

Chapter 18

Biodiversity

18 Biodiversity

This chapter provides an assessment of the potential impacts on biodiversity as a result of this proposal, and identifies mitigation measures to minimise these impacts. This chapter draws on information provided in the *Biodiversity Development Assessment Report Waiver Request* (Sydney Metro, 2021).

18.1 Overview

The proposal would be located within a highly urbanised area that does not possess large expanses of intact native vegetation with high biodiversity value. As the majority of this proposal would be underground or in pre-existing developed areas, direct impacts to terrestrial biodiversity have been largely avoided and/or minimised.

A Biodiversity Development Assessment Report (BDAR) Waiver was granted on 24 June 2021, as the proposal is not likely to have any significant impact on biodiversity values.

The proposal would result in the removal of around 16 trees (seven planted native trees and nine exotic trees) which includes six trees within the construction sites and ten street trees. Options would be investigated for the retention or protection of street trees identified for removal during detailed construction planning. The removal of trees is considered unlikely to significantly impact threatened fauna species that may use trees for foraging, including the Grey-headed Flying Fox, Powerful Owl and Little Lorikeet. In addition, the mitigation measures described in Chapter 11 (Landscape and visual amenity) would be implemented to ensure that trees removed by the proposal would be replaced to ensure there is a net increase in the number of mature trees provided at a ratio of 2:1 as part of future stages of the whole Sydney Metro West Concept.

The human-made structures proposed to be demolished within the construction sites are not anticipated to offer suitable roosting habitat for threatened microbats. As such, no impacts to threatened microbat species are anticipated as a result of the proposal.

Mitigation measures have been proposed to further minimise or avoid potential biodiversity impacts. This includes pre-clearing surveys, removal of vegetation in accordance with relevant guidelines, implementation of weed management measures and the implementation of an unexpected finds protocol for threatened flora or fauna.

18.2 Legislative and policy context

The Secretary's Environmental Assessment Requirements relating to biodiversity, and where these requirements are addressed in this Environmental Impact Statement, are outlined in Appendix A.

The proposal has been assessed in relation to key biodiversity legislation and policy, including:

- *Biodiversity Conservation Act 2016*
- Biodiversity Conservation Regulation 2017
- *Local Land Services Act 2013*
- *Biodiversity Assessment Method 2020* (Department of Planning, Industry & Environment, 2019)
- *Environmental Planning and Assessment Act 1979*.

18.3 Assessment methodology

The biodiversity assessment was carried out by suitably qualified and experienced ecologists and involved:

- A search of relevant databases to identify the existing biodiversity and natural environment features, such as landscape features, plant community types, threatened species, populations and communities as well as important habitat for migratory species, within five kilometres of the proposal
- A review of reports relevant to the proposal, including a review of the *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a), to determine the existing environment at The Bays tunnel launch and support site
- A habitat assessment to determine the threatened flora and fauna species known or predicted to occur within five kilometres of the proposal

- A visual assessment of habitat features within the Pyrmont Station construction sites and Hunter Street Station (Sydney CBD) construction sites on 24 May 2021
- Identification of likelihood of occurrence of threatened species presence based on database records and the visual assessment.

No plot-based vegetation surveys were undertaken, as there were no Plant Community Types (PCTs) identified within the construction sites.

As a result of the conclusions of this assessment, Sydney Metro prepared a BDAR waiver (Sydney Metro, 2021), which was submitted to the Department of Planning, Industry and Environment. Following this submission, the Department of Planning, Industry and Environment determined on 24 June 2021 that the proposal is not likely to have any significant impact on biodiversity values, in accordance with section 7.9(2) of the *Biodiversity Conservation Act 2016*, and that a Biodiversity Offset Scheme is not required.

18.3.1 Study area

The following areas are discussed throughout this chapter and are defined as:

- **Study area** – Includes the Pyrmont Station and Hunter Street Station (Sydney CBD) construction sites and surrounding area that may be used for site access; noting that The Bays was already assessed as part of the *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a)
- **Locality** – The area within a five-kilometre radius surrounding the construction sites
- **Landscape buffer** – 1.5 kilometre buffer surrounding the construction sites.

