Statement.

Delivery of the over station and adjacent station development does not form part of this proposal and would be subject to separate assessment and approval (with the exception of the provisioning elements listed above).

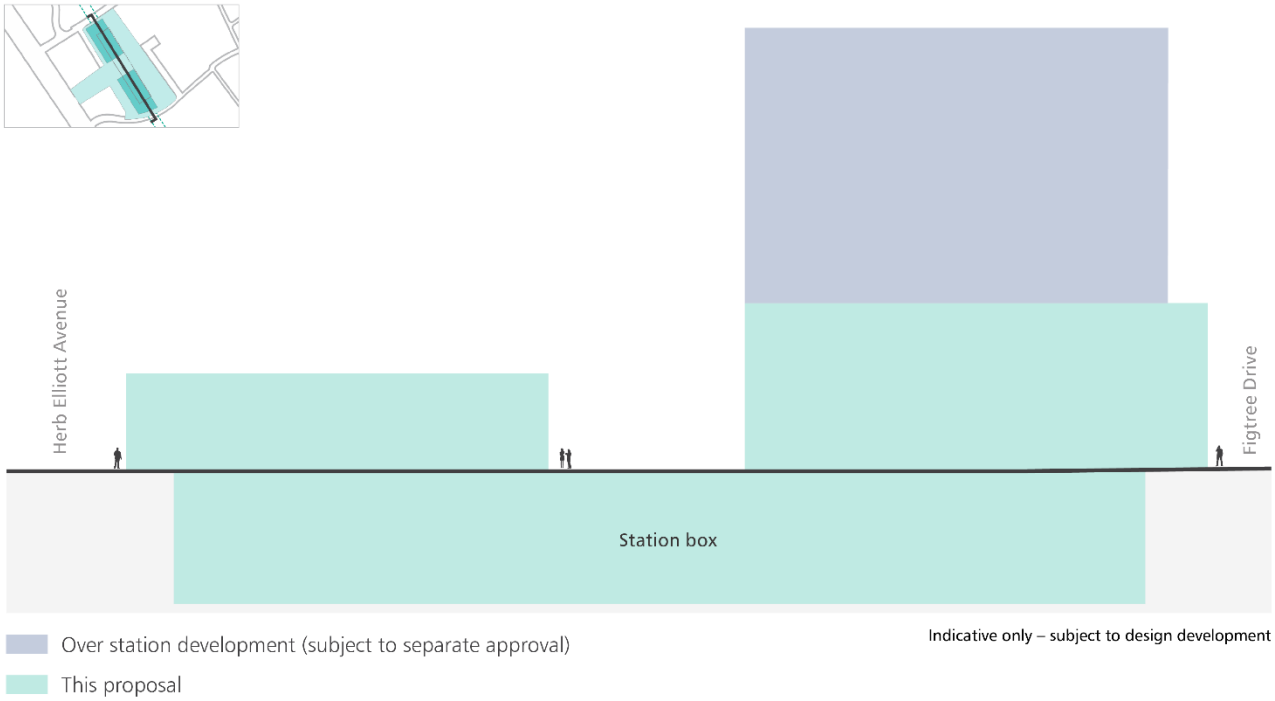

Figure 9-4 Potential over station development extent – Sydney Olympic Park metro station

9.3 Placemaking

The vision for Sydney Olympic Park metro station and its surrounds is for:

A thriving urban centre with a vibrant mix of homes and jobs and a premier destination for cultural, entertainment, recreation and sporting events.

9.3.1 Integration with strategic planning

As identified in the Central City District Plan (Greater Sydney Commission, 2018c), Sydney Olympic Park provides world-class sporting and event venues and residential, commercial and recreational activities. Since the release of the Central City District Plan, further plans and strategies have been developed that have informed the development of Sydney Olympic Park metro station and would guide future design.

This proposal has considered the objectives of *Better Placed* (Government Architect NSW, 2017) as outlined in Section 5.2 (Placemaking and design) of this Environmental Impact Statement. An overview of how this proposal meets the relevant transport and connectivity outcomes of the Healthy Built Environment Checklist (NSW Government, 2020a) is also provided in Appendix I (Healthy Built Environment Checklist).

City of Parramatta Local Strategic Planning Statement City Plan 2036

The relationship of Sydney Metro West to the City of Parramatta Local Strategic Planning Statement City Plan 2036 (City of Parramatta, 2020) is discussed in Section 7.10.3 of the *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a).

The Local Strategic Planning Statement highlights Sydney Olympic Park's role as a lifestyle precinct that will continue to offer a mix of living, recreation and entertainment options. The planning statement includes aspirations to grow the strategic centre to have a role in the Greater Parramatta and the Olympic Peninsula economic corridor between Westmead and Sydney Olympic Park. It also supports the vision for 30-minute door-to-door access to employment in the Parramatta CBD, Westmead and Sydney Olympic Park. Strategically, connectivity to the Sydney CBD is greatly enhanced by Sydney Metro West substantially improving access for people across Sydney to Sydney Olympic Park.

Sydney Olympic Park metro station would provide a direct and fast connection into the Parramatta CBD and Westmead and support the planned increases in residents and employment opportunities in the area. It would also support the precinct's continued role in sports and entertainment, serving the stadia and sports precinct and the Royal Agricultural Society Grounds. Wider benefits can be achieved with integrated transport connections into the Carter Street, Newington and Wentworth Point residential precincts, as outlined in the planning statement.

Sydney Olympic Park Master Plan 2030

The Sydney Olympic Park Master Plan 2030 (Sydney Olympic Park Authority, 2018) guides the long-term development of the precinct. As a strategic centre, the Plan outlines a strong growth in both employment and residential opportunities supported by a wide mix of land uses. At Sydney Olympic Park this growth is largely focused on the Central Precinct (within which the metro station would be located). Successful realisation of these aspirations would be catalysed by Sydney Metro West and its integration with the broader transport network, supported by and set within a new high-amenity precinct that supports active travel and walkability.

Sydney Olympic Park Authority is pursuing an amendment to the Sydney Olympic Park Master Plan 2030 to accommodate the Sydney Olympic Park metro station as part of the Draft Sydney Olympic Park Master Plan 2030 (Interim Metro Review) (Sydney Olympic Park Authority, 2021). The Interim Metro Review outlines a proposed structure plan for the Central Precinct which includes Sydney Olympic Park metro station. Sydney Metro has been consulting with Sydney Olympic Park Authority and would continue this consultation during finalisation of the Draft Sydney Olympic Park Master Plan 2030 (Interim Metro Review).

9.3.2 Place and design principles

Place and design principles for Sydney Olympic Park metro station were identified in Section 7.10.3 of the *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a). The principles build on the five Sydney Metro-wide design objectives and have considered relevant local council strategies and *Better Placed* design objectives (refer to Section 5.2 (Placemaking and design) of this Environmental Impact Statement). Table 9-2 outlines how these principles have been achieved in the Sydney Olympic Park metro station design.

Table 9-2 Design responses to Sydney Olympic Park metro station place and design principles

Place and design principle	Design response
Support the creation of a new town centre and reinforce Sydney Olympic Park as a premier destination for major events in line with the principles outlined in the Sydney Olympic Park Master Plan 2030	• the new station precinct public domain, open space and new streets would be fully integrated with the Central Precinct of the master plan to create a walkable, high-amenity interface to the new town centre • space provisioning and configuration in the precinct would enable the safe management of major event crowds • new streets and pedestrian connections would provide intimate scale and amenity for day-to-day residents and workers.
Deliver a station and public domain designed to support day-to-day activities and flexibility to accommodate major events and periodic large crowds	• clear and separate entry and exit location for the day-to-day function, distinct from the event mode access points • provision of a publicly accessible plaza adjacent to the station entry to accommodate higher volumes of pedestrian movement from the metro station and customers moving through the town centre • large public domain and plazas spaces would be relatively open and adaptable, enabling local community uses (e.g. markets) with the ability to be transitioned into safe marshalling space for major event egress.
Facilitate east-west access from Olympic Boulevard to the station and town centre to accommodate event crowds	• creation of new space between Olympic Boulevard and the station would support activated frontages and street amenity in the day-to-day function and enable movement into the town centre east of the station. This space can be transitioned into a key egress and marshalling space accommodating major event crowds.
Enhance permeability with new pedestrian links and connections to places within the wider station precinct supported by active street frontages and new open spaces	• north-south permeability would be enhanced with new Precinct Street B, and a pedestrian-only mid-block connection. Precinct Street A (when delivered by others in the future) would also enhance north-south permeability • east-west permeability would be provided across the station, connecting Olympic Boulevard to the new town centre • new open space located to the north-east of the station, positioned to maximise solar gain, and provide open views toward the Abattoir Heritage Precinct.

Place and design principle	Design response
Ensure the station provides easy, safe and intuitive interchange with other modes of transport, during day-to-day operation and events	• the southern station entrance would provide day-to-day direct connection to the bus interchange on Figtree Drive • the northern station entrance adjacent to point-to-point and kiss and ride would provide an easy connection to the proposed Parramatta Light Rail Stage 2 • centrally located separate event mode entries would be located to provide direct flow into the station from Olympic Boulevard.

The key urban design strategies to support the implementation of the place and design principles are illustrated in Figure 9-5, Figure 9-6 and Figure 9-7.

Figure 9-5 Land use and function urban design strategies – Sydney Olympic Park metro station

Figure 9-6 Access and connectivity urban design strategies – Sydney Olympic Park metro station

Figure 9-7 Built form urban design strategies – Sydney Olympic Park metro station

The Sydney Olympic Park metro station design includes the following key movement and place features:

- new streets close to the station entries would be pedestrian focused and traffic calmed, supporting activated ground floor uses and encouraging passive recreation
- new open space would be provided to the north-east of the station adjacent to the northern station entry. This position would maximise solar gain and provide open views toward the Abattoir Heritage Precinct
- new open space would be provided connecting the station to Olympic Boulevard and through to the future town centre. This generous open space can be transitioned into an efficient event crowd marshalling space towards the centrally located separate event mode station entries
- vehicle movement is focused on the Herb Elliott Avenue and Figtree Drive corridors, away from the station entries
- the street and public domain network would be structured so that large event crowds can be managed safely without impact on the function as a town centre.

9.3.3 Transport interchange, access and connectivity

Integration with other transport modes, including active transport, is fundamental to improving access to the public spaces and local community facilities surrounding or delivered as part of the Sydney Olympic Park metro station design. The delivery of a metro station provides a new mass transit hub right in the heart of Sydney Olympic Park, substantially improving access for people across Sydney to major events at Sydney Olympic Park. Sydney Olympic Park metro station would deliver an extensive new public domain integrating with the new Sydney Olympic Park town centre and be able to service major events safely.

Examples of how the Sydney Olympic Park metro station design integrates with other transport modes and improves access for customers and the community include:

- creation of a high-amenity pedestrian environment around the station entries and new Precinct Street B that provides activation and access for the community. Precinct Street A (when delivered by others in the future) would also enhance permeability
- active transport connections within the station precinct along the Precinct Street B shared zone, connecting the bicycle parking located near the northern station entry
- new pedestrian crossing points on Figtree Drive near the new bus stops and Herb Elliott Avenue to provide efficient and safe pedestrian access to the station entries
- direct access to new bus stops on Figtree Drive, via the southern day to day entry
- easy connections through to the existing Olympic Park Station and to the proposed Parramatta Light Rail Stage 2
- provision of kiss and ride and point-to-point zones on Herb Elliott Avenue near the northern station entry.

9.3.4 Event mode and crowded spaces management

Sydney Olympic Park metro station has a key role to play in safely servicing the major events within the stadia precinct, in combination with the existing Sydney Trains services and event buses on the northern section of Olympic Boulevard. Examples of how the Sydney Olympic Park metro station design addresses the event mode and crowded spaces management include:

- a bespoke platform configuration that includes an island and two side platforms enabling separation and safe function of customer access and egress during major events without impacting on the wider function of the Sydney Metro West line
- the separation of day-to-day and event entries and lifts and escalators within the station
- the creation of new public domain space and street connection from the event station entries through to Olympic Boulevard, to enable safe marshalling of customers prior to entry into the station, and separation from the future town centre to the east
- the ability to direct and marshal crowds separately towards Sydney Train services (along Dawn Fraser Avenue, Murray Rose Avenue and the associated open space) and towards Sydney Metro services (along Olympic Boulevard and through the new public plaza)
- ongoing engagement with the Sydney Olympic Park Authority, so that that the operational overlay for major event crowds is considered holistically with the whole of the Sydney Olympic Park precinct.

9.4 Construction description

This section provides a description of the construction activities required to completed Sydney Olympic Park metro station, and associated precinct work required for the operation of Sydney Metro West.

Major civil construction work including station excavation and tunnelling work at Sydney Olympic Park was assessed and approved under *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a) and does not form part of this proposal.

9.4.1 Overview

Construction of Sydney Olympic Park metro station would require the continued use of the construction site established under the previous Sydney Metro West planning application. The land required for the construction site would be consistent with the *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a). A minor area of additional footprint would be required during construction to support the development of the public domain (refer to Figure 9-8).

The Sydney Olympic Park metro station construction site would be located close to Olympic Boulevard and between Herb Elliott Avenue and Figtree Drive.

The Sydney Olympic Park metro station construction site would be demolished and excavated as a result of activities associated with the work carried out under the previous Sydney Metro West planning application. This proposal would include some earthworks across the site outside of the station box area (excavation to a depth of around three metres) to create a public domain that would be level with the surrounding road network. The earthworks would require the removal of about 32,000 cubic metres of spoil.

The location and indicative layout of the Sydney Olympic Park metro station construction site are shown in Figure 9-8. Some activities would occur outside this construction site, such as delivery of construction equipment and station precinct and interchange work.

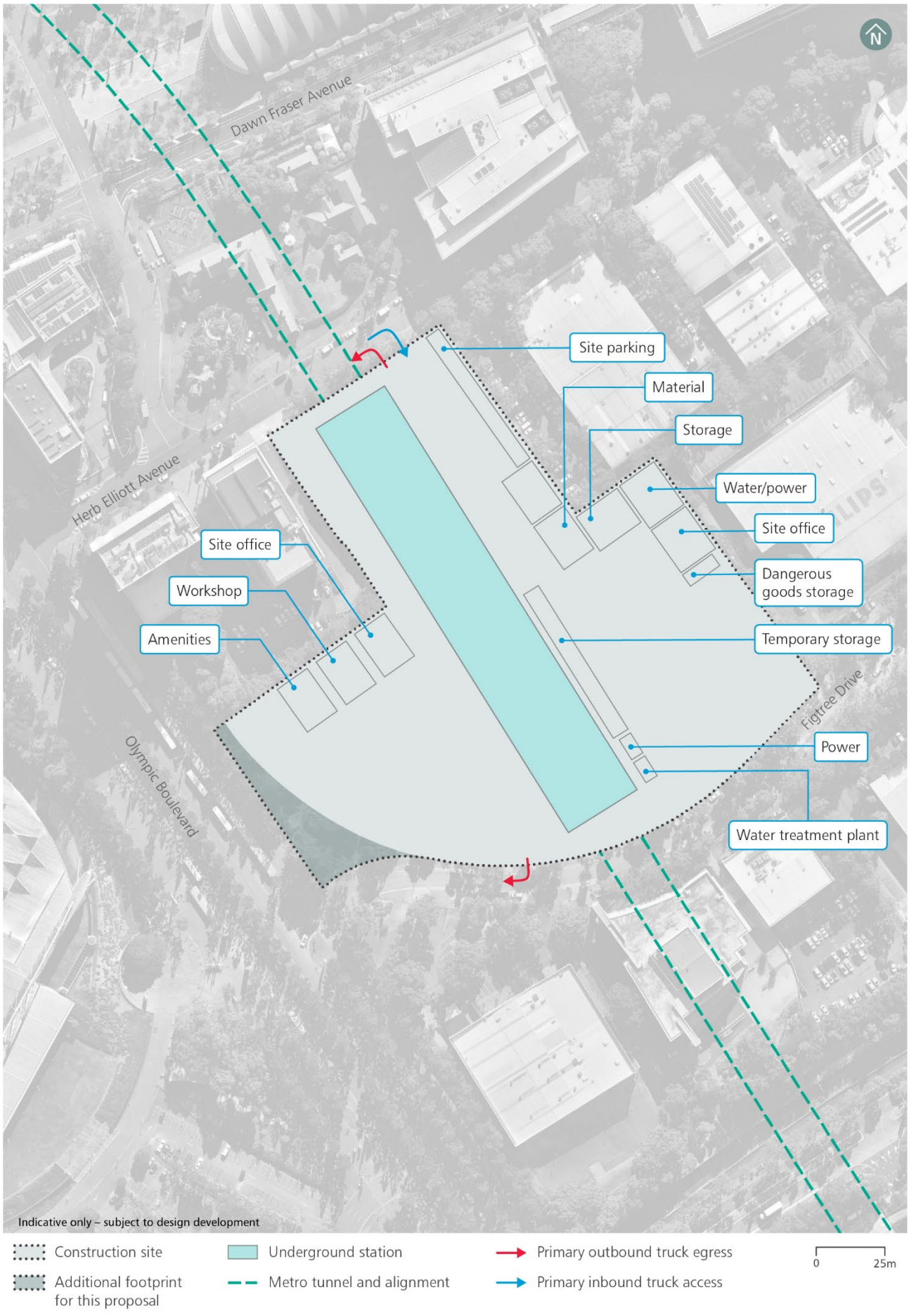

Figure 9-8 Indicative construction site layout – Sydney Olympic Park metro station

9.4.2 Construction work

Key construction work at the Sydney Olympic Park metro station construction site would include:

- enabling and site establishment work
- earthworks to level the site with the surrounding road network
- construction of the station and structures for non-station use
- station fit out
- construction of station precinct and interchange facilities, including provisioning for adjacent and over station development
- finishing work, testing and commissioning.

The indicative construction program for Sydney Olympic Park metro station is shown in Figure 9-9.

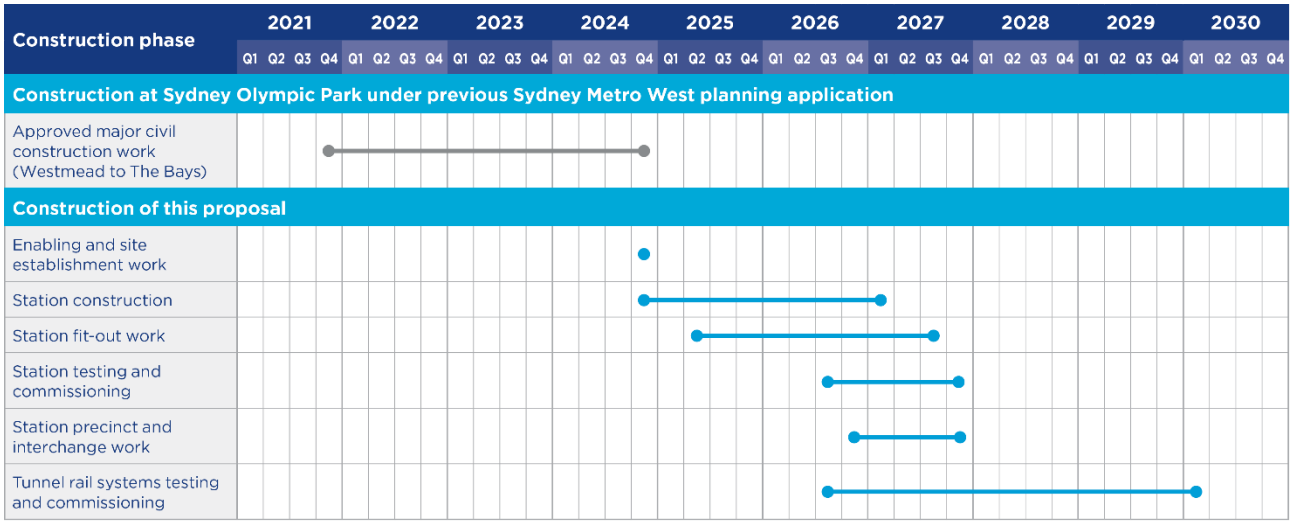

Figure 9-9 Indicative construction program – Sydney Olympic Park metro station

Other construction elements specific to Sydney Olympic Park metro station are shown in Table 9-3. Indicative construction hours, plant and equipment and workforce for the Sydney Olympic Park metro station construction site are provided in Section 6.5 (Other construction elements) of this Environmental Impact Statement. Key elements specific to Sydney Olympic Park metro station as described in the table below, are also depicted on Figure 9-8.

Table 9-3 Other construction elements – Sydney Olympic Park metro station

Construction element	Description
Construction traffic access and egress	Continued access and egress arrangements established by the previous Sydney Metro West planning application that would likely be maintained during construction include: • potential secondary access (for example during when special events impact primary routes) to the construction site via left-in from Herb Elliott Avenue • potential secondary egress from the construction site via right-out onto Herb Elliott Avenue.
	Additional and/or new access and egress arrangements likely to be required for construction of this proposal include: • access to the construction site via right-in from Herb Elliott Avenue • egress from the construction site via left-out onto Herb Elliott Avenue or right-out onto Figtree Drive • potential secondary access (for example during when special events impact primary routes) to the construction site via right-in from Figtree Drive • potential secondary egress from the construction site via right-out onto Figtree Drive.