18.4 Avoidance and minimisation of impacts

The design development of this proposal focussed on avoiding or minimising potential biodiversity impacts. The proposal would be located within a highly urbanised area that does not possess large expanses of intact native vegetation with high biodiversity value. As the majority of this proposal would be underground or in pre-existing developed areas, direct impacts to terrestrial biodiversity have been largely avoided and/or minimised.

18.5 Potential tunnelling impacts

18.5.1 Existing environment

The tunnel alignment would be located within a highly modified landscape where fauna habitat has been largely cleared. The tunnel alignment would be located underground, where no vegetation is present. There are no groundwater dependent ecosystems located within 500 metres of the tunnel alignment.

Table 18-1 summarises the general landscape features of the study area.

Table 18-1 Landscape features of the study area

Landscape feature	Details
IBRA bioregions and IBRA subregions	The study area is located within the Pittwater subregion of the Sydney Basin Bioregion as defined by Thackway and Cresswell (1995).
Mitchell landscapes	The construction sites would be located within the Port Jackson Basin Mitchell Landscape as mapped by the NSW National Parks and Wildlife Service (2003) and described by the NSW Department of Environment and Climate Change (2008).
Rivers, streams and estuaries	The construction sites would be located entirely within the Sydney Metro catchment (Port Jackson). The construction sites are surrounded by White Bay, Elizabeth Macarthur Bay, Rozelle Bay, Jones Bay, Johnstons Bay, Blackwattle Bay, Tumbalong Bay, Cockle Bay, Darling Harbour and Pyrmont Bay. However, there are no rivers, streams and estuaries present within the construction sites.
Wetlands	There are no significant wetlands (SEPP Coastal Management or Ramsar sites) present in the construction sites or within a 1.5 kilometre buffer.

Landscape feature	Details
Habitat connectivity	The study area is within a highly modified landscape where fauna habitats have been largely cleared. The habitats that do remain are fragmented and highly isolated. Planted urban vegetation can provide a role in facilitating the movement of threatened species across the landscape. However, there is no obvious physical habitat connectivity associated with the construction sites, so a discreet corridor cannot be drawn on a map. However, flying animals such as birds and bats use the airspace to move between habitats and the planted vegetation has the potential to be used as a foraging or perching resource as part of regular movements.
Areas of geological significance and soil hazard features	There are no areas of geological significance (such as karst, caves, crevices, cliffs) in the study area.
Areas of outstanding biodiversity value	There are no areas of outstanding biodiversity value within the study area.
Native vegetation cover	Per cent native vegetation cover within the 1.5 kilometre landscape buffer has not been calculated, however, considering the very low cover of mapped PCTs, the per cent native vegetation cover is likely to score the lowest category of zero to 10 per cent.
Patch size	The construction sites do not contain any naturally occurring native vegetation, woody or non-woody, that can be assigned to a PCT. As there are no PCTs, there are no vegetation zones for which a patch size can be determined.

18.5.2 Impact assessment

The tunnel alignment would be located underground and there are no groundwater dependent ecosystems located within 500 metres of the tunnel alignment and no vegetation would be impacted during tunnelling. As such, no biodiversity impacts are anticipated.

18.6 The Bays tunnel launch and support site

18.6.1 Existing environment

The *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a) assessed the impacts of The Bays Station construction site to:

- Carry out the excavation of The Bays Station
- Launch and support two tunnel boring machines for the drive west to the Sydney Olympic Park metro station construction site.

The Bays Station construction site is being established under the Sydney Metro West Concept and Stage 1 planning approval. As a result, the vegetation located within The Bays construction site has been previously assessed and approved for removal.

The area will have been cleared before work starts at The Bays tunnel launch and support site. As a result, there will be no naturally occurring native vegetation present within The Bays tunnel launch and support site. As no foraging, roosting or breeding habitat is present, no threatened fauna species are anticipated to be present. The Bays tunnel launch and support site is not classified as important habitat for migratory species.