Construction element	Description
Peak daily traffic movements	• about 224 daily heavy vehicle movements • about 226 daily light vehicle movements. Note: Movement refers to a one-way movement. A vehicle entering and then leaving a construction site represents two movements.
Transport network modifications	No transport network modifications are anticipated to support construction work

9.5 Transport

Further details of the operational and construction transport assessment, including the approach and methodology, is provided in Technical Paper 1 (Operational transport) and Technical Paper 2 (Construction transport).

Potential benefits and impacts at a regional level or where impacts are common across precincts are assessed in Chapter 18 (Proposal-wide) of this Environmental Impact Statement. This includes strategic transport benefits during operation, and potential impacts in relation to road user safety, construction worker parking, emergency vehicles and road condition during construction.

9.5.1 Baseline environment

The baseline transport environment described for Sydney Olympic Park metro station includes the existing transport environment, as well as adjustments made by the previous Sydney Metro West planning application.

Active transport network

The pedestrian network surrounding Sydney Olympic Park metro station is large and well established to accommodate large crowds in the precinct during major events. While there are few signalised or formal intersections in the precinct, surrounding local roads carry low vehicle volumes and have a 40 kilometres per hour sign-posted speed limit, allowing pedestrians to generally be able to cross the road safely. Key pedestrian facilities include:

- footpaths along all roads, including Olympic Boulevard, Dawn Fraser Avenue, Herb Elliott Avenue, Showground Road and Figtree Drive
- a staged crossing via the wide median on Olympic Boulevard
- signalised pedestrian crossings at the Sarah Durack Avenue/Olympic Boulevard, Sarah Durack Avenue/Australia Avenue and Australia Avenue/Herb Elliott Avenue intersections
- pedestrian activated signals on the Homebush Bay Drive ramps at the Homebush Bay Drive/Australia Avenue/Underwood Road roundabout.

The cycle network surrounding Sydney Olympic Park metro station is well developed and includes:

- on-road cycle routes along Australia Avenue, Sarah Durack Avenue, Edwin Flack Avenue, Dawn Fraser Avenue, Bennelong Parkway, Old Hill Link, Shirley Strickland Avenue, and Rod Laver Drive
- off-road shared paths that link to on-road cycle routes that serve local trips as well as the regional cycle network, including the M4 Motorway cycleway and the Cooks River cycleway:
  - west of Olympic Boulevard around the Aquatic and Athletic Centres and the Warm Up Arena
  - east of Australia Avenue around Bicentennial Park
- defined bicycle circuits within the precinct, including the Olympic Circuit, River Heritage Circuit and Parklands Circuit, comprising both on-road and off-road cycle paths listed above, as well as other bicycle paths located north of Bicentennial Park and Dawn Fraser Avenue.

Public transport network

A summary of the public transport services around Sydney Olympic Park metro station is provided in Table 9-4.

Table 9-4 Public transport services – Sydney Olympic Park metro station

Mode	Description
Rail	• T7 Olympic Park Line on the Sydney Trains network via Olympic Park Station, which operates as a shuttle to and from Lidcombe Station • during major events, direct trains run between Olympic Park and Central and some westbound services extend past Lidcombe to Blacktown, Leppington and Campbelltown • proposed Parramatta Light Rail Stage 2 (if approved).
Bus	• 4 bus routes (including one NightRide bus route) with major bus stops on Edwin Flack Avenue, Dawn Fraser Avenue, Park Street and Australia Avenue • 9 additional bus routes for major events • on demand bus services • 2 school bus routes.

Parking, loading, servicing and pick-up arrangements

The parking environment around Sydney Olympic Park metro station includes:

- time-limited on-street parking spaces along Olympic Boulevard, Murray Rose Avenue, Dawn Fraser Avenue, Figtree Drive, Herb Elliott Avenue, Showground Road, Grand Parade and Parkview Drive (potentially unavailable during major events due to road closures)
- ticketed on-street parking spaces along Herb Elliott Avenue, Dawn Fraser Avenue and Showground Road (potentially unavailable during major events due to road closures)
- on-street parking on Herb Elliott Avenue for motorbikes
- loading zones on the northern side of Herb Elliott Avenue and the southern side of Dawn Fraser Avenue
- a kiss and ride zone near Olympic Boulevard
- a mail zone on the western side of Showground Road.

Traffic volumes and patterns

Approximate peak-hour midblock volumes on key access roads surrounding Sydney Olympic Park metro station are shown in Table 9-5. The key access roads carry traffic volumes generally commensurate with their function.

Table 9-5 Existing peak hour traffic volumes (mid-block) by direction – Sydney Olympic Park metro station (2021)

Road	Direction	AM peak hour volume (vehicles per hour)	PM peak hour volume (vehicles per hour)
Herb Elliott Avenue west of Australia Avenue	Eastbound	120	220
	Westbound	170	90
Sarah Durack Avenue west of Olympic Boulevard	Eastbound	370	430
	Westbound	330	540
Figtree Drive west of Australia Avenue	Eastbound	90	100
	Westbound	110	100
Old Hill Link west of Edwin Flack Avenue	Eastbound	220	170
	Westbound	120	280
Hill Road north of M4 Western Motorway	Northbound	660	780
	Southbound	1,020	990
Olympic Boulevard north of Sarah Durack Avenue	Northbound	130	200
	Southbound	70	150

Road	Direction	AM peak hour volume (vehicles per hour)	PM peak hour volume (vehicles per hour)
Edwin Flack Avenue north of Sarah Durack Avenue	Northbound	330	540
	Southbound	370	420

Intersection performance

Modelled intersection performance during the AM and PM peak hours for key intersections in the vicinity of Sydney Olympic Park metro station is shown in Table 9-6.

Modelled intersection performance indicates that all intersections perform at level of service C or better during the AM and PM peak hours.

Table 9-6 Modelled peak hour baseline intersection performance – Sydney Olympic Park metro station (2021)

Intersection and peak hour	Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of service	Maximum queue length by directional approaches (metres)	
M4 Western Motorway EB ramps/Hill Road (priority controlled)					
AM peak	1,838	15	B	NB	<5
				EB	10
				SB	<5
				WB	-
PM peak	1,927	18	B	NB	<5
				EB	15
				SB	<5
				WB	-
Hill Road/John Ian Wing Parade (signalised)					
AM peak	2,029	18	B	NB	70
				EB	80
				SB	60
				WB	<5
PM peak	2,154	15	B	NB	80
				EB	45
				SB	60
				WB	<5
Hill Road/Old Hill Link (signalised)					
AM peak	1,662	12	A	NB	30
				EB	-
				SB	70
				WB	10
PM peak	1,878	13	A	NB	25
				EB	-
				SB	65
				WB	20
Edwin Flack Avenue/Old Hill Link (signalised)					
AM peak	643	15	B	NB	15
				EB	20
				SB	10
				WB	-

Intersection and peak hour	Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of service	Maximum queue length by directional approaches (metres)	
PM peak	803	18	B	NB	30
				EB	20
				SB	15
				WB	-
Edwin Flack Avenue/Dawn Fraser Avenue/Uhrig Road (signalised)					
AM peak	842	25	B	NB	20
				EB	40
				SB	20
				WB	25
PM peak	995	25	B	NB	25
				EB	30
				SB	25
				WB	45
Edwin Flack Avenue/Shane Gould Avenue/Birnie Avenue (signalised)					
AM peak	1,331	29	C	NB	40
				EB	70
				SB	45
				WB	5
PM peak	1,665	33	C	NB	100
				EB	70
				SB	50
				WB	15
Edwin Flack Avenue/Sarah Durack Avenue (signalised)					
AM peak	776	7	A	NB	-
				EB	<5
				SB	<5
				WB	5
PM peak	1,042	6	A	NB	-
				EB	<5
				SB	<5
				WB	10
Olympic Boulevard/Sarah Durack Avenue (signalised)					
AM peak	1,023	16	B	NB	10
				EB	30
				SB	10
				WB	25
PM peak	1,386	19	B	NB	15
				EB	30
				SB	20
				WB	40

Intersection and peak hour	Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of service	Maximum queue length by directional approaches (metres)	
Olympic Boulevard/Figtree Drive (priority controlled)					
AM peak	281	<5	A	NB	<5
				EB	-
				SB	<5
				WB	<5
PM peak	386	<5	A	NB	<5
				EB	-
				SB	<5
				WB	<5
Olympic Boulevard/Herb Elliott Avenue (priority controlled)					
AM peak	361	<5	A	NB	<5
				EB	-
				SB	<5
				WB	<5
PM peak	455	5	A	NB	<5
				EB	-
				SB	<5
				WB	<5

9.5.2 Operational impact assessment

This section outlines the transport interchange provisions proposed at Sydney Olympic Park metro station as shown in Figure 9-1.

The transport interchange provisions have been designed to maximise the seamless travel experience for all customer groups transferring between this proposal and other transport modes. Stations have been designed for ease of interchange from the different modes, including pedestrian and cycle facilities and to minimise disruptions to public transport users and the surrounding road network.

This section also discusses the potential impact of the transport interchange provisions on the transport network during operation.

Passenger demand

Station passenger demand forecast for the 2036 AM peak hour (8am to 9am) indicates 2,700 customers accessing Sydney Olympic Park metro station and 3,810 customers egressing Sydney Olympic Park metro station during the AM peak hour. This generally indicates this station would operate as an origin and destination.

The 2036 modal breakdown of access and egress during the AM peak hour is presented in Table 9-7. These results indicate a small number of passengers are anticipated to travel to nearby suburbs by bus after egressing from the station, who are not serviced by a train station within reasonable walking distance (such as Newington and Silverwater).

Table 9-7 2036 forecast mode of access and egress – Sydney Olympic Park metro station

Mode	Walk	Cycle	Bus	Kiss and ride	Park and ride
Access	52%	2%	39%	5%	1%
Egress	93%	1%	6%	0%	0%

Integration with other transport modes

A description of how Sydney Olympic Park metro station would integrate with existing transport modes during operation is provided in Table 9-8. Appropriate signage and wayfinding would be provided within the precinct to provide easy customer transfer and access to the station.

Table 9-8 Network integration – Sydney Olympic Park metro station

Network	Description
Pedestrian network	Two day-to-day station entries are proposed at Sydney Olympic Park metro station on the eastern side – a northern entry near Herb Elliott Avenue and a southern entry near Figtree Drive. New pedestrian facilities proposed to be provided as part of the station and precinct include: • a north-south promenade connecting from Herb Elliott Avenue to Figtree Drive, providing pedestrian access to the station entries • an unsignalised pedestrian crossing of Herb Elliott Avenue at the end of the north-south promenade • an unsignalised pedestrian crossing of Figtree Drive at the end of the north-south promenade • a shared zone along Precinct Street B to the west of the station between Herb Elliott Avenue to Figtree Drive • a new east-west plaza (Forest Plaza) connecting from Olympic Boulevard to the station. 2036 pedestrian modelling indicates the pedestrian network in Sydney Olympic Park would operate satisfactorily at level of service B or better. For both regular and major events, Sydney Olympic Park metro station is expected to move the highest percentage of passengers accessing the precinct area by 2036. The metro station would provide a substantial improvement in public transport options and clearance times following major events at Sydney Olympic Park. To cater for major events, two additional ‘event entries’ would be provided from around the middle of the station. During major events, the pedestrian network is expected to function as follows: • Olympic Boulevard would be closed and crowds wishing to access the metro station would be directed south down Olympic Boulevard to the Forest Plaza • Forest Plaza would provide the main pedestrian marshalling area and access to the station for event crowds from Olympic Boulevard • crowds wishing to access the existing Olympic Park Station would be marshalled separately along Dawn Fraser Avenue and the pedestrian plaza to the west of the existing station • the day-to-day station entries would remain operational to cater for non-event customers.
Cycle network	New cycling facilities proposed to be provided as part of the station and precinct include: • cycle provision along the Precinct Street B shared zone • cyclists would be able to use the proposed mid-block pedestrian crossings on Herb Elliott Avenue and Figtree Drive • bicycle parking.
Public transport network	Public transport integration at Sydney Olympic Park metro station would include: • new bus stops on Figtree Drive to the south of the station. Customers would be able to transfer from the bus stops using the proposed mid-block crossing of Figtree Drive and the north-south promenade to the southern station entry. The bus stops may need to be implemented in two stages so that adjacent property access is provided. Sydney Metro would work with Sydney Olympic Park Authority and the affected property owner to seek the relocation of this property access when the site is redeveloped prior to delivery of the additional bus stop • a new bus interchange on Figtree Drive that would be supported by existing paired bus stops on Park Street, Dawn Fraser Avenue and Australia Avenue.

Network	Description
	To enable bus services to access the metro station, intersection upgrades may be implemented at the Olympic Boulevard/Figtree Drive and the Australia Avenue/Figtree Drive intersections. This would be subject to further stakeholder consultation with Sydney Olympic Park Authority and Transport for NSW. Customers would also be able to make a connection between the existing Olympic Park Station and proposed metro station within suitable walking distance (about 200 metres). If the proposed Parramatta Light Rail Stage 2 is approved, it is expected that customers would be able to transfer between light rail and metro services via Showground Road.
Road network	Road network changes that would be implemented as part of the station precinct include: • provision of new Precinct Street B as a shared zone to the west of the station, connecting from Figtree Drive to Herb Elliott Avenue • new mid-block crossings on Herb Elliott Avenue and Figtree Drive • potential intersection upgrades at the Olympic Boulevard/Figtree Drive and Australia Avenue/Figtree Drive intersections to enable bus services to access the metro station. New Precinct Street A to the east of the station connecting from Figtree Drive north to about halfway along the station would be delivered by others as part of future development. Based on the low volumes of customers expected to access the station by car, these trips would not impact road network and intersection performance. The following facilities would be provided for these customers: • two kiss and ride bays (including one accessible space) on Herb Elliott Avenue • a point-to-point zone on Herb Elliott Avenue. Relatively low numbers of park and ride trips are forecast. No dedicated parking capacity would be provided as part of this proposal and customers who choose to drive to the station would be dependent on the availability of existing parking spaces in the local area. Parking strategies would be developed in consultation with Sydney Olympic Park Authority and City of Parramatta Council to manage the potential impacts associated with customer parking near the station.

Road network performance

Intersection performance results for the ‘2036 without proposal’ and ‘2036 with proposal’ scenarios during the AM and PM peak hours for key intersections in the vicinity of Sydney Olympic Park metro station are shown in Figure 9-1.

Future intersection performance across the local network is similar with and without this proposal in both AM and PM peaks. This proposal is forecast to result in increased delays at the Australia Avenue/Herb Elliott Avenue intersections during the AM and PM peak. These increased delays are likely to be caused by the anticipated kiss and ride trips needing to travel through the intersection twice (pick up and return trip).

The Australia Avenue / Sarah Durack Avenue intersection is forecast to reduce from level of service E to F in the PM peak with this proposal. Sydney Metro and Transport for NSW would continue to monitor intersection performance of Australia Avenue/Sarah Durack Avenue prior to and during operations to identify intersection improvements as a result of this proposal where required. Sydney Metro would continue to engage with Sydney Olympic Park Authority around the review of transport arrangements for the Australia Avenue/Herb Elliott Avenue intersection.

Elsewhere, all intersections are forecast to perform at level of service D or better, representing conditions where flow and speed may decrease as the number of vehicles increase in peak periods, though only minor delays would be expected.

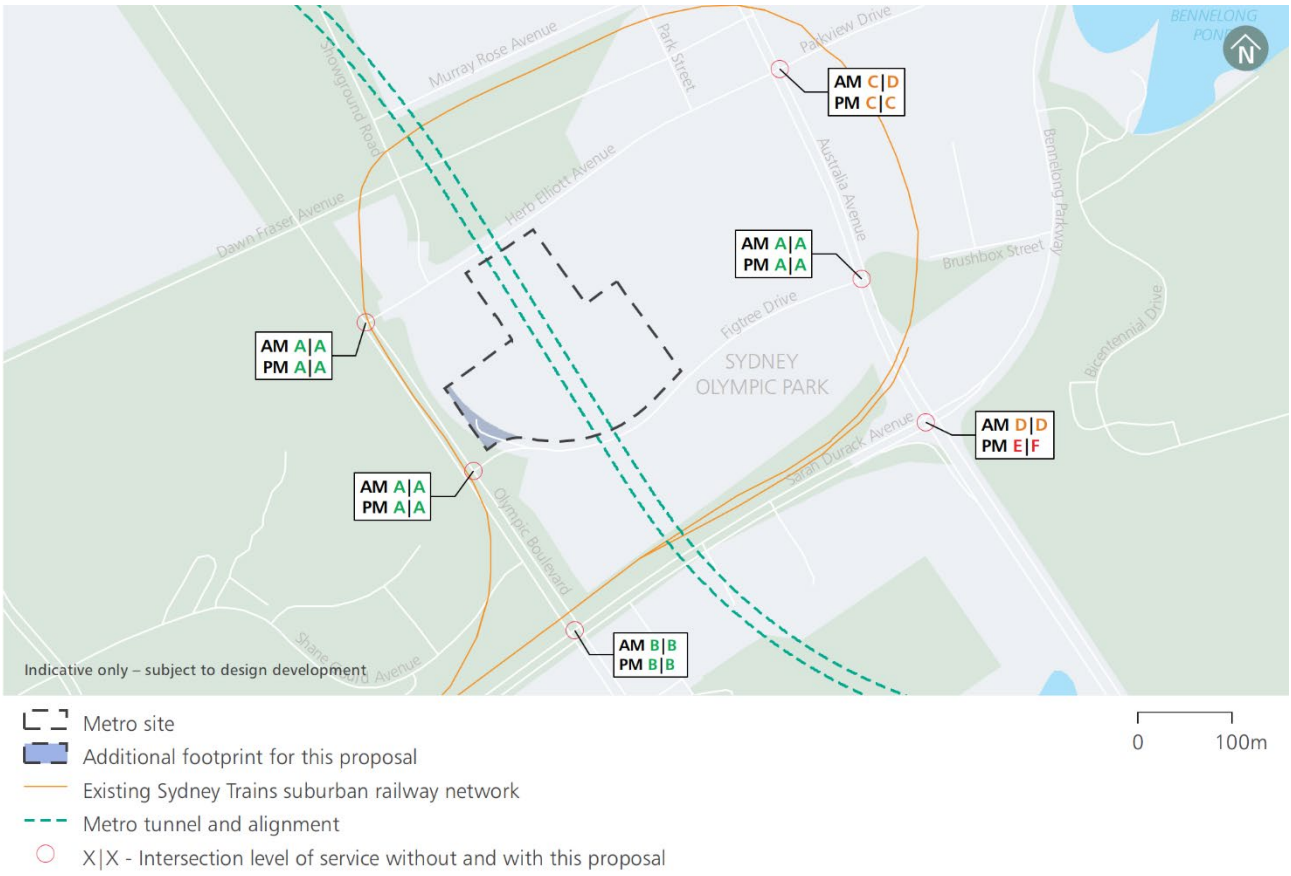

Figure 9-10 Operational intersection performance – Sydney Olympic Park metro station (2036)

Parking and property access

Several on-street parking spaces would be permanently removed around Sydney Olympic Park metro station including:

- on Herb Elliott Avenue:
  - around six on-street car parking spaces for provision of the point-to-point zone
  - around six on-street car parking spaces for provision of a pedestrian crossing
  - one on-street car parking space and one motorcycle parking space for provision of the relocated loading zone
  - around four on-street car parking spaces for provision of kiss and ride bays
- about 11 on-street car parking spaces on Figtree Drive to accommodate the new bus stops
- a number of parking spaces on Herb Elliott Avenue near the proposed Precinct Street B to accommodate a no stopping zone and reduce potential risks associated with unattended vehicles.

The provision of the bus stops on Figtree Drive would be staged to manage potential property access impacts to 6a Figtree Drive (as described in Table 9-8). There would be no other impacts to private property access.

9.5.3 Construction impact assessment

Construction haul routes

The primary construction haul routes for Sydney Olympic Park metro station are shown in Figure 9-11. Secondary haul routes may also include the use of Australia Avenue, Figtree Drive and Herb Elliott Avenue to and from Homebush Bay Drive. Construction site access and egress locations, as well as the number of daily traffic movements anticipated at Sydney Olympic Park metro station construction site, are outlined in Section 9.4.