18.6.2 Potential impacts

As The Bays tunnel launch and support site would be located within the footprint of the approved The Bays station construction site, there would be no direct impacts to biodiversity at The Bays as a result of this proposal.

There is a chance of fauna mortality during construction through vehicle collision. Mammals, reptiles, amphibians and birds are all at risk of vehicle strike, particularly those common species (e.g. birds) that are tolerant of disturbance and would remain within The Bays tunnel launch and support site. The risk of increased vehicle strike due to the proposal is low and would generally be limited to movement of vehicles to and from sites. Vehicle strike associated with the proposal is unlikely to affect any threatened species of animals.

18.7 Pyrmont Station construction sites

18.7.1 Existing environment

The Pyrmont Station construction sites are located within a highly modified landscape where fauna habitats have been largely cleared. There are no rivers, streams, estuaries or important wetlands present within the construction sites.

Threatened flora species

It is considered unlikely that any threatened flora is present within 1.5 kilometres of the Pyrmont Station construction sites.

Threatened fauna species

While there is no physical connectivity associated with the construction sites, flying animals such as birds and bats may use the airspace to move between habitats, and planted non-native vegetation has the potential to be used as a foraging or perching resource. There may be threatened birds and bats present within 1.5 kilometres of the Pyrmont Station construction sites as shown in Table 18-2. The Grey-headed Flying Fox, Powerful Owl and Little Lorikeet were assessed as having a potential likelihood of occurring within the construction sites and foraging in or around planted native trees.

Table 18-2 Threatened species and likelihood of occurrence within 1.5 kilometres of the Pyrmont Station and Hunter Street Station (Sydney CBD) construction sites

Scientific name	Common name	Likelihood of occurrence
Birds		
<i>Artamus cyanopterus</i>	Dusky Woodswallow	Low
<i>Haliaeetus leucogaster</i>	White-bellied Sea Eagle	Low
Mammals		
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	Low
<i>Myotis macropus</i>	Southern Myotis	Low
<i>Ninox strenua</i>	Powerful Owl	Low
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	Moderate
<i>Ptilinopus superbus</i>	Superb Fruit-Dove	Low
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	Low

While human-made structures may provide habitat for threatened species, particularly microbats, the likelihood of occurrence within the construction sites is considered to be low. The human-made structures proposed to be removed by the proposal at the Pyrmont Station construction sites do not appear to be old or derelict, and as such are unlikely to offer suitable roosting habitat for threatened microbats. While it is possible that these structures may provide potential roosting habitat in the future, the structures appear to be in good external condition with no openings that threatened microbats could regularly access and the construction sites are not in proximity to large expanses of natural vegetation. In addition, no other potential microbat roosting habitat, such as tunnels, bridges, or culverts are present within the Pyrmont Station construction sites. As a result, the human-made structures are not anticipated to offer suitable roosting habitat for threatened microbats.

Some threatened bat and bird species may use the planted native vegetation at the Pyrmont Station construction sites. However, this is unlikely given the small size of the trees, the noise disturbance from the road and the isolation from other habitat patches. The presence of better quality foraging habitat available surrounding the Pyrmont construction sites makes visitation of the planted native vegetation on the construction sites unlikely.

Native vegetation and vegetation integrity

There is some native vegetation (according to the definition of native vegetation provided in the *Local Land Services Act 2013*) that has been planted within the construction sites. This vegetation is not classified as a Plant Community Type, and is best described as miscellaneous ecosystems, specifically as 'highly disturbed areas with no or limited native vegetation', as there is limited native vegetation present. The landscape plantings within the Pyrmont Station construction sites are dominated by exotic species.

Native species located within or adjacent to the construction sites include:

- *Syzygium austral* (Brush Cherry)
- *Melaleuca citrina* (Crimson Bottlebrush)
- *Corymbia maculata* (Spotted gum).

Exotic species located within or adjacent to the construction sites include:

- *Populus alba var. pyramidalis* (Silver-leaf Poplar)
- *Robinia pseudoacacia* (Black locust)
- *Platanus x acerifolia* (London Plane).