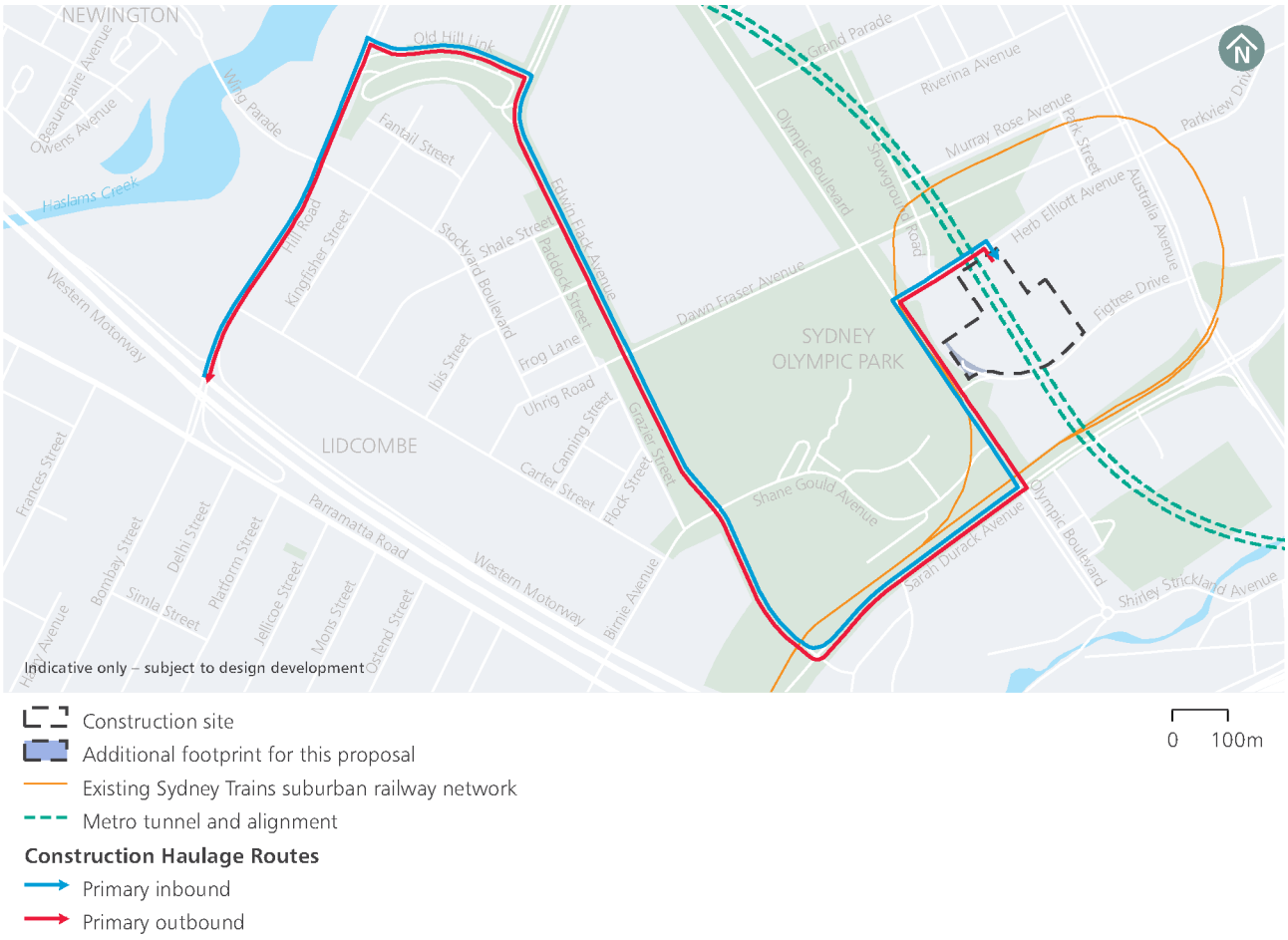

Figure 9-11 Primary construction haul routes – Sydney Olympic Park metro station

Active transport network

Existing pedestrian and cycle routes surrounding Sydney Olympic Park metro station construction site would be maintained throughout construction.

Precinct construction work around the construction site for new point-to-point zones, bus stops and pedestrian crossings may require some short-term closures (for around a few months) of sections of footpaths, which may result in some minor additional travel times for pedestrians. Appropriate diversions would be established to safely guide pedestrians around work zones.

Olympic Boulevard, Sarah Durack Avenue, Edwin Flack Avenue and Old Hill Link would be used by construction vehicles travelling to and from the construction site, which are designated on-road cycle links. Construction vehicles would also travel adjacent to or across shared paths along Hill Road, Birnie Avenue and Sarah Durack Avenue. Impacts on cyclists on these roads would be minor given that cyclists would be interacting with a low number of additional heavy vehicles. To address potential conflicts, mitigation measures outlined in the CTMF would be implemented during construction.

Public transport network

Roads forming part of the construction haul route for Sydney Olympic Park metro station that would also be used by buses include Sarah Durack Avenue, Edwin Flack Avenue, Old Hill Link and Hill Road. Impacts on buses would be limited to a potential minor increase in travel time due to the additional construction vehicles on the road network. During major events, construction vehicle movements would be limited where required to minimise impacts on special event bus services. No impacts are anticipated on the operation of regular customer and special event bus stops.

If Parramatta Light Rail Stage 2 is approved, the construction haul route may have an interface with the proposed alignment where construction vehicles would cross the light rail line. If Parramatta Light Rail Stage 2 is approved and operational during construction of this proposal, impacts on the light rail network would be minimal given that the interface between light rail vehicles and vehicles using the road network would be controlled by traffic signals at the Edwin Flack Avenue/Dawn Fraser Avenue/Uhrig Road intersection.

Parking and property access

Potential impacts associated with the short-term closures (for around a few months) of some on-street parking spaces on Herb Elliott Avenue for the new point-to-point zone, kiss and ride bays and pedestrian crossing, and on Figtree Drive for the new bus stops, would be minor given the short duration.

Where existing parking is removed to facilitate construction activities, a parking management plan would be developed in accordance with the requirements of the CTMF. This would include consultation with Sydney Olympic Park Authority and City of Parramatta Council to investigate opportunities to provide alternative parking facilities.

No impacts on property access are anticipated during construction.

Road network performance

Intersection performance results for the '2026 without proposal' (without construction vehicles) and '2026 with proposal' (with construction vehicles) scenarios are shown in Figure 9-12.

During the AM peak hour (8am to 9am) and PM peak hour (5pm to 6pm), it is anticipated that the Sydney Olympic Park metro station construction site would generate a total of 36 light vehicle movements and 28 heavy vehicle movements during the peak construction activity.

These vehicle movement forecasts were assumed for the intersection performance modelling. Peak hours were selected to represent the times when background traffic demand is at its greatest.

Modelled intersection performance during construction indicates the following intersections would experience a minor deterioration in level of service:

- M4 Western Motorway ramps/Hill Road during the PM peak hour from level of service B to C. The intersection would still operate with spare capacity with the addition of construction traffic
- Edwin Flack Avenue/Shane Gould Avenue/Birnie Avenue during the PM peak hour from level of service D to E. This is due to the additional construction vehicles travelling on Edwin Flack Avenue in both directions, resulting in increased congestion.

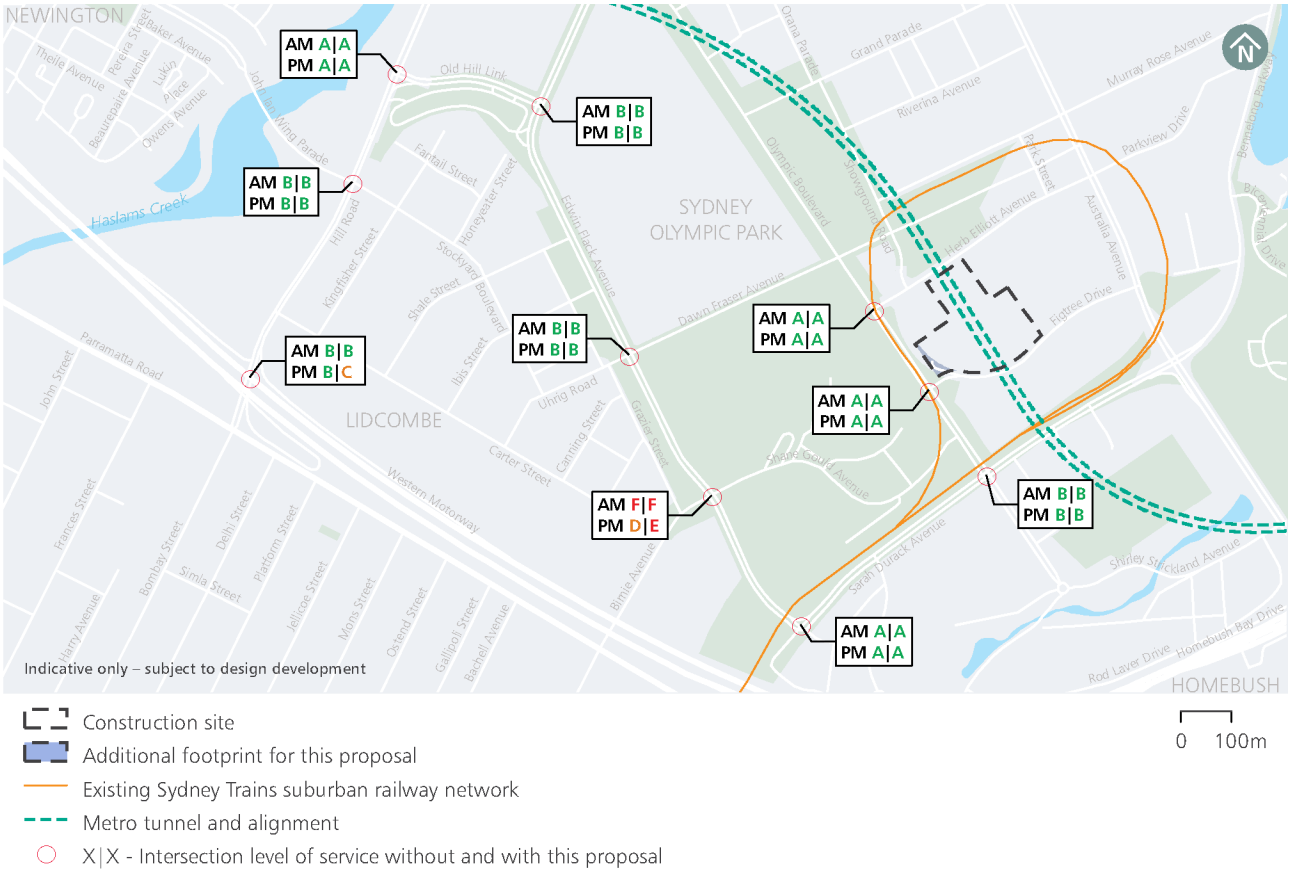

Figure 9-12 Construction site intersection performance – Sydney Olympic Park metro station (2026)

Major events

The existing Olympic Park Station is a major transport hub for access to and from a large number of events of varying size held each year at Sydney Olympic Park, such as the Sydney Royal Easter Show, Sydney Festival, music concerts and sporting events.

During major events, there are high levels of pedestrian activity throughout the Sydney Olympic Park precinct. Key pedestrian desire lines would fall within the immediate vicinity of the Sydney Olympic Park metro station construction site, with the potential for conflict between pedestrians and construction vehicles and impacts on pedestrian movement and accessibility. During special events these impacts are considered major and would require mitigation measures to reduce the anticipated impacts. To mitigate these potential impacts, construction vehicle movements to and from the construction site may be restricted during special events that involve the closure of the western end of Herb Elliott Avenue. The planning and development of appropriate restrictions to minimise impacts on the transport network during major events would be determined in consultation with Transport for NSW and other relevant agencies.

The CTMF outlines mitigation measures that would be implemented to minimise impacts during major events, which would be detailed in future Construction Traffic Management Plans.

9.5.4 Management and mitigation measures

Environmental management for this proposal would be undertaken through the environmental management approach as detailed in Chapter 20 (Synthesis) of this Environmental Impact Statement. This includes operational mitigation measures (where relevant) and performance outcomes for the operation and construction of this proposal.

The approach to transport and traffic management during the construction phase, including the process for the development of all construction traffic management plans is outlined in the CTMF.

The CTMF provides the overall strategy and approach for construction traffic management for Sydney Metro West, and an outline of the traffic management requirements, mitigation measures and processes that would be common to each of the proposed construction sites. It establishes the traffic management processes and acceptable criteria to be considered and followed in managing roads and footpaths adjacent to construction sites.

Mitigation measures that would be implemented under the provisions of the CTMF or are required to manage operational impacts but are specific to address potential impacts at Sydney Olympic Park metro station construction site are listed in Table 9-9.

Table 9-9 Transport mitigation measures – Sydney Olympic Park metro station

Ref	Impact/issue	Mitigation measure	Timing
Transport			
EIS-TT5	Bus access to precinct	Appropriate intersection upgrades to enable bus access to the station precinct would be investigated in consultation with Sydney Olympic Park Authority and Transport for NSW.	Operation

9.6 Noise and vibration

Further details on the operational and construction noise and vibration assessment, including the approach and methodology, are provided in Technical Paper 3 (Operational noise and vibration) and Technical Paper 4 (Construction noise and vibration).

9.6.1 Baseline environment

Existing noise levels around Sydney Olympic Park metro station are controlled by distant road traffic noise from the M4 Western Motorway and Homebush Bay Drive, some rail noise, and general noise from the sports and entertainment complex. Sydney Olympic Park has several open-air stadiums and various bars and restaurants. High levels of sporting/spectator noise are a regular feature of the area during events and when crowds disperse afterwards. The stadiums are also used for special events such as music festivals and concerts, which can also result in high levels of noise during the daytime, evening and parts of the night-time.

The area surrounding Sydney Olympic Park metro station is mainly commercial with receivers typically being of office or retail use. This precinct has been divided into two noise catchment areas (NCAs) for the construction noise assessment – NCA08 and NCA09. The site and NCAs are shown in Figure 9-13.

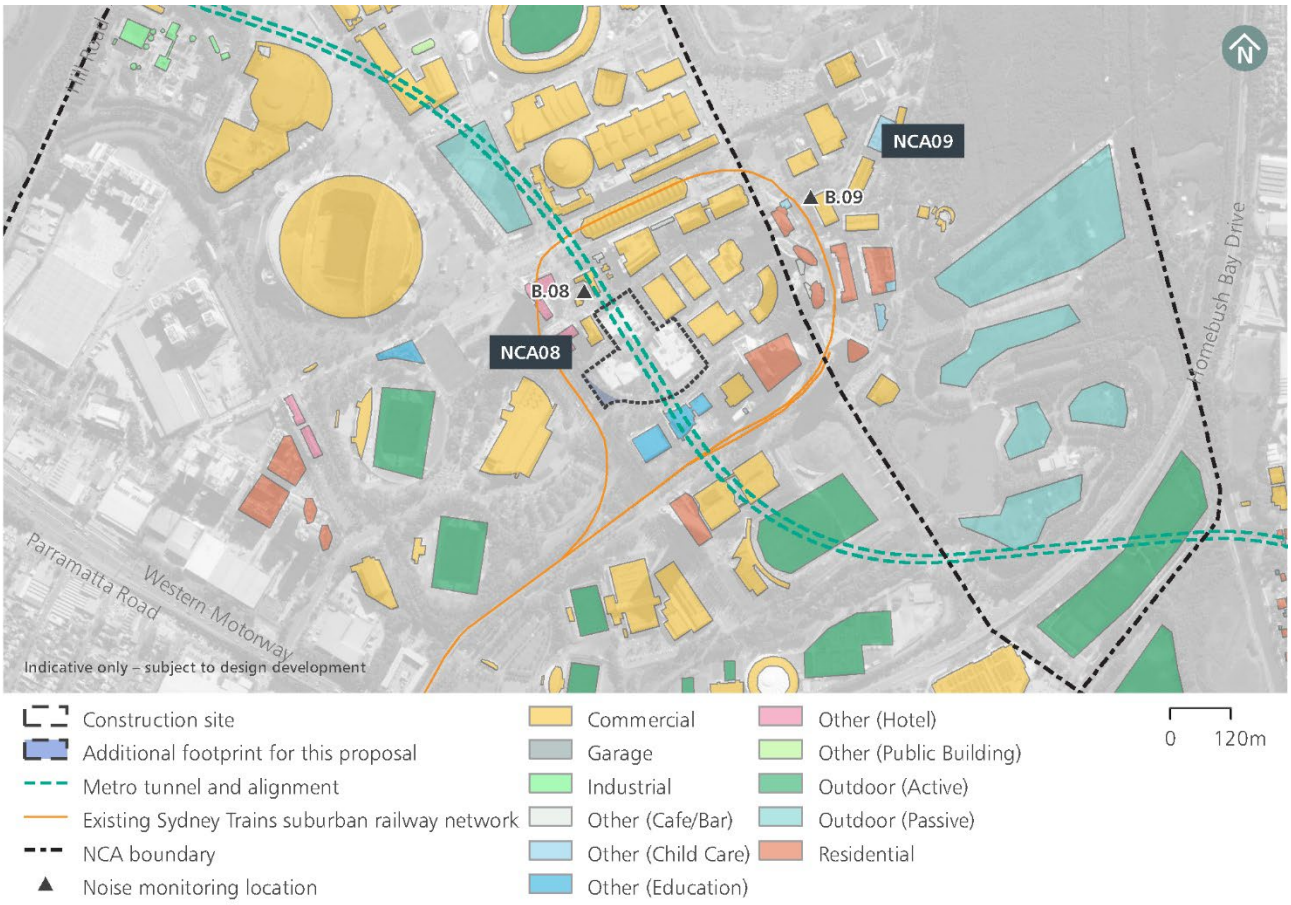

Figure 9-13 Location of sensitive receivers near Sydney Olympic Park metro station and NCAs

Unattended noise monitoring was carried out at sensitive receiver locations near Sydney Olympic Park metro station between March and July 2019 as part of the *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a). This data represents the noise environment prior to the commencement of the work carried out under the previous Sydney Metro West planning application.

The results of the unattended noise monitoring are summarised in Table 9-10 and indicate that background noise levels generally reflect the residential and commercial nature of the area.

Short-term attended noise monitoring was also carried out at Sydney Olympic Park metro station between March and July 2019. The results were generally found to be consistent with the unattended noise monitoring. Detailed observations from the attended monitoring are provided in Technical Paper 4 (Construction noise and vibration).

Table 9-10 Summary of unattended noise monitoring – Sydney Olympic Park metro station

Location ID	Noise logger location	Noise level (dBA)[1,2]					
		Background noise (RBL)			Average noise level (L_{Aeq})		
		Day	Evening	Night	Day	Evening	Night
B.08	1 Herb Elliott Avenue, Sydney Olympic Park	48	48	46	55	54	52
B.09	6 Parkview Drive, Sydney Olympic Park	48	46	41	57	58	53

Notes:

1. The RBL and L_{Aeq} noise levels have been determined with reference to the procedures in the Noise Policy for Industry (NSW Environment Protection Authority, 2017)
2. Daytime is 7am to 6pm, evening is 6pm to 10pm, and night-time is 10pm to 7am

9.6.2 Operational impact assessment

Predicted operational noise associated with Sydney Olympic Park metro station has been assessed for the nearest and most noise-affected commercial and residential sensitive receivers for each source type as presented in Table 9-11.

The results indicate that the predicted noise levels would be compliant with the applicable noise criteria. Noise attenuation has been incorporated into the design to determine the predicted noise levels and includes consideration of the use of large fan attenuators, vent orientation, acoustic louvres and appropriate plant selection. These measures would be further developed throughout the detailed design phase so that compliance with the environmental noise criteria is achieved.

At Sydney Olympic Park metro station the sleep disturbance noise criteria is L_{AFmax} 61 dB(A). At the nearest residential receivers, L_{AFmax} noise levels associated with the draught relief shaft are predicted to be 40 dB(A). Given compliance with the applicable noise criteria is achieved, further consideration of noise attenuation is not required at this location.

There would be no sources of vibration as part of operation of the station that would impact nearby receivers. Potential operational vibration impacts from trains operating in the tunnels are addressed in Chapter 16 (Tunnels) of this Environmental Impact Statement.

Table 9-11 Operational noise levels – Sydney Olympic Park metro station

Period/source	Criteria[1], dB(A)	Predicted noise level ($L_{Aeq,15min}$)
10 Herb Elliott Avenue – commercial		
Daytime	60	59
Evening	60	59
Night-time	60	55
Emergency mode	65	60
2 Figtree Drive – residential		
Daytime	53	43
Evening	48	43
Night-time	43	40
Emergency mode	48	48
Draught relief noise impacts	65 L_{Amax}	40

Notes:

1. Criteria differs between operational noise source type (refer Technical Paper 3 (Operational noise and vibration))

9.6.3 Construction impact assessment

The construction scenarios and anticipated working hours at the Sydney Olympic Park metro station construction site are shown in Table 9-12. The estimated duration of each activity is also provided, noting that most activities would be intermittent and would not occur on a continual basis during every day of the activity.

The proposed work is anticipated to have a total duration of about four and a half years. Refer to Figure 9-8 for the indicative construction program at Sydney Olympic Park metro station.

Temporary construction noise and vibration impacts would be managed through the implementation of standard and additional mitigation measures in accordance with the Sydney Metro CNVS.

Table 9-12 Construction activities and working hours – Sydney Olympic Park metro station

Scenario	Activity		Indicative duration (months)	Hours of work[1]			
				Std. day	Out of hours works		
					Day OOH	Evening	Night
Site establishment and public domain work	Typical	Deliveries and general work	18	✓	✓	-	-
	Peak	Construction/decommissioning of facilities and hoarding		✓	✓	-	-
Piling	Typical	Supporting work	9	✓	✓	-	-
	Peak	Bored piling with support plant		✓	✓	-	-
Station/facility construction	Typical	Internal construction and fit out	30	✓	✓	✓	✓
	Peak 1	Installation of framing and structure		✓	✓	✓	-
	Peak 2	Concrete work		✓	✓	✓	-
Excavation	Typical	Mucking out	9	✓	✓	-	-
	Peak	Through soft soil/rock		✓	✓	-	-

Notes:
1. OOH = out-of-hours

Airborne construction noise

The predicted airborne NML exceedances from the Sydney Olympic Park metro station construction site are summarised in Table 9-13 for all residential receivers and in Table 9-14 for commercial and other sensitive receivers. The predictions are representative of the highest noise levels that would be experienced when the works are nearest to the sensitive receiver.

The number of receivers predicted to experience exceedances of the NMLs are summarised in bands of 10 dB and are separated into day, evening and night-time periods, as appropriate.