18.7.2 Potential impacts

Native vegetation and vegetation integrity

Vegetation clearing has been largely avoided through the design of the proposal, with clearing of trees avoided where practicable. Most street trees would be retained along Pyrmont Street, Paternoster Row, Edward Street and Pyrmont Bridge Road. Some tree trimming may be required to provide appropriate clearance for trucks or large equipment. In addition, the mitigation measures described in Chapter 11 (Landscape and visual amenity) would be implemented to ensure that trees removed by the proposal would be replaced to ensure that there is a net increase in the number of mature trees provided at a ratio of 2:1 as part of future stages of the whole Sydney Metro West Concept.

Vegetation within or surrounding the Pyrmont Station construction sites would be removed as shown in Figure 18-1. This would include:

- Up to seven planted native trees, comprising
 - Five *Syzygium austral* (Brush Cherry) individuals
 - One *Melaleuca citrina* (Crimson Bottlebrush)
 - One *Corymbia maculata* (Spotted gum) tree
- Up to five exotic trees, comprising:
 - One *Populus alba var. pyramidalis* (Silver-leaf Poplar)
 - One *Robinia pseudoacacia* (Black locust)
 - Three *Platanus x acerifolia* (London Plane) trees
- Up to 250 square metres of exotic vegetation.

No Plant Community Types would be impacted as a result of the proposal as the native vegetation does not meet the criteria for a Plant Community Type. There would be no loss of vegetation condition, composition, structure, or function as a result of the proposal.



Figure 18-1 Vegetation to be removed within and adjacent to the Pyrmont Station construction sites

Threatened flora species

As none of the trees that would be cleared are considered threatened flora species, and other threatened flora species are unlikely to be located within the Pyrmont Station construction sites, no threatened flora species impacts are anticipated as a result of the proposal.

Threatened fauna species

Considering the extent of higher quality foraging resources in the locality, the removal of 12 planted trees within the Pyrmont Station construction sites is not considered likely to significantly impact threatened fauna species that may use the trees for foraging, including the Grey-headed Flying Fox, Powerful Owl and Little Lorikeet.

As the human-made structures within the Pyrmont Station construction sites are not anticipated to offer suitable roosting habitat for threatened microbats and the planted native vegetation is unlikely to be used by bats and birds, no impacts to threatened bat and bird species are anticipated as a result of the proposal.

No other impacts to threatened fauna species are anticipated as a result of the proposal.

18.8 Hunter Street Station (Sydney CBD) construction sites

18.8.1 Existing environment

The Hunter Street Station (Sydney CBD) construction sites would be located within a highly modified landscape where fauna habitats have been largely cleared. There are no rivers, streams, estuaries or wetlands present within the construction sites.

Threatened flora species

It is considered unlikely that any threatened flora is present within 1.5 kilometres of the Hunter Street Station (Sydney CBD) construction sites.

Threatened fauna species

There may be threatened birds and bats present within 1.5 kilometres of the Hunter Street Station (Sydney CBD) construction sites, as shown in Table 18-2. The Grey-headed Flying Fox, Powerful Owl and Little Lorikeet were assessed as having a potential likelihood of occurring within the construction sites and foraging in or around planted native trees.

Similar to the Pyrmont Station constructions sites, while human-made structures to be removed may provide habitat for threatened species, particularly microbats, the likelihood of occurrence within the construction sites is considered to be low. As a result, the human-made structures are not anticipated to offer suitable roosting habitat for threatened microbats.

Some threatened bat and bird species may use the planted native vegetation on the Hunter Street Station (Sydney CBD) construction sites. It is unlikely, however, given the small size of the trees, the noise disturbance from the road, the isolation from other habitat patches, and the presence of better quality foraging habitat available.

Native vegetation and vegetation integrity

There is no native vegetation (according to the definition of native vegetation provided in the *Local Land Services Act 2013*) within the Hunter Street Station (Sydney CBD) construction sites. Exotic species located within or adjacent to the construction sites include:

- *Celtis australis* (European Nettle Tree)
- *Platanus x acorifolia* (London Plane)
- *Populus alba var. pyramidalis* (Silver leaf Poplar).