During the daytime, the highest construction noise impacts are predicted during station/facility construction when noise intensive equipment such as a concrete saw would be in use. The highest impact work is expected to last for around 30 months; however, concrete saws would only be used intermittently as required when concrete slabs are poured.

During the night-time, internal construction and fit out during station/facility construction would be the only activity proposed at Sydney Olympic Park metro station construction site. The majority of this work would occur inside the built station structure and would not require noise intensive equipment. The work is expected to last for around 30 months.

Table 9-13 Overview of NML exceedances (residential receivers) – Sydney Olympic Park metro station construction site

Scenario	Activity	Indicative duration (months)	Number of receivers exceeding NML														
			Standard hours daytime			Out of hours											
						Daytime out of hours			Evening			Night time			Sleep disturbance		
			1 10 dB	10 20 dB	>20 dB	1 10 dB	10 20 dB	>20 dB	1 10 dB	10 20 dB	>20 dB	1 10 dB	10 20 dB	>20 dB	1 10 dB	10 20 dB	>20 dB
Site establishment and public domain work	Typical	18	-	-	-	1	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Peak		2	-	-	5	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Piling	Typical	9	-	-	-	2	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Peak		2	-	-	5	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Station/facility construction	Typical	30	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
	Peak 1		-	-	-	3	-	-	3	-	-	n/a	n/a	n/a	n/a	n/a	n/a
	Peak 2		4	1	-	5	3	-	4	4	-	n/a	n/a	n/a	n/a	n/a	n/a
Excavation	Typical	9	2	-	-	5	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Peak		4	-	-	4	1	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Table 9-14 Overview of NML exceedances (other sensitive receivers) – Sydney Olympic Park metro station construction site

Scenario	Activity	Indicative duration (months)	Number of receivers exceeding NML								
			Commercial			Child care			Educational		
			1 10 dB	10 20 dB	>20 dB	1 10 dB	10 20 dB	>20 dB	1 10 dB	10 20 dB	>20 dB
Site establishment and public domain work	Typical	18	-	-	-	-	-	-	2	-	-
	Peak		4	-	-	-	-	-	1	1	-
Piling	Typical	9	1	-	-	-	-	-	1	1	-
	Peak		2	-	-	-	-	-	1	1	-
Station/facility construction	Typical	30	-	-	-	-	-	-	1	-	-
	Peak 1		1	-	-	-	-	-	1	1	-
	Peak 2		6	1	-	4	-	-	-	1	1
Excavation	Typical	9	3	-	-	-	-	-	1	1	-
	Peak		5	-	-	-	-	-	-	2	-

The findings of the worst-case construction noise impact assessment at the Sydney Olympic Park metro station construction site during the daytime indicate:

- the surrounding receivers are generally commercial or educational facilities, with the nearest residential receivers at some distance from the site. 'Moderate' to 'high' impacts are predicted at a small number of the nearest receivers during noisy outside work, particularly when noise-intensive equipment, such as concrete saws, is being used as part of station/facility construction work. Concrete saws are expected to only be infrequently used throughout the 30-month construction period. When work is inside the station, the daytime impacts are predicted to substantially reduce, with noise levels predicted expected to comply with the noise management levels at most receivers
- the 'peak' scenarios would generate more noise and result in more exceedances than the 'typical' scenarios, which would result from the 'peak' scenarios using noise-intensive (or noisier) equipment
- the nearest commercial and 'other sensitive' receivers are predicted to be impacted during some of the noisier outdoor work activities. The highest impacts at these receivers are predicted when concrete saws are being used as part of station/facility construction. Worst-case impacts are predicted to be at:
    - 'high' at the NSW Institute of Sport
    - 'moderate' at Kirana Colleges Australia and adjacent commercial building

The findings of the worst-case construction noise impact assessment at Sydney Olympic Park metro station construction site during the night-time indicate:

- noise levels at the majority of receivers are predicted to comply with the noise management levels
- 'low' impacts are predicted at two residential receivers during internal station/facility construction activities at night-time.

Based on current construction planning access points for tunnel fit out and rail systems work would likely be via the Parramatta metro station, Clyde stabling and maintenance facility (including Rosehill services facility), Burwood North Station and The Bays Station construction sites. However, depending on construction staging, other construction sites would be used to access the tunnels to carry out tunnel fit out and rail systems work. If Sydney Olympic Park metro station is used to support rail systems fit out work, this would likely result in the following potential impacts:

- low exceedances of the noise management level at the nearest residential receivers during the daytime, which could be reduced to negligible with the use of an acoustic shed (or other acoustic measures)
- moderate exceedances of the noise management level at the nearest residential receivers during the night-time, which could be reduced to negligible with the use of an acoustic shed (or other acoustic measures)
- low exceedances of the noise management level at the nearest commercial receivers, which could be reduced to negligible with the use of an acoustic shed (or other acoustic measures).

The impacts presented above are based on all equipment working simultaneously in each assessed scenario. There would be periods when construction noise levels are much lower than the worst-case levels predicted and there would be times when no equipment is in use and no impacts occur.

Highly affected residential receivers

No residential receivers are predicted to be highly noise affected by works at the Sydney Olympic Park metro station construction site.

Sleep disturbance

No sleep disturbance impacts are predicted from the proposed work at the Sydney Olympic Park metro station construction site.

Vibration impacts

Construction work for this proposal at Sydney Olympic Park metro station would not involve major sources of vibration generating equipment. As such, potential vibration impacts are anticipated to be negligible and would be managed through the Sydney Metro CNVS.

Ground-borne noise

Ground-borne noise impacts would only arise where ground-borne noise levels are higher than the corresponding airborne noise levels. This can occur where work is underground or where surface work is shielded by noise barriers or other structures. For all scenarios at the Sydney Olympic Park metro station construction site, airborne noise is anticipated to be higher than ground-borne noise levels and, as such, a ground-borne noise assessment is not required.

Construction traffic noise

Construction-related traffic has the potential to temporarily increase road traffic noise levels at receivers that are adjacent to the construction site and haul routes. The forecast construction traffic volumes outlined in Section 9.5.3 have been used to determine where potentially noticeable increases in road traffic noise (i.e. a greater than 2 dB increase above the existing noise level) is likely. Figtree Drive east of Olympic Boulevard is anticipated to have a 2 dB increase during the day. This is associated with the increased construction traffic and proportion of heavy vehicles during the day, although there are limited residential receivers along this road. The increase represents the worst-case predicted increase in any period.

Further assessment of construction traffic would be completed during detailed design for this proposal, including consideration of the potential for exceedances of the NSW Road Noise Policy base criteria (where greater than 2 dB increases are predicted). Measures outlined in the CEMF would be implemented to manage potential impacts.

9.6.4 Management and mitigation measures

Environmental management for this proposal would be undertaken through the environmental management approach as detailed in Chapter 20 (Synthesis) of this Environmental Impact Statement. This includes operational mitigation measures (where relevant) and performance outcomes for the operation and construction of this proposal.

The approach to noise and vibration management during the construction phase, including the process for the development of all construction noise and vibration statements is outlined in the CNVS (Appendix H).

The CNVS provides the overall strategy and approach for construction noise and vibration management for Sydney Metro West, and an outline of the noise and vibration management requirements and processes that would be common to each of the proposed construction sites.

In addition, the Sydney Metro CEMF (Appendix F) outlines the construction noise and vibration mitigation measures to minimise impacts as relevant to this proposal as a whole.

The CNVS and CEMF are discussed further in Chapter 20 (Synthesis) of this Environmental Impact Statement.

9.7 Non-Aboriginal heritage

Further details on the non-Aboriginal heritage assessment, including the approach and methodology, are provided in Technical Paper 5 (Non-Aboriginal heritage).

9.7.1 Baseline environment

The assessment of non-Aboriginal heritage impacts in Chapter 12 of the *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a) included a description of the existing environment. The non-Aboriginal heritage assessment for this proposal has predominantly used the baseline environment that will be established following the completion of the work carried out under the previous Sydney Metro West planning application.

Areas within the Sydney Olympic Park metro station construction site used for the work carried out under the previous Sydney Metro West planning application will have been cleared of existing structures and vegetation, with the station box excavated. In carrying out the work under the previous Sydney Metro West planning application, provisions would be applied so that the State Abattoir heritage item is not modified or impacted in any way (refer to condition of approval D17 for the previous Sydney Metro West planning application).

A minor area of additional footprint would be required for this proposal at the corner of Figtree Drive and Olympic Park Boulevard. This would be required for vegetation clearing and would not include any subsurface work.

For the purpose of this heritage assessment, the study area for Sydney Olympic Park metro station has been defined as a 50-metre buffer around the full extent of the site.

Existing setting

The existing setting surrounding the study area comprises a mix of commercial buildings, retail development and high-density residential apartment buildings. The Sydney Olympic Park metro station study area and existing heritage items within the study area are shown in Figure 9-14.

Site history

The Sydney Olympic Park metro station study area is located in an area initially granted in 1794, and within an estate where a homestead and racing track was constructed in the 1820s. Through the 19th century, the property was rented by various tenants and the land was described as empty and cleared. Some residential subdivision occurred in the 1880s, but growth in the area was slow.

In the early 20th century, the Public Works Department moved the State Abattoir from Glebe to Homebush (then known as the Home Bush Estate) and much of the land was acquired by the NSW Government. The State Abattoir was established in 1907, became one the largest slaughterhouses in Australia, and operated at the site until its closure in 1988. Significant remnant elements within the former abattoir site include a collection of five Federation style buildings, set within landscaped gardens.

As industrial development in Sydney expanded in the mid-20th century, Homebush was also used as a dumping location for toxic waste, with a number of landfills located there. The area was rehabilitated and redeveloped for sports and recreational use for the 2000 Sydney Olympic and Paralympic Games.

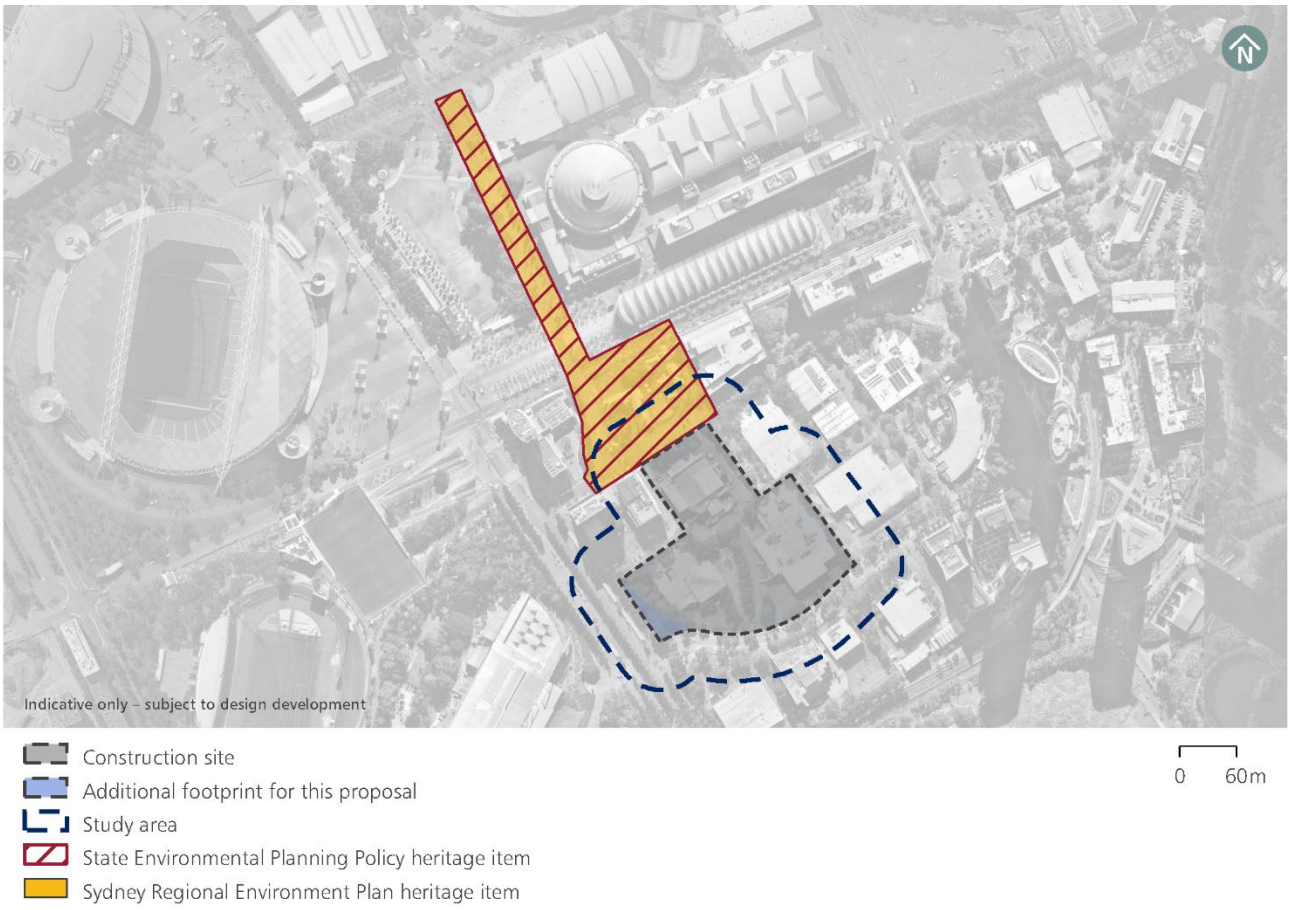

Figure 9-14 Heritage items within the study area – Sydney Olympic Park metro station

9.7.2 Impact assessment

Built heritage impact assessment

Table 9-15 summarises the potential impacts of construction and operation of this proposal on built heritage items within the study area at Sydney Olympic Park metro station. An assessment against relevant conservation management policies has also been carried out and is included in Technical Paper 5 (Non-Aboriginal heritage).

Potential impacts to build heritage items in the Sydney Olympic Park metro station study area would generally be neutral or negligible. Management of potential impacts is outlined in Section 9.7.3.

Table 9-15 Impacts on significance of built heritage items – Sydney Olympic Park metro station

Item, listing and significance	Potential impact	Magnitude
State Abattoirs State Environmental Planning Policy (State Significant Precincts) 2005 Listing No. A; Sydney Regional Environmental Plan No 24 – Homebush Bay Area Item No. 1 State	**Direct impact** The heritage curtilage of the item extends south towards the northern boundary of the construction site. Construction of the proposed point-to-point vehicle facility and a pedestrian crossing would be located within the heritage curtilage; however, this would also be within the existing road corridor where there is existing car parking. As such, no physical elements of significant structures or landscaping of the State Abattoir would be modified by this proposal.	**Neutral**
	Settlement and vibration Vibration levels from the surrounding construction works are predicted to be below the cosmetic damage screening criteria. Potential direct impacts associated with vibration are not anticipated.	**Neutral**
	Temporary indirect (visual) impact The aesthetic significance of the item is associated with its landscaped gardens and Federation building design. While the construction site would be in proximity to these elements, they would not overshadow or obstruct views of that space.	**Negligible**
	Permanent indirect (visual) impact The height of the northern station entry and services building would be relatively consistent with an existing multi-storey commercial building situation to the west of the construction site. The proposed metro station would not result in overshadowing of the significant elements of the State Abattoir item. The construction of interchange and precinct facilities on Herb Elliott Avenue in front of the Gatehouse building would not obstruct views of the building or surrounding landscaping and would be located within the road corridor currently used for car parking. Overall, these works would result in negligible indirect (visual) impacts to the heritage significance of the item, as significant elements of the item would not be overshadowed and views would not be obstructed.	**Negligible**

Archaeological impact assessment

The area within the approved Sydney Olympic Park metro station construction site has been previously assessed in Chapter 12 of the *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a). No non-Aboriginal archaeological remains were predicted in the approved Sydney Olympic Park metro station construction site.

Construction of this proposal would include minor earthworks to level the site consistent with the surrounding road network. Given that no non-Aboriginal archaeological remains were predicted in this area, the proposed work is not anticipated to result in any impacts to archaeological remains. Any potential impacts would be managed through the CEMF, which includes procedures for unexpected heritage finds (refer to Section 9.7.3).

No subsurface works are proposed in the area of additional footprint required for this proposal. As such, this proposal would not result in any impacts to potential archaeological remains, if present, in this area.

9.7.3 Management and mitigation measures

Environmental management for this proposal would be undertaken through the environmental management approach as detailed in Chapter 20 (Synthesis) of this Environmental Impact Statement. This includes operational mitigation measures (where relevant) and performance outcomes for the operation and construction of this proposal.

During construction of this proposal, non-Aboriginal heritage would be managed in accordance with Sydney Metro's CEMF (refer to Appendix F). The CEMF includes heritage management objectives and mitigation measures to minimise impacts as relevant to this proposal as a whole.

Mitigation measures that are specific to the operation and construction of Sydney Olympic Park metro station to address potential impacts are listed in Table 9-16.

Table 9-16 Non-Aboriginal heritage mitigation measures – Sydney Olympic Park metro station

Ref	Impact/issue	Proposed mitigation measure	Timing
Non-Aboriginal heritage			
EIS-NAH2	Permanent indirect (visual) impact	Detailed design for aboveground station elements, ancillary facilities and public domain and landscaping work located in or near to heritage significant items, would respond to the following heritage guidelines during design development in order to minimise indirect (visual) impacts to heritage items identified under this proposal: • The Burra Charter – The Australia ICOMOS Charter for Places of Cultural Significance (2013), Australia ICOMOS • Better Placed – Design Guide for Heritage (2019), prepared by the NSW Government Architect • Design in Context (2005), prepared by the NSW Heritage Office and the Royal Australian Institute of Architects NSW Chapter • New Uses for Heritage Places (2008), prepared by the Heritage Council of NSW and the Royal Australian Institute of Architects • Draft Connecting with Country Framework (2020), Government Architect NSW. Detailed design would also respond to guidelines and policies outlined in existing Conservation Management Plans or other relevant heritage assessment documents for relevant heritage items (State Abattoir, White Bay Power Station), with particular focus on preserving significant views towards the item.	Operation

9.8 Aboriginal heritage

The approach and methodology for the Aboriginal heritage assessment are provided in Chapter 4 (Methodology) of this Environmental Impact Statement. The legislative context for the assessment is provided in Appendix B (Legislative and policy context).

9.8.1 Baseline environment

The previous Sydney Metro West planning application assessed the potential impacts of the establishment of the Sydney Olympic Park metro station construction site.

This section summarises the existing environment presented in the *Sydney Metro West Environmental Impact Statement – Westmead to the Bays and Sydney CBD* (Sydney Metro, 2020a) to provide context for this proposal. The Sydney Olympic Park metro station construction site is largely consistent with the construction site approved as part of the previous Sydney Metro West planning application. A minor area of additional footprint along Olympic Boulevard is required for construction of this proposal to support the development of the public domain at Sydney Olympic Park metro station.

Landscape and archaeological context

The Sydney Olympic Park metro station construction site is located within the Cumberland Lowlands physiographic region of the Cumberland Plain, described by Chapman & Murphy (1989), as a broad and gently undulating ridge crest bordered by Haslams Creek to the west, Powells Creek to the east, and Homebush Bay to the north. Reference to the 1:100,000 Geological Map Sheet for Sydney (9130) indicates that the surface geology is dominated by Wianamatta Group units, comprising Ashfield Shale, Minchinbury Sandstone and Bringelly Shale, overlying the Mittagong Formation and the Hawkesbury Sandstone. Raw materials included shale (claystone and siltstone), carbonaceous claystone, laminite and fine to medium-grained lithic sandstone.

Review of historical reference materials indicates that the Sydney Olympic Park metro station construction site has been heavily impacted by commercial and/or industrial development and the development of Sydney Olympic Park. The archaeological implication of these works is the potential disturbance or destruction of pre-existing Aboriginal sites and archaeological deposits.

Previous Aboriginal cultural heritage assessments

The following summarises key investigations undertaken in the local environs that are relevant to this proposal:

- Urbis Pty Ltd (2016) undertook a limited Aboriginal archaeological assessment of 2 Figtree Drive, Sydney Olympic Park, located 200 metres east of the Sydney Olympic Park metro station construction site. The assessment noted that the project's study area was located on high ground about 600 metres to the west of Powells Creek and the same distance to Homebush Bay, suggesting the area represented unfavourable environs for Aboriginal occupation
- Brayshaw (1997) completed an archaeological survey of the Olympic Village site and Newington. No Aboriginal sites were identified. Brayshaw noted a high level of disturbance on the lower slopes west of Haslams Creek and concluded that the area did not retain any archaeological potential on that basis
- Carney & Steele (1997) completed an archaeological survey of a proposed building site located 300 metres west of the Sydney Olympic Park metro station construction site. No Aboriginal sites were identified or areas suggestive of Aboriginal occupation
- Irish (2004) completed an archaeological assessment of the nature reserve buffer zone of the Newington Armory Precinct. Irish's field observations of trees in the precinct concluded that observed trees were of insufficient age to retain cultural scarring and suggested that the scarred trees identified in previous studies were not Aboriginal in origin. The survey identified three isolated silcrete and chert artefacts along with two areas of Potential Archaeological Deposit around 1.5 kilometres north of the Sydney Olympic Park metro station construction site
- Artefact Heritage Pty Ltd undertook archaeological survey of the area as part of the *Sydney Metro West Environmental Impact Statement - Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a*)*. The survey identified that the Sydney Olympic Park metro station construction site was located within a modified industrial landscape located a significant distance from permanent water sources. On the basis of its previous disturbance and distanced from permanent water, the area was assessed as having a low archaeological potential. The assessment did not identify any site-specific cultural values within the Sydney Olympic Park metro station construction site for the previous Sydney Metro West planning application.