18.8.2 Potential impacts

Native vegetation and vegetation integrity

Vegetation clearing has been largely avoided through the design of the proposal, with clearing of trees avoided where practicable. In addition, the mitigation measures described in Chapter 11 (Landscape and visual amenity) would be implemented to ensure that trees removed by the proposal would be replaced to ensure that there is a net increase in the number of mature trees provided at a ratio of 2:1 as part of future stages of the whole Sydney Metro West Concept.

Vegetation within or surrounding the Hunter Street Station (Sydney CBD) construction sites would be removed as shown in Figure 18-1. Up to four exotic trees would be removed, comprising:

- Up to one *Celtis australis* (European Nettle Tree) tree
- Up to two *Platanus x acorifolia* (London Plane) trees
- Up to one *Populus alba var. pyramidalis* (Silver leaf Poplar) tree.

Potential tree trimming may also be required to establish hoardings along Hunter Street within the Hunter Street Station (Sydney CBD) construction sites. However, all trees adjacent the Hunter Street Station (Sydney CBD) construction sites are exotic species, and, other than those trees listed above, all remaining trees would be retained along Hunter Street, O'Connell Street and George Street.

No Plant Community Types would be impacted as a result of the proposal as the native vegetation does not meet the criteria for a Plant Community Type. There would be no loss of vegetation condition, composition, structure, or function as a result of the proposal.