Recorded Aboriginal sites

The *Sydney Metro West Environmental Impact Statement – Westmead to the Bays and Sydney CBD* (Sydney Metro, 2020a) did not identify any previously recorded Aboriginal sites within the Sydney Olympic Park metro station construction site.

An updated search of the AHIMS database was undertaken for this assessment on 21 August 2021 (Search ID 609567) which also did not identify any previously recorded Aboriginal sites within 100 metres of the Sydney Olympic Park metro station construction site, including within the area of additional footprint required for this proposal along Olympic Boulevard.

Aboriginal community consultation and cultural values

Consultation undertaken with Registered Aboriginal Parties for the previous Sydney Metro West planning application did not identify any site-specific cultural values at the Sydney Olympic Park metro station construction site.

Ongoing consultation with Aboriginal heritage knowledge holders is underway as part of design development for this proposal, including for the purposes of better understanding cultural values and addressing the Connecting with Country framework.

Field investigation results

The *Sydney Metro West Environmental Impact Statement – Westmead to the Bays and Sydney CBD* (Sydney Metro, 2020a) included a survey of the Sydney Olympic Park metro station construction site undertaken with participation from Registered Aboriginal Party representatives from the Metropolitan Local Aboriginal Land Council. A field investigation was also undertaken on 11 January 2021 for the additional footprint required for this proposal at Sydney Olympic Park metro construction site with participation from a Registered Aboriginal Party representative from the Metropolitan Local Aboriginal Land Council. No site-specific cultural values were identified during the field investigation, however the representative noted that the surrounding area at Sydney Olympic Park was a prominent resource area in association with the Parramatta River. Aboriginal peoples would have migrated along the Parramatta River during culturally and environmental significant times of the year. Additionally, the representative noted the cultural significance of fig trees which are present in the surrounding area.

9.8.2 Operational impact assessment

Direct impacts

No identified Aboriginal sites, objects and/or site-specific cultural heritage values would be directly impacted during operation of this proposal at Sydney Olympic Park metro station.

Indirect impacts

No identified Aboriginal sites, objects and/or site-specific cultural heritage values would be indirectly impacted during operation of this proposal at Sydney Olympic Park metro station.

During development of Sydney Metro West, consultation was undertaken with knowledge holders to inform the project development as part of the Connecting with Country Pilot program. This consultation will continue during further development of the project. In accordance with Concept conditions of approval CB4 and CB5, a Draft Heritage Interpretation Strategy has been prepared for this proposal (refer to Appendix K) which details how Aboriginal heritage values would be interpreted and reflected within the design of this proposal.

Further details regarding Sydney Metro's approach to Connecting with Country, and heritage and archaeology design guidelines are provided in the station and precinct design guidelines in Appendix E (Design guidelines).

9.8.3 Construction impact assessment

Direct impacts

There were no recorded Aboriginal sites, objects or site-specific cultural values identified within the Sydney Olympic Park metro station construction site, including within the additional footprint area required for this proposal along Olympic Boulevard. Therefore, there would be no direct impacts on identified Aboriginal heritage sites, objects or site-specific cultural values during construction of this proposal.

Indirect impacts

No identified Aboriginal sites, objects and/or site-specific cultural heritage values would be indirectly impacted during construction of this proposal at the Sydney Olympic Park metro station construction site, including the additional footprint area required for this proposal along Olympic Boulevard.

9.8.4 Management and mitigation measures

Environmental management for this proposal would be undertaken through the environmental management approach as detailed in Chapter 20 (Synthesis) of this Environmental Impact Statement. This includes operational mitigation measures (where relevant) and performance outcomes for the operation and construction of this proposal.

During construction of this proposal, Aboriginal heritage would be managed in accordance with Sydney Metro's CEMF (Appendix F). The CEMF management objectives and mitigation measures to minimise impacts as relevant to this proposal as a whole.

9.9 Landscape and visual amenity

Further details on the landscape and visual amenity assessment, including the approach and methodology, are provided in Technical Paper 6 (Landscape and visual amenity).

9.9.1 Baseline environment

The Sydney 2000 Olympic and Paralympic Games at Sydney Olympic Park resulted in the creation of a series of iconic sporting and recreational facilities, including the ANZ Stadium, formerly known as the Olympic Stadium. The major event facilities are arranged around two principles axes – Olympic Boulevard and Dawn Fraser Avenue – which provide grand ceremonial vistas between the various destinations.

The existing business park is intended to be converted into a high-density mixed-use town centre under the *Sydney Olympic Park Master Plan 2030* (Sydney Olympic Park Authority, 2018). Section 9.3 provides further discussion of the intended future character local strategic plans relevant to Sydney Olympic Park, including the *Sydney Olympic Park Master Plan 2030* (Sydney Olympic Park Authority, 2018) and *Draft Sydney Olympic Park Master Plan 2030 (Interim Metro Review)* (Sydney Olympic Park Authority, 2021). A detailed review of local planning guidance relevant to landscape and visual context is provided in Technical Paper 6 (Landscape and visual amenity).

The Sydney Olympic Park metro station site would be located to the south of the Abattoir Heritage Precinct, an item of State heritage significance, which is designed in a Federation style, with a collection of buildings set within landscaped gardens and lawns.

All buildings and vegetation within the approved Sydney Olympic Park metro station construction site would be removed as a part of the work carried out under the previous Sydney Metro West planning application. This includes major demolition and station excavation works south of Herb Elliott Avenue that would leave a large vacant site within a business park setting. There would be existing hoarding around the perimeter of this vacant site.

Landscapes and public realm areas

The landscapes and public realm areas potentially impacted by this proposal, and the landscape sensitivity level for these areas, are outlined in Table 9-17.

Table 9-17 Landscapes and public realm areas – Sydney Olympic Park metro station

Location	Baseline environment	Landscape sensitivity level
Herb Elliott Avenue and Figtree Drive streetscapes and the site	The mature native street trees along much of Herb Elliott Avenue contribute to a leafy streetscape character and visually soften the scale and bulk of the adjacent commercial buildings. Buildings along the southern side of the street are mostly setback, whereas buildings along the northern side are generally located close to the street frontage. The Abattoir Heritage Precinct is located to the north of Herb Elliott Avenue, on the corner of Showground Road. The curtilage of the Abattoir Heritage Precinct extends across Herb Elliott Avenue and Showground Road to provide a visual buffer and maintain short distance views to the precinct. Figtree Drive is a low-speed street with two traffic lanes, indented parking areas, planted verges and footpaths on both sides. Trees on Figtree Drive contribute to the amenity of the streetscape and provide shade and comfort for pedestrians. The curved nature of the streetscape and varying topography adds to the visual interest of the streetscape; however, this reduces legibility. Land uses along Herb Elliott Avenue are intended to be transformed into a high-density mixed-use town centre. Herb Elliott Avenue and Figtree Drive provide east-west pedestrian connectivity, linking Olympic Boulevard and Australia Avenue. The grid street layout provides some permeability to the north of the Abattoir Heritage Precinct; however, the large block layout south of Herb Elliott Avenue forms a barrier for pedestrians moving through this area.	Local
The Abattoir Heritage Precinct gardens	The Abattoir Heritage Precinct includes a collection of Federation-style buildings set within landscaped gardens and lawns. The precinct is an item of State heritage significance. The gardens include formal rose gardens, a palm grove, avenue planting and succulent gardens.	Local

Representative viewpoints

Representative viewpoints that have been selected to inform the daytime visual impact assessment are shown in Figure 9-15. Viewpoints 1, 2 and 5 are of local sensitivity, while viewpoints 3 and 4 are of neighbourhood sensitivity.

While the impact ratings for all of these five viewpoints are provided, the following three have been selected as the most representative for this station to be discussed in this section. These take into account the degree of sensitivity, and potential operational and construction elements that would be visible:

- **viewpoint 1: view south-east along Showground Road** – as the gardens and palm grove within the Abattoir Heritage Precinct are visible from this viewpoint, providing a distinctive setting to the heritage buildings and gatehouse near the corner of Showground Road and Herb Elliott Avenue
- **viewpoint 2: view south-west along Herb Elliott Avenue** – as the Abattoir Heritage Precinct gardens can be seen from this view, beyond the existing commercial built form

- **viewpoint 5: view east from Olympic Boulevard** – as this view is from a wide pedestrian plaza adjacent to a series of bus stops on Olympic Boulevard.

These viewpoints are assessed in further detail in this section. A detailed assessment of all viewpoints is provided in Technical Paper 6 (Landscape and visual amenity).

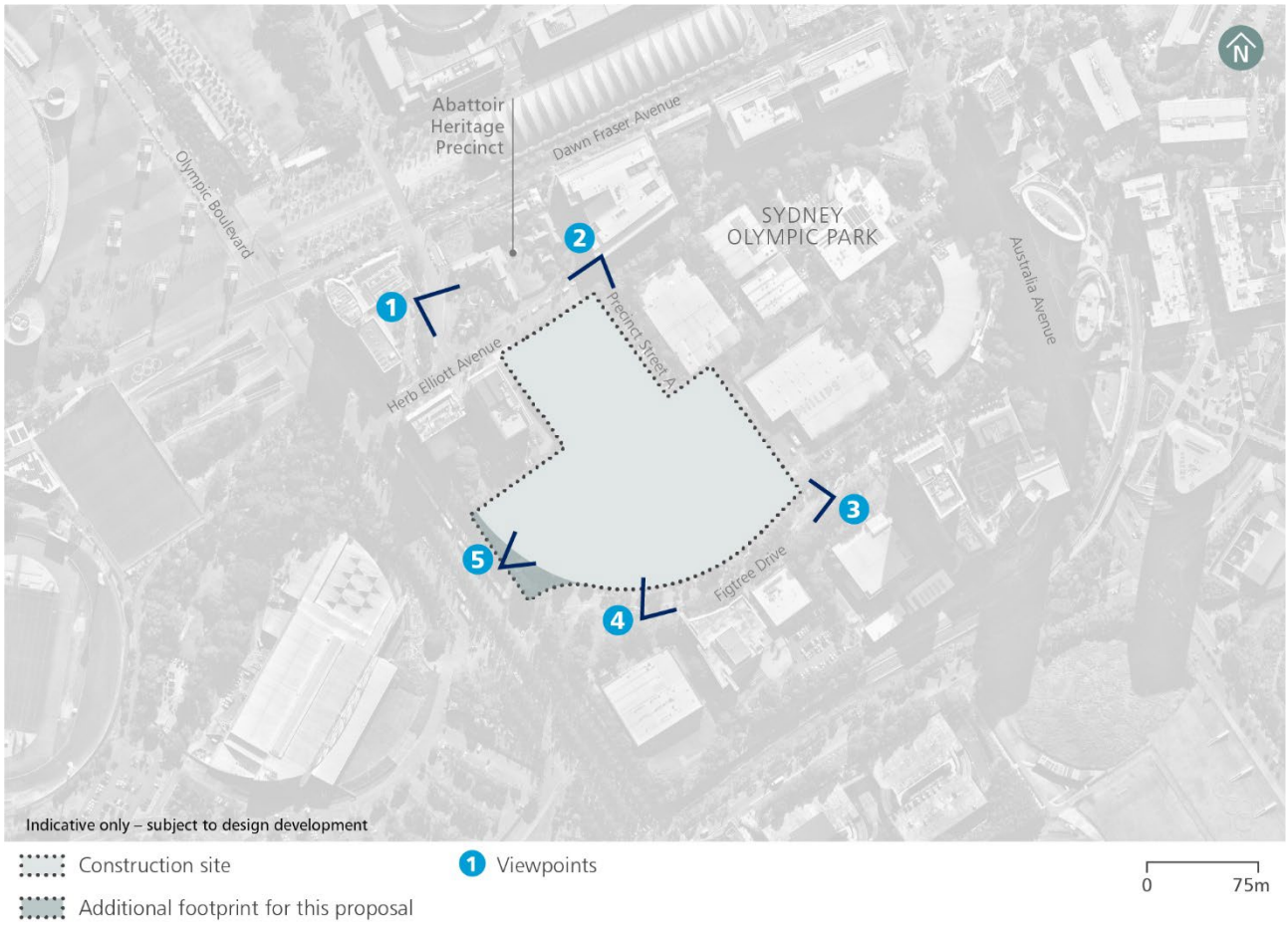

Figure 9-15 Representative viewpoints – Sydney Olympic Park metro station

Night-time visual sensitivity

The Sydney Olympic Park metro station site is an area of medium district brightness (A3) and would be of low sensitivity. This is due to the concentration of hotels and low-rise commercial buildings in this location and adjacent residential towers. Brightly lit sporting, recreational, entertainment and transport facilities nearby, such as the ANZ Stadium and the existing Olympic Park Station, contribute to the high night-time lighting levels. There will be some security lighting remaining from the work carried out under the previous Sydney Metro West planning application. The remaining mature street trees and vegetation on Herb Elliott Avenue and Figtree Drive somewhat contain the light from streetlights and traffic on these streets.

9.9.2 Operational impact assessment

Operation of this proposal at Sydney Olympic Park metro station would comprise underground and surface elements. The key elements that would be visible are described in Section 9.2.

Landscape impact

Landscape impacts anticipated as a result of the operation of this proposal are summarised in Table 9-18. Management of potential impacts is discussed in Section 9.9.4.

The operation of this proposal would generally result in landscape benefits due to the provision of public domain areas and improvements in the permeability of the area for pedestrians. New public domain areas would be created, including a large north-south oriented plaza that would adjoin the southern side of Herb Elliott Avenue. There would be a new activated built form facing Herb Elliott Avenue, of a similar scale to the existing adjacent buildings to the east and west of the site.

As part of this proposal, an expansive new plaza would be created between Herb Elliott Avenue and Figtree Drive, and between this plaza and Olympic Boulevard in the west. The plaza extending west to Olympic Boulevarde would function as the primary event mode access for crowds accessing the metro station. The scale of these spaces would be consistent with the large event-sized plaza areas that currently exist in Sydney Olympic Park.

The provision of north-south aligned Precinct Street B and public domain areas within the station precinct would reduce the block size and improve the permeability of this area for pedestrians.

The character and amenity of the Abattoir Heritage Precinct would be restored as the construction activity in the surrounding areas ceases. The creation of a new areas of public domain, to the south-east of the gardens, would create a sense of openness and create opportunities for views towards the heritage gardens and buildings from surrounding areas. The metro station building would rise about two to three storeys and step up to about four to five storeys over Herb Elliott Avenue, lower than the adjacent existing buildings to the west of the site. This built form is set back from Herb Elliott Avenue and the Abattoir Heritage Precinct gardens so that it would not be overbearing. The existing street trees along Herb Elliott Avenue and additional trees within the public domain areas would provide further physical and visual separation between the heritage gardens and the new built form.

Table 9-18 Landscape impacts during operation – Sydney Olympic Park metro station

Location	Landscape sensitivity level	Magnitude of change	Impact rating
Herb Elliott Avenue and Figtree Drive streetscapes and the site	Local	Considerable improvement	Moderate beneficial
The Abattoir Heritage Precinct gardens	Local	No perceived change	Negligible

Daytime visual amenity impact

Visual amenity impacts anticipated as a result of the construction of this proposal are summarised in Table 9-19. Management of potential impacts is discussed in Section 9.9.4. An artist's impression of the metro station during operation is shown in Figure 9-16. Potential station finishes would be identified as part of further design development and would be consistent with the principles and outcomes presented in the Design Guidelines (Appendix E).

The majority of viewpoints would experience minor beneficial or negligible impact due to the introduction of a new metro station and public domain areas, which would be compatible with the planned future character of Sydney Olympic Park (as part of the Sydney Olympic Park Master Plan 2030 (Sydney Olympic Park Authority, 2018)).

Table 9-19 Daytime visual impacts during operation – Sydney Olympic Park metro station

Location	Sensitivity rating	Magnitude of change	Impact rating
Viewpoint 1: view south-east along Showground Road	Local	No perceived change	Negligible
Viewpoint 2: view south-west along Herb Elliott Avenue	Local	Noticeable improvement	Minor beneficial
Viewpoint 3: view north-west along Figtree Drive	Neighbourhood	Noticeable improvement	Negligible
Viewpoint 4: view east along Figtree Drive	Neighbourhood	Noticeable improvement	Negligible
Viewpoint 5: view east from Olympic Boulevard	Local	Noticeable improvement	Minor beneficial

As noted in Section 9.9.1, the most representative viewpoints have been discussed in detail in this section. Potential impacts at these viewpoints would include the following:

- **viewpoint 1: view south-east along Showground Road** – operation of this proposal would result in negligible impact at this viewpoint, where the proposed aboveground station building would be set back from Herb Elliott Avenue and visible in the background of the view. This built form would be of a scale consistent with the adjacent commercial buildings and as intended by the Sydney Olympic Park Master Plan 2030 (Sydney Olympic Park Authority, 2018), which proposes a new high-density town centre in this location
- **viewpoint 2: view south-west along Herb Elliott Avenue** – there would be a minor beneficial impact at this viewpoint due to the compatibility of the proposed built form with the existing scale of buildings in this area combined with the expansive areas of public domain. The new station building would be set back from Herb Elliott Avenue, reducing its prominence in this view. The existing street trees and proposed new trees within the public domain areas would filter views to the building's street level and along its east-facing façade. This built form would be stepped down in scale from the adjacent commercial buildings. This built form scale would be consistent with the Sydney Olympic Park Master Plan 2030 (Sydney Olympic Park Authority, 2018), which proposes a new high-density town centre in this location
- **viewpoint 5: view east from Olympic Boulevard** – there would be a minor beneficial impact at this viewpoint due to intervening vegetation, the provision of new public domain and compatibility of the built form with the scale of the existing buildings at this view. This view would be oriented along a new central east-west public domain area, which would allow views east and towards a new precinct street and proposed metro station buildings. The new station building would be visible in the background of this view, set back from Olympic Boulevard and extending across the background of the view. The level of the site would be lowered, so that the public domain is level with Figtree Drive. The new building would rise prominently above the streetscape; however, it would be filtered through existing street trees and would be of scale consistent with the adjacent commercial buildings and as the intentions of the Sydney Olympic Park Master Plan 2030 (Sydney Olympic Park Authority, 2018).

The existing view and a photomontage of this proposal during operation at viewpoint 1 is provided in Figure 9-17 and Figure 9-18, respectively.

Indicative only – subject to design development

Figure 9-16 Artist's impression of Sydney Olympic Park metro station during operation

Figure 9-17 Existing view from viewpoint 2 (view south-west along Herb Elliott Avenue). Extent of vegetation removal (under the previous Sydney Metro West planning application) is shown in orange

Indicative only – subject to design development

Figure 9-18 Photomontage from viewpoint 2 (view south-west along Herb Elliott Avenue)

Night-time visual amenity impact

The anticipated night-time visual impacts during operation are summarised in Table 9-20.

The new station and surrounding public domain areas would be brightly lit for legibility and customer safety. This lighting would be somewhat contained and filtered through existing mature trees and proposed new plaza trees. This would increase the lighting levels visible from the adjacent hotel on the corner of Herb Elliott Avenue and Olympic Boulevard and from upper-level apartments of surrounding residential buildings. Overall, these additional light sources and skyglow would be seen in an area of high district brightness where there exists brightly lit streets, public domain and other public transport facilities. This lighting would be consistent with and largely absorbed into the surrounding brightly lit night scene.

Table 9-20 Night-time visual amenity impacts during operation – Sydney Olympic Park metro station

Location	Sensitivity rating	Magnitude of change	Impact rating
Sydney Olympic Park metro station	A3: Medium level brightness	No perceived change	Negligible

9.9.3 Construction impact assessment

The Sydney Olympic Park metro station construction site for this proposal would comprise the site for the work carried out under the previous Sydney Metro West planning application, and an area of additional footprint at the corner of Olympic Boulevard and Figtree Drive. The main elements that would be visible include the proposed works, construction site features, equipment and vehicle access routes described in Chapter 6 (Proposal description – construction) and Section 9.4.

Landscape impact

Landscape impacts anticipated as a result of the construction of this proposal are summarised in Table 9-21. Management of potential impacts is discussed in Section 9.9.4.

During construction of this proposal, the approved construction site would continue to be enclosed by hoarding (generally about three metres high). In the additional footprint area at the corner of Olympic Boulevard and Figtree Drive, about 16 trees would be removed to accommodate construction work.

There would be large-scale machinery, plant and vehicles visible within the site to support the station fit out and the construction of station buildings and proposed public domain.

Overall, the leafy streetscape character of both Herb Elliott Avenue and Figtree Drive would be largely maintained. Potential impacts would be localised and affect a small part of this streetscape. During construction, Herb Elliott Avenue would be temporarily closed in the vicinity of the site, including the adjacent footpaths and on-street parking spaces. The car parks adjacent to the site on Figtree Drive would also continue to be temporarily impacted. Further details on impacts to parking are addressed in Section 9.5.

There would continue to be construction site access via both Herb Elliott Avenue and Figtree Drive. This would continue the already reduced level of permeability and accessibility within this area as a result of the work carried out under the previous Sydney Metro West planning application at this site.

There would be no direct impact on the Abattoir Heritage Precinct heritage buildings and gardens. However, the construction site south of Herb Elliott Avenue, would be visible from the gardens, reducing the amenity of this precinct for recreational users. This work would also reduce the accessibility and legibility of the gardens.