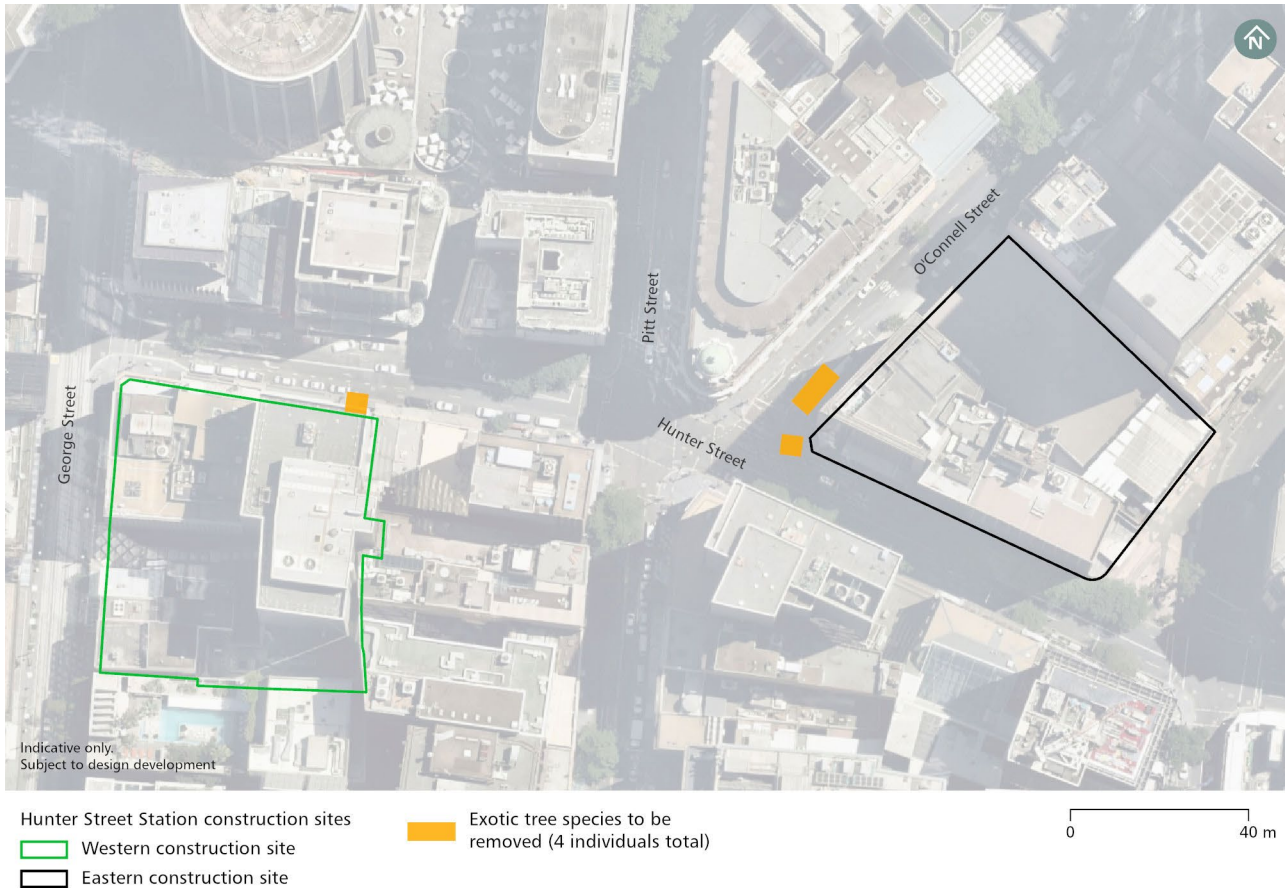


Figure 18-2 Vegetation to be removed within and adjacent to the Hunter Street Station construction sites (Sydney CBD)

Threatened flora species

As none of the street trees that would be cleared are considered threatened flora species, and other threatened flora species are unlikely to be located within the Hunter Street Station (Sydney CBD) construction sites, no threatened flora species impacts are anticipated as a result of the proposal.

Threatened fauna species

No native trees would be removed within or surrounding the Hunter Street Station (Sydney CBD) construction sites and only three exotic trees would be removed. As such, vegetation removal is not considered likely to significantly impact threatened fauna species that may use the trees for foraging, including the Grey-headed Flying Fox, Powerful Owl and Little Lorikeet.

As the human-made structures to be removed within the Hunter Street Station (Sydney CBD) construction sites are not anticipated to offer suitable roosting habitat for threatened microbats, no impacts to threatened microbat species are anticipated as a result of the proposal. No other impacts to threatened fauna species are anticipated as a result of the proposal.

18.9 Impacts to Matters of National Environmental Significance

18.9.1 Existing environment

The following Matters of National Environmental Significance have been considered for the Pyrmont Station and Hunter Street Station (Sydney CBD) construction sites:

- **Threatened ecological communities** – There are no nationally listed threatened ecological communities located in or directly adjacent to the construction sites
- **Threatened fauna species** – The Grey-headed Flying-fox, listed as vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999*, may on rare occasions use the planted native vegetation in the construction sites for foraging when other food resources are limited. No roost camps are present in

the construction sites. The planted native vegetation within or adjacent to the construction sites provides no significant floral or fruiting foraging resource for this species. These foraging resources are common across the Sydney metropolitan area. No threatened fauna under the *Environment Protection and Biodiversity Conservation Act 1999* are likely to use the habitats in the construction sites

- **Threatened flora species** – No threatened plant species listed under the *Environment Protection and Biodiversity Conservation Act 1999* are considered likely to occur in the construction sites
- **Migratory species** – While some migratory species of bird may use the construction sites, they are not classed as an important habitat.

18.9.2 Potential impacts

The proposal has assessed the impact on the following Matters of National Environmental Significance for the Pyrmont Station and Hunter Street Station (Sydney CBD) construction sites:

- **Threatened ecological communities** – As there are no nationally listed threatened ecological communities located in or directly adjacent to the construction sites, no impacts are anticipated
- **Threatened fauna species** – Threatened fauna species may use planted native vegetation within the Pyrmont Station construction sites as a foraging resource, however this is considered unlikely. No native vegetation foraging resources would be removed within the Hunter Street Station (Sydney CBD) construction sites. As a result, no significant impacts are anticipated
- **Threatened flora species** – As no threatened plant species listed under the *Environment Protection and Biodiversity Conservation Act 1999* are considered likely to occur in the construction sites, no impacts are anticipated
- **Migratory species** – As the construction sites are not classed as an important habitat, no significant impacts are anticipated.