Table 9-21 Landscape impacts during construction – Sydney Olympic Park metro station

Location	Landscape sensitivity level	Magnitude of change	Impact rating
Herb Elliott Avenue and Figtree Drive streetscapes and the site	Local	Noticeable reduction	Minor adverse
The Abattoir Heritage Precinct gardens	Local	Noticeable reduction	Minor adverse

Daytime visual amenity impact

Visual amenity impacts anticipated as a result of the construction of this proposal are summarised in Table 9-22.

The majority of viewpoints would experience minor adverse temporary visual impacts due to the presence of construction activities. Management of potential impacts is discussed in Section 9.9.4.

Table 9-22 Daytime visual impacts during construction – Sydney Olympic Park metro station

Location	Sensitivity rating	Magnitude of change	Impact rating
Viewpoint 1: view south-east along Showground Road	Local	Noticeable reduction	Minor adverse
Viewpoint 2: view south-west along Herb Elliott Avenue	Local	Noticeable reduction	Minor adverse
Viewpoint 3: view north-west along Figtree Drive	Neighbourhood	Noticeable reduction	Negligible
Viewpoint 4: view east along Figtree Drive	Neighbourhood	Considerable reduction	Minor adverse
Viewpoint 5: view east from Olympic Boulevard	Local	Noticeable reduction	Minor adverse

As noted in Section 9.9.1, the most representative viewpoints have been discussed in detail in this section. Potential temporary impacts for the duration of construction at these viewpoints would include the following:

- **viewpoint 1: view south-east along Showground Road** – construction of this proposal would result in a temporary minor adverse impact at this view. The Abattoir Heritage Precinct, including the mature gardens and heritage gatehouse would block views to the street-level construction activity beyond. There would be taller machinery and construction activity visible in the background of this view, enclosing the view. However, this would be seen in the context of the existing adjacent taller buildings
- **viewpoint 2: view south-west along Herb Elliott Avenue** – construction of this proposal would result in a temporary minor adverse impact at this view. There would be construction vehicles seen travelling along Herb Elliott Avenue and accessing the site. Works to construct the northern end of the station building would be seen through the retained street trees, with large machinery and equipment rising above the hoarding. However, the existing context of higher density built form and retained existing street trees, increases the capacity of this view to absorb this change
- **viewpoint 5: view east from Olympic Boulevard** – construction of this proposal would result in a temporary minor adverse impact at this view, due to the presence of large-scale construction activity seen in the background of this view. There would be some further tree removal in the additional footprint area between Olympic Boulevard and Figtree Drive, which would also be included in the construction site for this proposal. While the existing street trees along Olympic Boulevard would filter the view to the construction site, hoarding, large equipment and the construction of buildings along the western boundary of the site would be visible.

To manage these potential impacts, management and mitigation measures are provided in Section 9.9.4 and Chapter 20 (Synthesis) of this Environmental Impact Statement. These sections include measures to locate elements of construction sites to minimise visual impact, where feasible and reasonable.

Night-time visual amenity impact

The anticipated night-time visual impacts during operation are summarised Table 9-20.

Night works would be required at this location during station construction. This would include brightly lit task lighting, lighting of key site areas and light from construction vehicles accessing the construction site. Lighting would be designed to minimise light spill and skyglow; however, this lighting would increase the lighting levels around the hotel building to the north-west of the site. Otherwise, the uses on adjoining properties are commercial and not in use at night. The existing street trees along Herb Elliott Avenue, Figtree Drive and Olympic Boulevard, and within the surrounding properties, would provide some filtering of the lighting within the site. There may however be some skyglow above the site seen from elevated residential properties in surrounding areas. The additional light sources and skyglow would generally be absorbed into the surrounding night scene.

Table 9-23 Night-time visual amenity impacts during construction – Sydney Olympic Park metro station

Location	Sensitivity rating	Magnitude of change	Impact rating
Sydney Olympic Park metro station	A3: Medium level brightness	No perceived change	Negligible

9.9.4 Management and mitigation measures

Environmental management for this proposal would be undertaken through the environmental management approach as detailed in Chapter 20 (Synthesis) of this Environmental Impact Statement. This includes operational mitigation measures (where relevant) and performance outcomes for the operation and construction of this proposal.

During construction of this proposal, landscape and visual amenity impacts would be managed in accordance with Sydney Metro's CEMF (Appendix F). The CEMF includes landscape and visual amenity management objectives and mitigation measures to minimise impacts as relevant to this proposal as a whole.

The design of this proposal would also be consistent with the principles and outcomes presented in the Design Guidelines (Appendix E).

Mitigation measures that are specific to the operation and construction of Sydney Olympic Park metro station to address potential impacts are listed in Table 9-24.

Table 9-24 Landscape and visual amenity mitigation measures – Sydney Olympic Park metro station

Ref	Impact/issue	Mitigation measure	Timing
Landscape and visual amenity			
EIS-LV6	Activation of streetscapes	Opportunities to provide temporary activation would be explored in areas of future adjacent station development (that would be delivered by others)	Operation

9.10 Soils, contamination and groundwater

Further details on the contamination assessment, including the approach and methodology, are provided in Technical Paper 7 (Contamination). The approach and methodology for the soils and groundwater assessments are provided in Chapter 4 (Methodology) of this Environmental Impact Statement and Appendix D (Detailed assessment methodologies). The legislative context for the assessment is provided in Appendix B (Legislative and policy context).

9.10.1 Baseline environment

The baseline environment as relevant to soils, contamination and groundwater is discussed in the following sections.

Prior to the commencement of construction for this proposal, buildings within the Sydney Olympic Park metro station construction site will be demolished as part of the work carried out under the previous Sydney Metro West planning application, which includes the bulk excavation work for an untanked station box.

Soils

The existing soils environment at Sydney Olympic Park metro station is largely consistent with the existing environment as described in Chapter 19 of *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a). The existing soils environment is summarised in the following sections.

Soil and geology types

The geological units expected to be encountered at the Sydney Olympic Park metro station construction site include fill/Quaternary deposits (0 – 2 metres below ground level, Ashfield Shale and Mittagong Formation (2 to 45 metres below ground level) and Hawkesbury Sandstone (greater than 45 metres below ground level).

The Soil Landscapes of Sydney 1:100,000 Sheet (Bannerman et al., 2009) and Penrith 1:100,000 Sheet (Chapman et al., 2010) identify Blacktown (strongly acidic and hard setting soils) soil units in the vicinity of Sydney Olympic Park metro station.

Soil salinity

The *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a) identified there is the potential to encounter saline soils at Sydney Olympic Park metro station construction site.

Acid sulfate soils

Potential acid sulfate soils risk maps obtained from the former Office of Environment and Heritage (now part of NSW Department of Planning and Environment) were reviewed to assess the probability of potential acid sulfate soils being present in proximity to Sydney Olympic Park metro station. No potential acid sulfate soils were identified within the construction site; however, soils mapped as containing high acid sulfate soil risk are located about 400 metres north-east of the construction site and disturbed terrain is located around 300 metres north-west and 250 metres south.

Contamination

The work carried out under the previous Sydney Metro West planning application would include the investigation and remediation of soil and/or groundwater contamination, where required, in accordance with the applicable mitigation measures and conditions of approval.

Areas of environmental interest have been identified in Chapter 20 of the *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD*. There are no AEIs located within the construction site (including the area of additional footprint required for this proposal); however, the AEIs located adjacent are described as follows:

- AEI 30, 31 and 32 – Golf Driving Range Landfill located south of the construction site, Aquatic Centre Landfill (south-west of the construction site) and Bicentennial Park Landfill (south-east of the construction site) – low risk of groundwater contamination and vapour from known areas of heavy metals, hydrocarbons, volatile organic compounds (VOCs), per- and poly-fluroalkyl substances (PFAS) and asbestos, as well as potential leachate containing former uncontrolled waste burial
- AEI 33 – Former abattoir located to the north of the construction site – low risk of groundwater contamination from inappropriate chemical storage and use, waste disposal and burial including of pathogens and nutrients.

The conceptual site model and risk ranking for the areas of environmental interest at Sydney Olympic Park metro station are detailed in Appendix C of Technical Paper 7 (Contamination).

The ingress of contaminated groundwater into the station excavation is expected to be partially or fully mitigated through remediation performed during the work carried out under the previous Sydney Metro West planning application. An additional review of residual contaminant concentrations and rates of inflow would be required for this proposal to determine the requirements for any additional groundwater remediation.

Groundwater

The work carried out under the previous Sydney Metro West planning application will include the excavation of an untanked station box (excavation that allows groundwater to flow into the structure).

The baseline groundwater environment for this proposal is described further in Table 9-25, and shown in Figure 9-19.

Table 9-25 Groundwater baseline environment – Sydney Olympic Park metro station

Aspect	Description
Groundwater levels and flow	The work carried out under the previous Sydney Metro West planning application would lower the groundwater level to about 16 metres below ground level within the immediate station area (Sydney Metro, 2020a) (see Figure 9-19 for groundwater drawdown extent). This groundwater level would be expected at the commencement of construction work for this proposal. The predicted groundwater inflows to the Sydney Olympic Park metro station box at the commencement of construction work for this proposal would be about 0.4 litres per second and localised groundwater flow is expected to be towards the untanked station box.

Aspect	Description
Groundwater quality	The baseline groundwater quality may be impacted by a change in the groundwater flow direction towards the untanked station box (which has the potential to induce groundwater seepage). Potential contaminants of concern include nutrients, heavy metals, hydrocarbons, volatile organic compounds and polyfluorooctanesulfonic acid. The baseline groundwater quality for this proposal is expected to be consistent with the groundwater quality encountered during the work carried out under the previous Sydney Metro West planning application. Groundwater drawdown in the vicinity of saltwater bodies has the potential to promote intrusion of saltwater into fresh groundwater systems. There is potential that the saline waters of Powells Creek and the Bicentennial Park Wetlands could be drawn into the fresh groundwater between the surface water features and the station. The potential impacts to sensitive receptors are discussed in section 5.7.8 of Technical Paper 7 (Hydrogeology) of the *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a).
Groundwater users	Three registered bores, reported to be used for monitoring purposes, are expected to have a reduced groundwater level at the commencement of the construction phase of this proposal. No registered water supply bores were identified within the groundwater drawdown extent and, therefore, are not likely to be impacted by this proposal and have not been discussed further.
Groundwater dependent ecosystems	No groundwater dependent ecosystems have been identified within the predicted extent of groundwater level drawdown at the commencement of construction work for this proposal. As such, potential impacts to groundwater dependent ecosystems as a result of this proposal are not expected and have not been discussed further.
Surface water and groundwater interaction	The interaction between surface water and groundwater in proximity to the Sydney Olympic Park metro station construction site is considered limited due to the urban development and fill material present in the area. The primary interactions include: • surface water acting as recharge to underlying groundwater units, where hydraulic gradients and modified environments (e.g. concrete-lined waterways/channels) allow • groundwater discharging to surface water as baseflow, especially in areas of low elevation (where hydraulic gradients and modified environments allow) • induced flow of surface water into groundwater due to the predicted groundwater drawdown resultant from the work carried out under the previous Sydney Metro West planning application. • the surrounding area is highly urbanised with predominantly impervious surfaces across the catchments prior to the commencement of work for this proposal, which reduces possible surface water infiltration into soils and underlying groundwater. Groundwater drawdown is expected in the vicinity of Haslams Creek, the Mason Park wetlands, Bicentennial Park wetlands (see Figure 9-19) and the pond at Brickpit Park (located around 700 metres north of the construction site) as a result of the work carried out under the previous Sydney Metro West planning application.

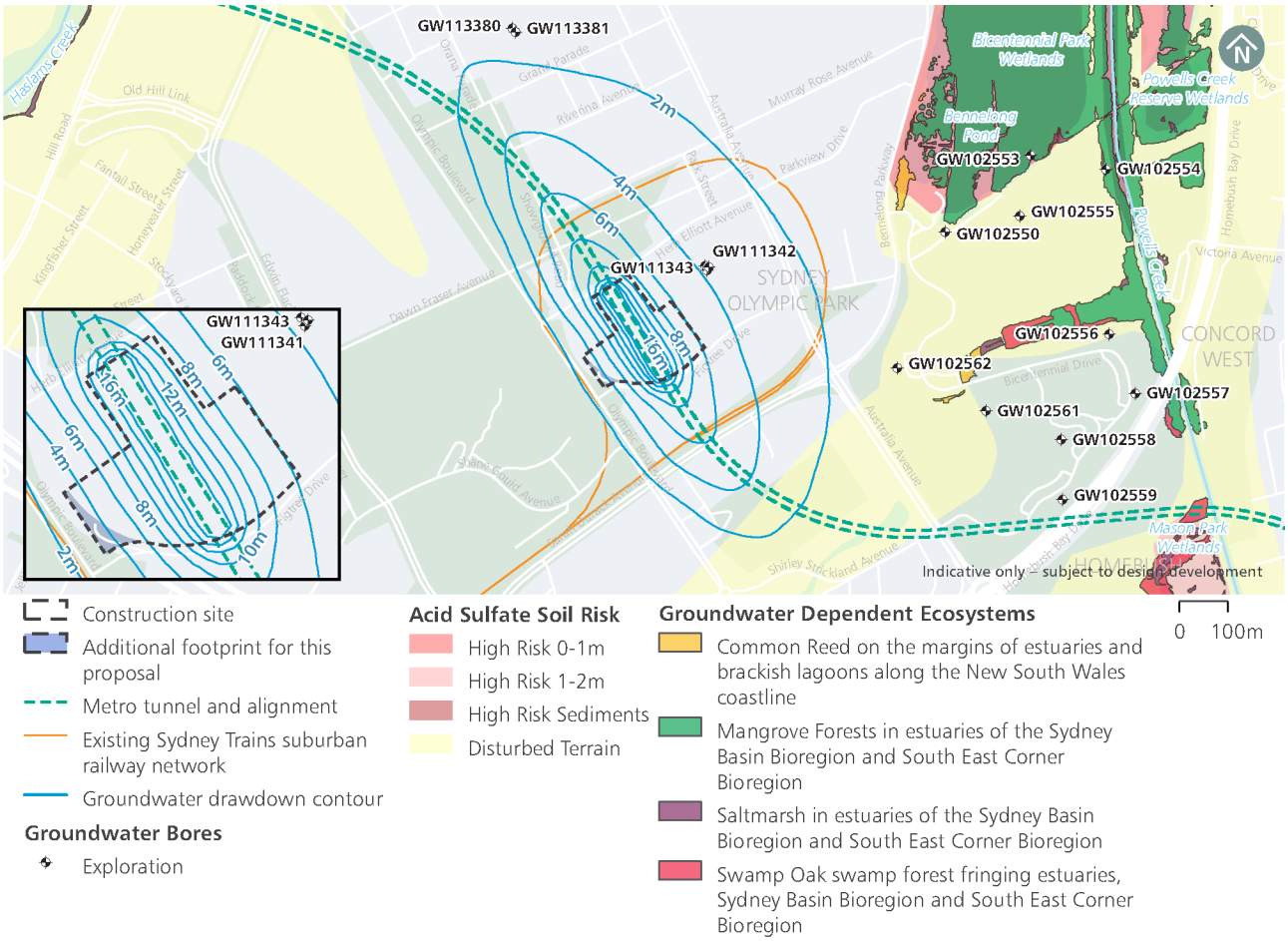

Figure 9-19 Baseline groundwater environment – Sydney Olympic Park metro station

9.10.2 Operational impact assessment

Soils

The operation of Sydney Olympic Park metro station is not expected to have any further impact on soils, including from saline soils, as there would be no excavation after completion of construction. Acid sulfate soil investigations would be undertaken under the previous Sydney Metro West planning application within the zone of groundwater drawdown to assess potential impacts and decide whether an Acid Sulfate Soils Management Plan (ASSMP) is required for operation of this proposal.

Contamination

Soil and/or groundwater contamination, if present, are expected to be investigated and remediated during the work carried out under the previous Sydney Metro West planning application in accordance with the relevant mitigation measures and conditions of approval. The station box would be untanked during operation, requiring ongoing de-watering, which would result in groundwater drawdown. All groundwater extracted from de-watering of the station box would be captured, pumped to the operational water treatment plant at the Clyde stabling and maintenance facility and treated prior to discharge, in accordance with the water quality requirements outlined in Section 18.9 (Hydrology and water quality) of this Environmental Impact Statement.

Groundwater drawdown during operation has the potential to increase landfill gas generation at the landfill area beneath the Golf Driving Range. Further contamination investigations would be carried out in accordance with conditions of approval D71 to D78, and mitigation measure C5 for the previous Sydney Metro West planning application. These measures would be reviewed and updated to manage potential contamination risk during the operation of this proposal.

Operation of Sydney Olympic Park metro station would require limited use and storage of chemicals, oils or fuels. There are no significant sources of contamination or impacts anticipated from the operation of the station or public domain. Management measures associated with the use and storage of chemicals during operation would be implemented (refer to Chapter 20 (Synthesis) of this Environmental Impact Statement).

Groundwater

Potential impacts to groundwater during operation at Sydney Olympic Park metro station are described further in Table 9-26.

Table 9-26 Potential impacts to groundwater during operation – Sydney Olympic Park metro station

Potential impact	Discussion
Groundwater recharge	The surface area of impervious surfaces at Sydney Olympic Park metro station is not expected to increase due to the operational elements for this proposal, as the construction site prior to commencement of work for this proposal would comprise predominately paved (impervious) surfaces.
Groundwater levels, inflows, and flow patterns	Groundwater inflows to the station box would continue throughout operation at roughly the modelled inflow rates identified as part of the baseline environment (refer to Table 9-25). This inflow rate is deemed to be representative of long-term inflow rates for operation of this proposal. The potential impacts of this proposal are not expected to further exacerbate water levels, inflows, and groundwater flow regime resulting from the work carried out under the previous Sydney Metro West planning application. Further groundwater modelling to confirm the impacts and flow patterns would be undertaken in accordance with condition of approval D122 for the work carried out under the previous Sydney Metro West planning application. This groundwater modelling report would be reviewed and updated as required for this proposal.
Groundwater quality	Groundwater quality and the volume of potentially impacted groundwater to be managed during operation of this proposal is expected to remain consistent with the baseline conditions. Operation of the Sydney Olympic Park metro station is not expected to result in any negative adverse environmental impacts from saltwater intrusion. Any long-term groundwater inflows would be collected, treated at the operational water treatment plant at the Clyde stabling and maintenance facility, and discharged in accordance with the water quality requirements outlined in Section 18.9 (Hydrology and water quality) of this Environmental Impact Statement.
Surface water – groundwater interaction	The baseline conditions for surface water features in proximity to the station are expected to continue during the operational phase of this proposal and therefore there is potential for groundwater drawdown to impact on recharge to surface water features. Mitigation measures GW2 and GW3 for the previous Sydney Metro West planning application require further investigations during design development to confirm the existing baseflow contribution by groundwater resources to Haslams Creek, the Mason Park wetlands, Bicentennial Park wetlands and the pond at Brickpit Park, and the likelihood and significance of potential impacts of predicted groundwater drawdown on baseflow. A review of these further investigations and potential treatments implemented as part of work under the previous Sydney Metro West planning application would be carried out to identify whether further measures may need to be implemented to manage potential impacts as part of this proposal.
Policy compliance	The minimal harm criteria in the NSW Aquifer Interference Policy (NSW Department of Primary Industries, 2012) and Water Sharing Plan rules (NSW Department of Industry, 2011) adopted for the previous Sydney Metro West planning application are expected to be carried through and complied with during the operation phase of this proposal.

9.10.3 Construction impact assessment

Soils

There may be potential temporary minor soil erosion from the exposure of soil to water runoff and wind during minor excavation works required for this proposal. This would be adequately managed with the implementation of standard erosion and sediment controls.

There is the potential to disturb saline soils at Sydney Olympic Park metro station construction site. Any potential salinity impacts would be managed in accordance with Book 4 Dryland Salinity: Productive Use of Saline Land and Water (NSW DECC, 2008).

There is potential for acid sulfate soils within the predicted groundwater drawdown extent during construction. The exposure of acid sulfate soils during construction could result in the release of acid sulfates, which could pollute downstream watercourses. Further investigation of acid sulfate soils would be undertaken as part of the work carried out under the previous Sydney Metro West planning application. This would be reviewed for this proposal to identify the potential need for further measures to manage acid sulfate soils if present.

Contamination

Existing contamination

Areas of environmental interest 30, 31 and 32 were rated as low risk for this proposal as the ingress of contaminated groundwater into Sydney Olympic Park metro station is expected to be partially or fully mitigated through remediation performed during the work carried out under the previous Sydney Metro West planning application. Groundwater ingress into the untanked station box would continue to be managed during construction of this proposal. Information regarding residual contaminant concentrations and rates of inflow from the work carried out under the previous Sydney Metro West planning application would be reviewed for this proposal to determine the requirements for any additional contaminated groundwater remediation.

Groundwater modelling carried out for the previous Sydney Metro West planning application predicts groundwater drawdown of two to four metres would occur within the Golf Driving Range landfill (AEI 30) to the south-east. A lowered groundwater/leachate level within the landfill could potentially result in increased landfill gas generation, as the volume of unsaturated material in the landfill is increased. The groundwater drawdown could impact on the existing leachate control measures for the landfills. Further investigation would be undertaken for the previous Sydney Metro West planning application to assess contamination impacts (in accordance with Concept conditions of approval D71 to D78) and specific mitigation measures identified for the previous Sydney Metro West planning application would be reviewed and, where applicable, implemented during the construction of this proposal.