18.10 Cumulative impacts

Potential cumulative impacts were considered for assessment based on the likely interactions of the proposal with other projects and plans that met the adopted screening criteria. The approach to assessment and the other projects considered are described further in Appendix G (Cumulative impacts assessment methodology).

As minimal biodiversity impacts are anticipated from the construction of the proposal, the proposal would not contribute to cumulative biodiversity impacts.

18.11 Mitigation and management measures

The Construction Environmental Management Framework (Appendix C) describes the approach to environmental management, monitoring and reporting during construction. Specifically, it lists the requirements to be addressed by the construction contractor in developing the Construction Environmental Management Plans, sub-plans, and other supporting documentation for each specific environmental aspect. This includes standard mitigation measures, including the preparation of a Flora and Fauna Management Plan.

The environmental management approach for the project is detailed in Chapter 23 (Synthesis of the Environmental Impact Statement). Under these broad frameworks and as outlined within the Concept assessment, a series of performance outcomes have been developed to define the minimum environmental standards that would be achieved during construction of the proposal (refer to Section 18.11.1), and mitigation measures that would be implemented during construction to manage potential identified impacts (refer to Section 18.11.3).

The environmental management approach for this proposal has also considered the relevant Conditions of Approval for the Sydney Metro West Concept, to ensure this proposal would be carried out in accordance with these conditions (refer to Section 18.11.1).

18.11.1 Concept Conditions of Approval

The Conditions of Approval for the Sydney Metro West Concept were received on 11 March 2021. The Concept conditions that relate to biodiversity between The Bays and Sydney CBD are presented in Table 18-3, along with consideration of their relevance to this proposal.

Table 18-3 Concept Conditions of Approval – Biodiversity

Reference	Condition	Relevance to this proposal
C-B8	As many mature trees as practicable must be retained. In addition, within ten (10) years of the date of this approval or no later than the commencement of operation of the CSSI (whichever is earlier) there must be a net increase in the number of mature trees provided at a ratio of 2:1.	Yes, relevant – The mitigation measures described in Chapter 11 (Landscape and visual amenity) would be implemented to ensure that trees removed by the proposal would be replaced to ensure that there is a net increase in the number of mature trees provided at a ratio of 2:1 as part of future stages of the whole Sydney Metro West Concept.
C-B9	The CSSI must result in an increase in tree canopy coverage.	Yes, relevant – response as per above.

18.11.2 Performance outcomes

Construction performance outcomes were developed for the proposal as part of the Concept assessment. Performance outcomes for the proposal identify measurable, performance-based standards for environmental management. Identified performance outcomes in relation biodiversity for construction of the proposal include:

- Impacts on biodiversity are avoided (where possible) and minimised, including the clearing of native vegetation
- Significant impacts to flow regimes in receiving waterways are avoided
- Design of waterway modifications and crossings incorporates best practice principles
- Biodiversity impacts are offset in accordance with the *Biodiversity Conservation Act 2016*.

Chapter 23 (Synthesis of the Environmental Impact Statement) describes how the proposal addresses these performance outcomes. The proposal would be located within a highly urbanised area that does not possess large expanses of intact native vegetation with high biodiversity value and would not involve any modifications to waterways or water crossings, avoiding and/or minimising impacts to biodiversity.

18.11.3 Mitigation measures

Specific mitigation measures that would be implemented to address potential biodiversity impacts are described in Table 18-4.

Table 18-4 Mitigation measures – Biodiversity

Reference	Impact/Issue	Mitigation measure	Applicable location(s)
B1	Unexpected microbat finds procedure	If any threatened microbats are identified prior to or during any part of the demolition works then the unexpected microbats finds procedure would be implemented.	Pymont Station construction sites Hunter Street Station (Sydney CBD) construction sites

18.11.4 Interactions between mitigation measures

Mitigation measures in other chapters that are relevant to the management of potential biodiversity impacts include:

- Chapter 11 (Landscape and visual amenity) – Specifically measures which address tree protection requirements.

Together, these measures would minimise the potential biodiversity impacts of this proposal. A full list of mitigation measures is presented in Chapter 23 (Synthesis of the Environmental Impact Statement).