As identified in Section 9.6.3, construction work for this proposal at Sydney Olympic Park metro station would not involve major sources of vibration generating equipment. As such, the potential for vibration to impact waste containment cells in the area is anticipated to be negligible.

New contamination

With the exception of the use and storage of chemicals associated with construction activities (e.g. fuels and oils associated with the operation of plant and equipment), the construction activities associated with this proposal are unlikely to represent a significant source of contamination. Management measures associated with the use and storage of chemicals during construction activities would be implemented (refer to Chapter 20 (Synthesis) of this Environmental Impact Statement).

Groundwater

Potential impacts to groundwater during construction at Sydney Olympic Park metro station construction site are outlined in Table 9-27.

Table 9-27 Potential impacts to groundwater during construction – Sydney Olympic Park metro station

Potential impact	Discussion
Groundwater recharge	Almost all of the surface area within the construction site is expected to be comprised of impervious surfaces at the commencement of this proposal and therefore, the net impact on regional groundwater recharge due to the construction work for this proposal is considered negligible.

Potential impact	Discussion
Groundwater levels, inflows, and flow patterns	Groundwater inflows to the station box would continue throughout construction of this proposal at roughly the modelled inflow rates identified as part of the baseline environment (refer to Table 9-25). Due the relatively shallow excavation across the site as part of this proposal, this excavation is not predicted to intercept groundwater or result in any groundwater drawdown. The potential impacts from construction of this proposal are expected to be consistent with the baseline groundwater levels, inflows, and groundwater flow regime. Potential groundwater impacts of this proposal would be managed through the implementation of mitigation measures outlined in the CEMF and Chapter 20 (Synthesis) of this Environmental Impact Statement. This would include the development of a Groundwater Construction Monitoring Program that would be consistent with the requirements of condition of approval C17 for the previous Sydney Metro West planning application.
Groundwater quality	Groundwater quality and the volume of potentially impacted groundwater to be managed during construction of this proposal is expected to remain consistent with the baseline conditions (refer to Table 9-25). If contamination is present in groundwater at concentrations above the relevant assessment criteria, it is not likely to be significantly above the criteria based on the likely nature and extent of potential residual contamination in the construction site. Groundwater de-watering required during construction could result in contact with contaminated groundwater by construction workers and groundwater, which would require treatment prior to discharge. Groundwater inflows would be collected, treated, and discharged in accordance with the water quality requirements outlined in Section 18.9 (Hydrology and water quality) of this Environmental Impact Statement. Potential environmental impacts from saline water intrusion were not identified as part of the previous Sydney Metro West planning application, due to the absence of freshwater groundwater dependent ecosystems within the area of predicted groundwater drawdown. Further groundwater monitoring to confirm groundwater quality and groundwater modelling to confirm potential groundwater flow patterns would be carried out under the previous Sydney Metro West planning application. This would be reviewed and updated as required for this proposal (refer to the mitigation measures in Chapter 20 (Synthesis) of this Environmental Impact Statement).
Surface water – groundwater interaction	The potential for groundwater drawdown to impact on recharge to surface water features during construction of this proposal would remain consistent with the baseline environment. Further investigations during design development for work under the previous Sydney Metro West planning application to confirm the existing baseflow contribution by groundwater resources to Haslams Creek, the Mason Park wetlands, Bicentennial Park wetlands and the pond at Brickpit Park, and the likelihood and significance of potential impacts of predicted drawdown on baseflow, would be reviewed and updated for this proposal. The mitigation measures identified for the previous Sydney Metro West planning application would be maintained into and throughout construction of this proposal.
Policy compliance	The minimal harm criteria in the NSW Aquifer Interference Policy (NSW Department of Primary Industries, 2012) and Water Sharing Plan rules (NSW Department of Industry, 2011) adopted for the previous Sydney Metro West planning application are expected to be carried through and complied with into construction of this proposal.
Ground movement	The potential for ground movement (and therefore potential impacts to buildings and structures) as a result of construction of this proposal is unlikely due to the excavation of the station box being carried out under the previous Sydney Metro West planning application. As such, the extent of ground movement is considered to be negligible as a result of construction of this proposal.

9.10.4 Management and mitigation measures

Environmental management for this proposal would be undertaken through the environmental management approach as detailed in Chapter 20 (Synthesis) of this Environmental Impact Statement. This includes operational mitigation measures (where relevant) and performance outcomes for the operation and construction of this proposal.

During construction of this proposal, soils, contamination and groundwater would be managed in accordance with Sydney Metro's CEMF (Appendix F). The CEMF includes soil, contamination and groundwater management objectives and mitigation measures to minimise impacts as relevant to this proposal as a whole.

9.11 Flooding

Further details on the flooding assessment, including the approach and methodology, are provided in Technical Paper 8 (Hydrology, flooding and water quality). The legislative context for the assessment is provided in Appendix B (Legislative and policy context).

9.11.1 Baseline environment

Sydney Olympic Park metro station would be located at a local highpoint within the Sydney Olympic Park precinct. The site ranges from around 16 to 25 metres Australian Height Datum (AHD).

Baseline flood modelling for this proposal identified that the Sydney Olympic Park metro station construction site, (including the minor additional footprint area required to support the development of the public domain for this proposal), is affected by up to about 0.3 metres in the one per cent Annual Exceedance Probability (AEP) and 0.5 metres in the Probable Maximum Flood (PMF) events. The site is not a conveyance or flood storage area in flood events up to the PMF event. Stormwater discharge from the site is via the existing underground stormwater network and adjacent streets.

Flood hazard in the five per cent AEP, one per cent AEP and one per cent AEP (with climate change) flood events would be generally low within the site (including the minor additional footprint area), with some localised areas of high flood hazard to the north of the site. In the PMF event, there are localised areas of high hazard within and adjacent to the site, which would be hazardous to pedestrians and vehicles restricting access and evacuation routes from the site.

The station box at Sydney Olympic Park metro station will have been excavated as part of the work carried out under the previous Sydney Metro West planning application. Construction of this proposal would include additional excavation to level the site.

The previous Sydney Metro West planning application identified that impacts to existing flooding behaviour at the Sydney Olympic Park metro station construction site and immediate surrounds are unlikely.

9.11.2 Operational impact assessment

The flood protection levels for Sydney Olympic Park metro station are driven by the one per cent AEP (with climate change) flood event (plus 0.3 metres of freeboard) which is 22.09 metres AHD at the northern station entrance and 22.11 at the southern station entrance. The existing surface levels at both station entries are around 22 metres AHD. Therefore, the design level of the station is at or above the flood protection level which indicates the station is unlikely to be affected by flooding during this flood event.

Operational flood impact criteria established for this proposal are described in Section 3.1.4 of Technical Paper 8 (Hydrology, flooding and water quality). An assessment of potential flooding impacts at Sydney Olympic Park metro station is provided in Table 9-28 and shown in Figure 9-20. The operational flooding assessment considers the flooding extent for the one per cent AEP (with climate change) and PMF events. The five per cent AEP (with climate change) is also considered in Technical Paper 8 (Hydrology, flooding and water quality). Figures showing the modelling for a range of flooding events are provided in Appendix B and C of Technical Paper 8 (Hydrology, flooding and water quality).

Potential impacts during operation of this proposal at Sydney Olympic Park metro station are expected to be minor and localised in all flooding events. Mitigation measures to manage potential impacts are outlined in Section 9.11.4.

Table 9-28 Potential flooding impacts for the modelled one per cent AEP and PMF flood events – Sydney Olympic Park metro station

Potential impact	Description
Change in peak flooding levels	• during the one per cent AEP event, flood depths across the site would be shallow, with a maximum depth up to about 0.1 metres. The redirection of floodwater and on-site detention stormwater storage would result in slightly reduced flood levels within Herb Elliott Avenue at the north of the site and Figtree Drive to the south. There would be reduced discharge from the site toward Olympic Boulevard • during the PMF event flood depths across the site would be up to about 0.28 metres. There would be increases in flood levels of up to about 0.11 metres on Herb Elliott Avenue, and reductions of up to about 0.16 metres on Figtree Drive.
Change in flood extent	• during both the one per cent AEP and PMF events, there would be no change in flood extent.
Compatibility with the flood hazard of the land	• during the one per cent AEP event, flood hazard conditions would generally remain low consistent with the baseline conditions. Small, localised areas of high flood hazard would be present in Showground Road. Access and evacuation routes are readily available via the adjacent streets • in the PMF event, there are localised areas of high hazard in Herb Elliott Avenue and Showground Road. Evacuation from the site can be accessed via adjacent streets (only Showground Road would not be trafficable for its full width). However, due to the small catchment area and short critical storm duration this would likely only be affected for a short period of time.
Change in duration of inundation	• change in duration of inundation would be negligible in all flood events.
Potential property impacts	• there are not anticipated to be any newly flood-affected private properties as a result of this proposal.
Consistency with floodplain risk management	• the Sydney Olympic Park Authority has a policy entitled Stormwater Management and Water Sensitive Urban Design but no applicable floodplain risk management plans • the area is not subject to major overland or riverine flooding • this proposal includes landscaping and a new drainage system, including piped stormwater network and detention basins which would be consistent with the policy.
Potential impacts to critical infrastructure or emergency management arrangements for flooding	• no major road or rail transport routes listed within the South West Metropolitan Regional Emergency Management Plan (South West Metropolitan Regional Emergency Management Committee, 2017) and Parramatta Local Emergency Management Plan (Parramatta Local Emergency Management Committee, 2018) would be impacted by flood flows in the vicinity of the site • during the PMF event, vehicular access for emergency support vehicles to and from the NSW State Health Emergency Operations Centre may be affected by increased flooding in Herb Elliott Avenue, however vehicle access to this centre is already affected during the PMF event. Consultation would occur with NSW State Emergency Services and the City of Parramatta Council in relation to potential impacts to existing community emergency management arrangements for flooding (refer to Section 9.11.4).
Potential social and economic costs from flooding impacts	• given the generally low flood affectation at Sydney Olympic Park metro station and the expected low impact on flood behaviour on surrounding properties and infrastructure as a result of this proposal, the potential social and economic costs from flooding impacts are considered low.

Figure 9-20 Potential change in flood levels (one per cent AEP event) – Sydney Olympic Park metro station

9.11.3 Construction impact assessment

The duration of construction at the Sydney Olympic Park metro station construction site would be about five years (see Figure 9-9). In general, the potential construction phase flood risks would be a continuation of the potential flooding risks associated with the previous Sydney Metro West planning application. That is, potential impacts to flooding at the Sydney Olympic Park metro station construction site and immediate surrounds are unlikely because the majority of the site (including the additional footprint for this proposal) is mapped as low flood hazard and outside of floodway and flood storage areas in both the five per cent AEP and one per cent AEP events (both with climate change). The potential impacts on flood behaviour from the previous Sydney Metro West planning application that would continue during construction of this proposal include:

- direct intense rainfall onto the site may cause nuisance flooding and drainage issues
- flow of water into excavation areas to depth of about three metres
- continued potential interruption of overland flow paths from temporary construction site infrastructure and modifications to landforms
- the potential interruption or diversion of existing flood routes away from the location of bunding or spoil within construction sites, resulting in a reduction of flood storage and an increased flood risk to adjacent sites
- disruption of street kerb and gutter at construction site vehicle entry locations which may result in localised ponding
- potential blocking of drainage networks through increased sedimentation of surface water.

The CEMF (Appendix F) requires the preparation of a Soil and Water Management Plan that would include consideration of surface water and flooding measures and progressive erosion and sediment control plans to manage potential impacts.

Compatibility of construction sites with flood conditions

Sydney Olympic Park metro station construction site is considered to be compatible with flood conditions due to the majority of the construction site not being flood prone and having low flood hazard during the five per cent AEP and one per cent AEP flood events (both with climate change).

Consistency with floodplain risk management plans

The Sydney Olympic Park Authority has a policy entitled Stormwater Management and Water Sensitive Urban Design but no applicable floodplain risk management plans. The site is not an overland flow path or flood storage area in all flood events including the PMF event.

Potential impacts to emergency management arrangements for flooding

No major road or rail transport routes identified in the South West Metropolitan Regional Emergency Management Plan (South West Metropolitan Regional Emergency Management Committee, 2017) and Parramatta Local Emergency Management Plan (Parramatta Local Emergency Management Committee, 2018) areas would be impacted by flood flows in the vicinity of the site.

However, vehicular access for emergency support vehicles to and from the NSW State Health Emergency Operations Centre (north-east of the construction site) may be affected by flooding in Herb Elliott Avenue in the PMF event. However, vehicular access is already currently affected during the PMF event and the increase in impact from this proposal would be minor.

Potential social and economic costs from flooding impacts

Similar to the operations phase, potential social and economic costs from flooding impacts at Sydney Olympic Park as a result of this proposal are considered low given the generally low flood affectation of Sydney Olympic Park metro station construction site and the expected low impact on flood behaviour on surrounding properties and infrastructure. The CEMF (Appendix F) requires the preparation of a Soil and Water Management Plan that would include consideration of surface water and flooding measures and progressive erosion and sediment control plans to manage potential impacts.

9.11.4 Management and mitigation measures

Environmental management for this proposal would be undertaken through the environmental management approach as detailed in Chapter 20 (Synthesis) of this Environmental Impact Statement. This includes operational mitigation measures (where relevant) and performance outcomes for the operation and construction of this proposal.

Potential flood risks during construction of this proposal would be managed in accordance with Sydney Metro's CEMF (Appendix F). The CEMF includes flooding management objectives and mitigation measures to minimise impacts as relevant to this proposal as a whole.

Mitigation measures that are specific to the operation and construction of Sydney Olympic Park metro station to address potential impacts are listed in Table 9-29.

Table 9-29 Flooding mitigation measures – Sydney Olympic Park metro station

Ref.	Impact/issue	Proposed mitigation measure	Timing
Flooding			
EIS-HF3	Residual impacts during operations	Ongoing consultation would occur with State Emergency Services and relevant councils in relation to potential impacts to existing community emergency management arrangements for flooding.	Operation

9.12 Social impacts

Further details on the social impact assessment, including the approach and methodology, are provided in Technical Paper 9 (Social impacts). A discussion of potential broader proposal-wide and regional social impacts (both benefits and disbenefits) are provided in Chapter 18 (Proposal-wide) of this Environmental Impact Statement.

9.12.1 Baseline environment

The characteristics of the communities within the social locality is described as the social baseline. The social baseline has been analysed by considering the human, social, economic, physical, and natural capital present around Sydney Olympic Park metro station.

Statistical analysis of the social baseline has been carried out by considering the primary geographical areas of interest as defined by the Australian Bureau of Statistics (ABS). These areas of interest have been termed as:

- **the proximal area:** Statistical Area level 1 (SA1s) have been chosen as the closest approximation of each of the localities along the corridor
- **suburb:** Statistical Area level 2 (SA2s) have been chosen to prepare community profiles for this proposal corridor
- **region:** the Greater Sydney area has been chosen to assist with the assessment of the broader social impacts. It has also been used for comparative purposes.

A summary of each type of community capitals related to Sydney Olympic Park metro station is discussed in Table 9-30. This summary considers the proximal area of analysis only. A discussion of potential broader corridor-wide and regional social impacts (both benefits and disbenefits) is provided in Chapter 18 (Proposal-wide) of this Environmental Impact Statement.

Table 9-30 Community capitals summary – Sydney Olympic Park metro station

Capital	Summary
Human	The share of residents in Sydney Olympic Park aged between 20 to 34 years was the largest across all the Sydney Metro West localities. It also hosted the lowest percentage of population over the age of 65 – just 1.7 per cent – indicating that this locality is an attractive location for young professionals. Compared to other localities, the Sydney Olympic Park locality had the second lowest overall share of residents attending an educational facility at 18.3 per cent. Of those residents attending an educational facility, the majority were attending university or other tertiary institution, with relatively low shares attending pre-school, or infants/primary or secondary school. This is reflecting the high share of young professionals living within the area.
Social	In 2016, the composition of households within the Sydney Olympic Park locality differed compared to the other localities. While the majority of households were family households, the overall share was the lowest across all the other localities. Of these family households, the majority were couple families with no children. This share was significantly higher compared to all the other localities. The Sydney Olympic Park locality also had the second highest overall share of lone person households compared to the other localities (Sydney CBD had the highest), with lone person households accounting for 29.5 per cent of all household types within the Sydney Olympic Park locality. Overall, this suggests that the locality is an attractive location for young professionals. In 2016, 29.6 per cent of households in the Sydney Olympic Park locality reported speaking only English at home. This share was slightly lower compared to localities to the west along the corridor, and well below the share across the entire corridor at 45 per cent. The stability of residence within the Sydney Olympic Park locality was the lowest overall compared to other localities, with only 4.8 per cent of residents living in the same address as they were in 2011, and 42.1 per cent in 2015. This, in part, is due to the relatively newer residential developments that have occurred in this area over recent years.
Economic	The Sydney Olympic Park locality had the lowest proportion of dwellings owned outright across the locality (4.1 per cent) potentially due to most dwellings only being completed within the last ten years. 68.9 per cent of households rented, with the large majority paying weekly rent in the highest quartile (84.9 per cent paying over $443 per week). 70.3 per cent of the labour force worked full time, the highest across all localities and reflective of the young professional demographic. The top three industries of employment were professional, scientific and technical services (11.8 per cent), financial and insurance services (11.1 per cent) and health care and social assistance (9.8 per cent).

Capital	Summary
Physical	Nearly all dwellings within the Sydney Olympic Park locality were flats, units or apartments at 99.7 per cent. The majority of these dwellings have been completed within the last 10 years. The average household size within the locality was the second lowest overall at 2.1 persons per household. Around half of residents reported travelling to work via car as a driver only, which suggests that residents are fairly car dependent within the locality. Key community assets within the area include Sydney Olympic Park itself.
Natural	The natural heritage of Bicentennial Park, which is part of the Sydney Olympic Park and features an important wetland ecosystem.

9.12.2 Operational impact assessment

Social impacts would be experienced at different geographies or spatial extents. A large proportion of operational social impacts associated with Sydney Olympic Park metro station would be felt at a regional and a suburb level; however, some would be experienced at a proximal level. This section focuses on the operational impacts at the proximal level, while a region- and suburb-based analysis, including potential beneficial social impacts, is provided in Chapter 18 (Proposal-wide) of this Environmental Impact Statement.

An assessment of the potential social impacts, both positive (benefits) and negative (disbenefits), of the operation of Sydney Olympic Park metro station is outlined in Table 9-31. These potential impacts are unmitigated and would be appropriately managed through the implementation of the mitigation measures outlined in Section 9.12.4 and through the performance outcomes detailed in Chapter 20 (Synthesis) of this Environmental Impact Statement. Sydney Metro would also develop a Community Benefit Plan to guide the development of community benefit initiatives (by Principal Contractors).

A residual impact rating has been assigned to each pre-mitigated impact in Table 9-31 to quantify the impacts after mitigation measures have been applied.

Table 9-31 Summary of operational social impacts – Sydney Olympic Park metro station

Pre mitigation impact	Social impact category	Impact type	Residual impact rating
Increased access to jobs, businesses, education, services, and social facilities improving social cohesion and social health for the whole community, including vulnerable persons. By improving the connections between key economic centres, Sydney Metro West would directly support the creation of new jobs at Sydney Olympic Park, as well as enhanced international competitiveness through increased accessibility to world-class precincts, which would be expected to attract international visitors, jobs and investment. This could lead to increased opportunities for employment or businesses.	Health and wellbeing Way of life Accessibility Livelihoods	Positive	Very high
Social amenity and placemaking benefits, including improvements to the aesthetic value of the area by creating attractive and active public spaces that reflect the existing or desired future scale and character of local areas. While there is an existing station at Sydney Olympic Park, it is expected that the operation of Sydney Olympic Park metro station would create a more activated town centre with increased retail and hospitality opportunities, and additional open spaces. Community cohesion would be enhanced by providing a new focal point for potential community interactions and improved equity in terms of accessibility to the precinct sporting and cultural events.	Surroundings	Positive	High

Pre mitigation impact	Social impact category	Impact type	Residual impact rating
Technical Paper 6 (Landscape and visual amenity) found that the expansive public domain, improved permeability, accessibility and canopy cover would considerably improve the landscape quality and functioning of this precinct in general, enhancing how people experience their surroundings.			
Change in community character due to permanent changes to improve local visual character.	Community	Positive	High
Potential decline in social amenity and ability to experience surroundings in the way the community have done in the past to due to operational noise or light spill.	Way of life	Negative	Negligible

Overall, this assessment found that the operation of Sydney Olympic Park metro station would increase the reach and use of Sydney's public transport network by providing a more direct connection to Sydney Olympic Park. The travel time saving expected between Parramatta and Sydney Olympic Park is expected to be 19 minutes, while more than 20 minutes is expected to be saved between Sydney Olympic Park and the Sydney CBD. Improved public transport options and reduced travel times would provide for community cohesion and improved equity, particularly for vulnerable groups that currently experience transport or mobility difficulties.

The assessment indicates that the longer term and ongoing social impacts of this proposal would be mostly positive, particularly with respect to the creation of jobs and social amenity and placemaking benefits. There would be some residual negative social impacts with respect to operational noise and lighting; however, these would be managed to an acceptable level through the mitigation measures as identified in Chapter 20 (Synthesis) of this Environmental Impact Statement.

9.12.3 Construction impact assessment

Construction activities would predominantly be carried out within the same construction site required for the previous Sydney Metro West planning application, including the additional footprint at Figtree Drive. Anticipated construction impacts are expected to be similar and would be a continuation of those from the work carried out under the previous Sydney Metro West planning application. During this proposal, local amenity impacts such as noise, vibration, and air quality would reduce compared to the work carried out under the previous Sydney Metro West planning application due to the nature of the construction activities for this proposal.

An assessment of the potential social impacts , of constructing this proposal at Sydney Olympic Park metro station are outlined in Table 9-32. These potential impacts would be appropriately managed through the implementation of the mitigation measures outlined in Section 9.12.4 and through the performance outcomes detailed in Chapter 20 (Synthesis) of this Environmental Impact Statement. Sydney Metro would also develop a Community Benefit Plan to guide the development of community benefit initiatives (by Principal Contractors).

A residual impact rating has been assigned to each pre-mitigated impact to quantify the impacts after these mitigation measures have been applied.

Table 9-32 Summary of construction social impacts – Sydney Olympic Park metro station

Pre mitigation impact	Social impact category	Impact type	Residual impact rating
Continued temporary changes to the way of life for people living, working or accessing services near the construction site due to temporary removal of parking spaces and ongoing changes to traffic management in the area. Culturally and linguistically diverse households and communities may be disproportionately impacted if communication materials are not accessible in their language.	Accessibility Way of life	Negative	Low

Pre mitigation impact	Social impact category	Impact type	Residual impact rating
Continued indirect impact to heritage item near the construction site and potential disturbance due to construction.	Culture	Negative	Low
Continued changes to the community character of the area due to changing visual amenity, including additional hoarding and streetscape changes.	Surroundings	Negative	Low

The assessment indicates that the social impacts of this proposal would effectively represent a continuation of the impacts identified for the previous Sydney Metro West planning application, though generally at a lower level of intensity and extent. Negative impacts would be related to accessibility, way of life, culture, and surroundings, and would be temporary and short term in nature. These impacts would be managed to an acceptable level through proven mitigation measures as identified in Chapter 20 (Synthesis) of this Environmental Impact Statement.

9.12.4 Management and mitigation measures

Environmental management for this proposal would be undertaken through the environmental management approach as detailed in Chapter 20 (Synthesis) of this Environmental Impact Statement. This includes operational mitigation measures (where relevant) and performance outcomes for the operation and construction of this proposal.

During construction of this proposal, social impacts would be managed in accordance with Sydney Metro's CEMF (Appendix F). The CEMF includes social impact management objectives and mitigation measures to minimise impacts as relevant to this proposal as a whole.

The OCCS (Appendix C) also specifies that a Community Communication Strategy would be prepared and implemented during construction which would. define the location-specific measures to be implemented to minimise impacts on people during construction.

Design refinements that have occurred to avoid or minimise social impacts, and to respond to stakeholder feedback are provided in Technical Paper 9 (Social impacts). Monitoring commitments during the operation and construction of this proposal, including adaptive management measures, are provided in Technical Paper 9 (Social impacts).

9.13 Local business impacts

The approach and methodology for the local business assessment are provided in Chapter 4 (Methodology) of this Environmental Impact Statement. The legislative context for the assessment is provided in Appendix B (Legislative and policy context).

9.13.1 Baseline environment

The Sydney Olympic Park metro station construction site will be established under the previous Sydney Metro West planning application. This included a description of the existing environment as it relates to this business impact assessment, based on ABS Census 2016 data. As updated census data is not yet available, the existing environment as described by Chapter 16 of the *Sydney Metro West Environmental Impact Statement - Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a) is considered to remain largely applicable for this assessment.

To verify this a desktop gap analysis was carried out with respect to any new data available and the specific scope of this proposal. The baseline environment is summarised in the sections below and more detail is provided in Chapter 16 of the *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a).

Local business profile

The Sydney Olympic Park metro station local business study area is largely consistent with that considered in Chapter 16 of the *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a). The main business area is located south of the existing Olympic Park Station. Due to the minor additional footprint areas required for this proposal at Sydney Olympic Park metro station, the 400-metre zone for consideration of local businesses has been expanded accordingly (refer to Figure 9-21).

Figure 9-21 Local business impacts study area – Sydney Olympic Park metro station

The Sydney Olympic Park metro station local business impacts study area has a diverse mix of commercial, education, tourism, hotel and retail uses, with some cafes and restaurants.

Businesses located within the local business impacts study area also include a range of commercial businesses, education and technical engineering businesses. Reflecting the surrounding context of Sydney Olympic Park, many of the commercial offices are sports-related organisations and businesses. Within the local business study area, Sydney Olympic Park has low-rise commercial office buildings and generally provides campus style commercial office space for a range of large businesses. Table 9-33 identifies the types of existing businesses within the local business impacts study area.

Table 9-33 Businesses within the local business impacts study area – Sydney Olympic Park metro station

Impact area	Types of businesses	Approximate number of businesses
Within 100 metres of the site	Commercial, retail, hotels, cafes and restaurants	20 to 30
Between 100 and 400 metres of the site	Commercial, retail, hotels, cafes and restaurants	50 to 80

Employment

At the 2016 Census, around 9,800 people were employed within the destination zones relevant to the Sydney Olympic Park local business impacts study area. 'Destination zones' are the spatial unit used to code 'place of work' by the Australian Bureau of Statistics.

A high number of these workers were employed in business services, accounting for almost 50 per cent of all jobs. The largest employers are financial and insurance services and arts and recreation services, which are primarily associated with the sporting and event functions. The contrast between the two largest industries is reflective of the mixed-use nature of the local business study area.

Travel patterns

Australian Bureau of Statistics 2016 Census data indicates that the highest proportion of commuters in the local business study area travel to work by car (as a driver) with about 57.9 per cent of the local workforce preferring this method of travel. Public transport accounted for the second and third greatest mode of travel to work with 2 per cent choosing to travel by train and 4.4 per cent using the bus. Individuals are considered more likely to use public transport when their travel is related to attending major sporting and entertainment events.

Since the 2016 Census, it is likely that the share of workers working from home in the local business impacts study area has increased, with this trend likely to be accelerated in a post-COVID-19 environment.

9.13.2 Operational impact assessment

A qualitative assessment of the potential indirect operational impacts to local businesses at Sydney Olympic Park is provided in Table 9-34. There are no direct impacts anticipated for local businesses during operation. Potential opportunities for local businesses during operation are also provided in Table 9-34.

Overall, the highly specialised nature of Sydney Olympic Park indicates that most of the businesses should be more resilient to potential negative operational impacts, as customers are attracted by destination businesses serving a wider regional catchment, or for major events and sporting activities.

A new metro station at Sydney Olympic Park is expected to further enhance the area's role as Sydney's premier entertainment, sports and recreation precinct by providing direct connections from both the Parramatta and Sydney CBDs, and other precincts along this proposal. The presence of a metro station would provide more public transport options for members of the public travelling to evets and services run by sporting businesses, and would also improve passing trade for bars, restaurants, cafes and retail.

Table 9-34 Local business impacts during operation – Sydney Olympic Park metro station

Potential impact operation	Risk assessment	
	Likelihood	Significance
Potential opportunities		
Increased passing trade for businesses Some businesses (e.g. retail and cafes) located around Sydney Olympic Park metro station may benefit from an increase in passing trade from customers accessing the station.	Likely	Moderate positive
Improved accessibility Some businesses may experience increased accessibility (both those reliant on passing trade and destination businesses, for example those that are visited by appointment) bringing in new customers who previously could not easily access the area. Additionally, the provision of a mid-block pedestrian crossing at Figtree Drive and Herb Elliott Avenue, opposite the north-south promenade, would provide greater safety for customers moving around the precinct.	Likely	Moderate positive
Improved amenity Improved amenity (e.g. visual impacts and urban design) around Sydney Olympic Park metro station would make the area a more attractive place. This could contribute to improved customer experiences (for a range of business types) throughout the area and increased foot traffic for those businesses reliant on passing trade.	Likely	Moderate positive
Potential indirect impacts		
Impacts on accessibility Some businesses may experience reduced accessibility due to altered traffic, access and parking conditions. Changed traffic arrangements could collectively restrict and hinder servicing, delivery and customer access opportunities, resulting in time- and vehicle-related costs.	Unlikely	Slight negative

Potential impact operation	Risk assessment	
	Likelihood	Significance
About 33 on-street and off-street parking spaces would be removed as part of this proposal for the purposes of creating point-to-point, bus stops, kiss and ride bays, and a pedestrian crossing, as well as relocating a loading zone. These spaces would be removed on Herb Elliott Avenue and Figtree Drive. Additionally, an unknown number of parking spaces would be removed on Herb Elliott Avenue near the proposed Precinct Street B and replaced with a no stopping zone. The removal of this parking would be unlikely to impact greatly on businesses, as there are a great number of parking spaces available on the surrounding streets and in nearby off-street parking facilities. Some businesses in immediate proximity of these parking spaces have their own loading zones.		

9.13.3 Construction impact assessment

A qualitative assessment of the potential indirect construction impacts to local businesses at Sydney Olympic Park is provided in Table 9-35. There are no direct impacts anticipated for local businesses during construction. Potential opportunities for local businesses during construction are also provided in Table 9-35.

Overall, similar to potential operational impacts, the highly specialised nature of Sydney Olympic Park indicates that most of the businesses would be resilient to potential negative construction impacts. This is likely as the majority of customers who visit Sydney Olympic Park are attracted by destination businesses which serve a wider regional catchment, or for major events and sporting activities (i.e., most of the businesses are not highly reliant on passing trade). Sydney Metro would work with the NSW Department of Planning and Environment in relation to managing construction impacts throughout the precinct during major events. As such, temporary or mobile businesses associated with major events would generally not be impacted.

Additionally, anticipated construction impacts are expected to be similar and would be a continuation of those for the work carried out under the previous Sydney Metro West planning application, local amenity impacts such as noise, vibration, and air quality would reduce compared to the previous Sydney Metro West planning application due to the nature of this proposal's activities.

Table 9-35 Local business impacts during construction – Sydney Olympic Park metro station

Potential impact construction	Risk assessment	
	Likelihood	Significance
Potential opportunities		
Continuation of passing trade from construction workforce Businesses located around the construction site may continue to benefit from an increase in the number of customers (construction workers) buying goods and services from retail, cafes and restaurants, in comparison with pre-construction numbers.	Likely	Slight positive
Continuation of redistribution of trade As a result of the previous Sydney Metro West planning application, it was considered rare that customers would redistribute their trade towards locally servicing businesses as directly impacted businesses are not population serving in nature. This would also continue for this proposal.	Rare	Slight positive

Potential impact construction	Risk assessment	
	Likelihood	Significance
Potential indirect impacts		
Continuation of redistribution of trade As a result of the work carried out under the previous Sydney Metro West planning application, some local customers could have redistributed their trade towards similar locally serving businesses within other parts of the study area or the surrounding area which would be a negative impact for those businesses that potentially experience a reduction in trade. This redistribution of trade could continue during construction of this proposal.	Rare	Slight negative
Continuation of temporary traffic congestion and increased travel times Businesses within the local business study area are familiar with operating in the context of major events and therefore were considered to be capable of absorbing a continued impact generated from construction vehicle movements during the work carried out under the previous Sydney Metro West planning application. This would continue for this proposal. Events would continue to be a major attraction for customers, and it is anticipated that any continuation in traffic congestion and travel times would not affect the numbers of customers accessing local businesses during these events. Workers are highly car dependent and potential continuation in traffic congestion and travel times around the precinct could affect workers journey to work time. Servicing and deliveries could also continue to be affected by traffic congestion and travel times around the construction site.	Rare	Slightly negative
Temporary loss of power and utilities Unplanned power and utility interruptions could result in business impacts during interruptions. Given most utility works would be completed as part of the work carried out under the previous Sydney Metro West planning application, any substantial impact from unplanned power and utility interruptions is very unlikely.	Almost unprecedented	Slight negative
Continuation of temporarily reduced local amenity Some businesses surrounding the construction site may have experienced impacts associated with reduced local amenity and visibility during the work carried out under the previous Sydney Metro West planning application. These impacts may continue during construction of this proposal. A range of businesses near the construction site may be temporarily impacted by noise and vibration impacts, although this would be minimised through measures such as hoardings around the site. Businesses potentially affected would primarily be those located closest to the construction site and those more reliant on a pleasant urban amenity and visibility.	Likely	Slight negative
Parking Some businesses surrounding the construction site may have experienced impacts associated with temporary and short-term closures of some on-street parking spaces on Herb Elliott Avenue and on Figtree Drive.	Unlikely	Neutral
Continuation of safety and security impacts There is potential for businesses to experience a temporary reduction in patronage due to perceptions related to safety and security when travelling through the local business study area. Safety and security could relate to the perception of potentially becoming a victim of crime.	Rare	Slight negative

Potential impact construction	Risk assessment	
	Likelihood	Significance
These perceived impacts are likely to be limited to retail and cafes and restaurants located near the Sydney Olympic Park metro station construction site that would normally continue trading into the evening. This is because safety and security impacts tend to become more prevalent outside of daylight hours when any reduction in visibility decreases surveillance and the ability to see and navigate hazards.		

9.13.4 Management and mitigation measures

Environmental management for this proposal would be undertaken through the environmental management approach as detailed in Chapter 20 (Synthesis) of this Environmental Impact Statement. This includes operational mitigation measures (where relevant) and performance outcomes for the operation and construction of this proposal.

During construction of this proposal, local business impacts would be managed in accordance with Sydney Metro's CEMF (Appendix F).

The OCCS (Appendix C) also specifies that a Community Communication Strategy would be prepared and implemented during construction and include requirements related to small business engagement. The Community Communication Strategy would define the location specific measures to be implemented to minimise impacts on individual businesses during construction, taking into account the commercial character of the locality, its general trading profile (daily and annually), and information gained from the business profiling.

9.14 Biodiversity

The approach and methodology for the biodiversity assessment are provided in Chapter 4 (Methodology) of this Environmental Impact Statement. The legislative context for the assessment is provided in Appendix B (Legislative and policy context).

9.14.1 Baseline environment

Site context

The area immediately surrounding Sydney Olympic Park metro station is urbanised, with a history of clearing and development over the past 200 years. This includes the previous use of the area for agriculture, with subsequent redevelopment for mainly industrial land uses throughout much of the 20th century. The area is relatively flat, with a landform generally draining towards Haslams Creek to the north and Powells Creek to the east.

The nearest area of native vegetation is the Badu Mangroves area, about 550 metres to the east.

The Sydney Olympic Park metro station construction is largely consistent with the construction site established under the previous Sydney Metro West planning application. However, a minor area of additional footprint along Olympic Boulevard is required for construction of this proposal to support the development of the public domain (refer to Figure 9-22).

Vegetation characteristics

Vegetation in the area surrounding Sydney Olympic Park metro station construction site is limited to landscape and ornamental plantings only. No remnant native vegetation is present. The Sydney Olympic Park metro station construction site is occupied by several multi-storey commercial buildings, with associated native and exotic landscape plantings in isolated garden beds or as street trees. Vegetation and structures within the existing construction site will be removed and demolished as part of the work carried out under the previous Sydney Metro West planning application.

Vegetation within the additional footprint areas along Olympic Boulevard is wholly comprised of landscaping planting associated with the redevelopment of the area for the Sydney Olympics in 2000. Landscaping vegetation present in this location includes Blue gum (*Eucalyptus saligna)*, tallowwood (*Eucalyptus microcorys)*, forest red gum (*Eucalyptus tereticornis)*, spiny head mat-rush (*Lomandra longifolia)*, *Liriope* sp. and Hoop Pine (*Araucaria cunninghamii*).

Vegetation in the surrounding area is similarly comprised solely of landscape planting and street trees and is not remnant. This vegetation would not be directly affected by this proposal.

Figure 9-22 Vegetation – Sydney Olympic Park metro station

Threatened ecological communities

There are no threatened ecological communities present within the Sydney Olympic Park metro station construction site, including the additional footprint for this proposal.

Groundwater dependent ecosystems

There are no groundwater dependent ecosystems present within the Sydney Olympic Park metro station construction site, including the additional footprint for this proposal.

Threatened flora species

There are no threatened flora species present within the Sydney Olympic Park metro station construction site, including the additional footprint for this proposal.

Threatened fauna species

The Sydney Olympic Park metro station construction site will be cleared as part of the work carried out under the previous Sydney Metro West planning application. As such, at the commencement of work associated with this proposal no roosting habitat would be present for microbats.

All additional footprint areas associated with this proposal were assessed for threatened fauna habitat, including microbat habitat within vegetation proposed to be removed. No habitat or any individuals were identified during the inspection undertaken for this assessment. As such, no potential impacts to microbats are anticipated and impacts have not been assessed further.

It is noted that there are several Bionet records for Green and Golden Bell Frog (listed as vulnerable under the EPBC Act and endangered under the BC Act) within and adjacent to the additional footprint area on Olympic Boulevard, as per a desktop search undertaken in July 2021. These records are low accuracy and suggest they represent records from a variety of locations within the broader precinct. No Green and Golden Bell Frog Habitat is present within the Sydney Olympic Park metro station construction site or additional footprint for this proposal.

Migratory species

There is no habitat associated with migratory species present within the Sydney Olympic Park metro station construction site, including the additional footprint for this proposal.

Aquatic ecology

There is no aquatic habitat present within the Sydney Olympic Park metro station construction site, including the additional footprint for this proposal.

9.14.2 Operational impact assessment

Direct impacts

Direct impacts related to the operation of Sydney Olympic Park metro station would be limited to the disruption of fauna due to noise, light and human activity. As the majority of activity would be underground at this location, impacts would only include those associated with surface activities such as people moving in and out of the station, additional street-level lighting and the increased movement of private vehicles, buses and point-to-points. In the context of the locality including substantial commercial and residential development, as well as movements associated with the existing station (particularly during major events), these impacts would be minor.

Indirect impacts

Indirect impacts associated with the operation of Sydney Olympic Park metro station would be limited to the management of stormwater runoff and its impacts to local waterways. This may include changes in the quantity and quality of stormwater runoff leaving Sydney Olympic Park metro station, resulting in subsequent impacts to nearby aquatic systems such as Haslams Creek and the Parramatta River. Potential biodiversity impacts associated with such changes include temporary or permanent inundation of wetland habitat, changes in water chemistry affecting sensitive breeding habitat (such as pH changes affecting amphibian breeding and foraging habitat) and changes in turbidity affecting the overall health and productivity of aquatic plants and animals.

This proposal is located within an area that is already highly urbanised and the existing stormwater systems are likely to already be contributing to the impacts described above. The additional impact of the proposal above this existing level is likely to be minimal, given the site is already highly developed. This proposal would seek to manage operational stormwater effectively and manage the quantity and quality of water leaving the Sydney Olympic Park metro station construction site (refer to Chapter 18 (Proposal-wide) of this Environmental Impact Statement).

9.14.3 Construction impact assessment

Direct impacts

As described in Section 9.14.1, construction activities associated with Sydney Olympic Park metro station would predominantly take place within the Sydney Olympic Park metro station construction site established as part of the work carried out under the previous Sydney Metro West planning application.

Primary clearing would be required for the additional footprint area along Olympic Boulevard described above. This vegetation does not represent a coherent plant community type. No threatened flora is present within this location and the habitat value of this area for threatened fauna is considered to be very low, given that the vegetation proposed to be removed comprises planted landscaping species. As such, there would be no significant impact on threatened species or ecological communities associated with the removal of this vegetation.

Construction of Sydney Olympic Park metro station would lead to a small degree of disruption to fauna due to noise, light and human activity associated with construction activities. As noted in Section 9.14.1, there are several Bionet records for Green and Golden Bell Frog within and adjacent to the additional footprint area, as per a desktop search undertaken in July 2021. These records are low accuracy and suggest they represent records from a variety of locations within the broader Sydney Olympic Park precinct. Considering the nature of the vegetation present and its poor connectivity with nearby waterways, it is considered unlikely that this area represents substantial or regular foraging habitat for this species. The area would also not comprise breeding habitat due to the total absence of water features. As such impacts to this species due to the clearing of vegetation in this area would be negligible. Direct impacts to other fauna present in the area is also considered to be minor.

Indirect impacts

Potential changes to the quantity and quality of stormwater runoff leaving the Sydney Olympic Park metro station construction site, sediment-laden runoff and spills could result in indirect adverse impacts to nearby aquatic systems such as the Parramatta River. Biodiversity impacts associated with this would include temporary or permanent inundation of wetland habitat, changes in water chemistry affecting breeding habitat (such as pH changes affecting amphibian breeding and foraging habitat) and changes in turbidity affecting the overall health and productivity of aquatic plants and animals.

The mobilisation of sediment and contaminants from the construction site would be managed through the implementation of mitigation measures outlined in Appendix F (Construction Environmental Management Framework). Potential water quality and quantity impacts would be managed through the measures included in Chapter 18 (Proposal-wide) of this Environmental Impact Statement. As such the potential for indirect downstream biodiversity impacts is expected to be low.

9.14.4 Management and mitigation measures

Environmental management for this proposal would be undertaken through the environmental management approach as detailed in Chapter 20 (Synthesis) of this Environmental Impact Statement. This includes operational mitigation measures (where relevant) and performance outcomes for the operation and construction of this proposal.

During construction of this proposal, biodiversity would be managed in accordance with Sydney Metro's CEMF (Appendix F). The CEMF includes biodiversity management objectives and mitigation measures to minimise impacts as relevant to this proposal as a whole.