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Sydney Metro – Western Sydney Airport

# EPBC Act Final Environmental Impact Assessment of off-airport proposed action (EPBC 2020/8687)

## Volume 1 – Main Report

# Certification page

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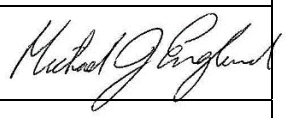
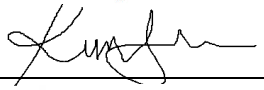
| Michael England | Author | B. Arts (Urban & Regional Planning) |  |
| Kimberley Skellern | Author | B. Science and B. Business |  |
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# 1. Introduction

## 1.1 Overview

Sydney Metro – Western Sydney Airport (the project) is identified in the *Greater Sydney Region Plan* (Greater Sydney Commission, 2018) as a key element to delivering an integrated transport system for the Western Parkland City. The new railway line would become the city's transport spine, connecting communities and travellers with the rest of Sydney's public transport system with a fast, safe and easy metro service. The project would enable the realisation of the vision for Greater Western Sydney and the Western Sydney Aerotropolis, by connecting people to employment, education, shops, services and recreation facilities. The project would also provide important access to Western Sydney International (Nancy-Bird Walton) Airport (referred to as Western Sydney International) for airport workers and aviation travellers.

The project would provide a connection between the existing Sydney Trains suburban rail network at St Marys and six new metro stations, including two at Western Sydney International and one at the Aerotropolis. The stations would play a key role in the development of future precincts in the Western Parkland City.

The project is being delivered under the *Western Sydney City Deal* (NSW Government, 2018), a partnership between the Australian Government, NSW Government and eight Western Sydney local governments that aims to deliver the vision for the Western Parkland City. The Australian and NSW Governments are partners in funding the project and have a shared objective to connect rail to Western Sydney International when the airport opens for passenger services.

Sydney Metro (the Proponent) submitted a Referral (EPBC 2020/8687) for the component of the project located to the north of Western Sydney International being the off-airport proposed action from St Marys to Elizabeth Drive under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), hereafter referred to as the proposed action. In July 2020, Sydney Metro was advised that the proposed action is a controlled action and will require assessment in the form of preliminary documentation. The relevant controlling provisions for the controlled action relate to Commonwealth land and listed threatened species and communities.

This assessment, including the Revised Biodiversity Development Assessment Report (Appendix A) and Revised Aboriginal Cultural Heritage Assessment Report (Appendix B), has been prepared to provide the assessment information as requested in the Preliminary Documentation Guidelines issued on 21 July 2020 in order to allow the Commonwealth Environment Minister to determine whether to grant approval for the controlled action under the EPBC Act. This assessment updates and finalises the Draft Environmental Impact Assessment which was exhibited between 21 October and 18 November 2020 in accordance with section 95A of the EPBC Act.

## 1.2 Key features of the project

The project involves the construction and operation of a metro rail line around 23 kilometres in length, between St Marys in the north and the Aerotropolis Core precinct in the south (the area to be called Bradfield), via Western Sydney International (see Figure 1-1). Station locations for the project would include:

- a new metro station connecting to, and providing interchange with, the existing Sydney Trains suburban rail network at St Marys, north of Western Sydney International – part of the proposed action
- two new metro stations between the existing Sydney Trains suburban rail network and Western Sydney International; one at Orchard Hills and one at Luddenham within the Northern Gateway precinct – part of the proposed action
- two new metro stations within the Western Sydney International site; one at the airport terminal and one at the airport business park – not part of the proposed action
- a new metro station within the Aerotropolis Core precinct, south of Western Sydney International (the area to be called Bradfield) – not part of the proposed action.

The alignment of the new metro railway line would include a combination of tunnel, surface and viaduct sections. The project includes works required to support its construction and operation, including all operational systems and infrastructure, including a stabling and maintenance facility and up to two services facilities (the Bringelly services facility does not form part of the proposed action).

A more detailed description of the project, as it relates to the proposed action, is provided in Chapter 2 (Description of metro rail link).

## 1.3 Project need

Various State, regional and local policies and plans identify the need for an integrated transport solution that can respond to the needs of a growing Western Parkland City and that can support this growth in a sustainable manner to enhance the liveability and productivity of the area.

The project would be a key component in delivering an integrated transport system for the Western Parkland City. The new metro railway would become the city's transport spine, linking residential areas with the Aerotropolis, other job hubs and the nationally significant Western Sydney International.

The project is needed to:

- service a growing population in the Western Parkland City
- provide rail access to Western Sydney International and the Aerotropolis
- connect with the existing Sydney Trains suburban rail network at St Marys, providing a link to the Central River and Eastern Harbour cities
- open access to jobs and increase the potential for jobs growth in the Western Economic Corridor (including Western Sydney International and the Aerotropolis precincts) and in the Greater Penrith to Eastern Creek Growth Investigation Area
- facilitate the movement of workers and airline passengers westwards, helping to rebalance demand and supply across Greater Sydney
- support and shape the sustainable growth of the Western Parkland City by optimising land use around station precincts
- create opportunities for precinct planning that would improve liveability in and around station precincts
- support access to urban renewal and new land release areas including the Greater Penrith to Eastern Creek Growth Investigation Area and the Western Sydney Aerotropolis precincts.

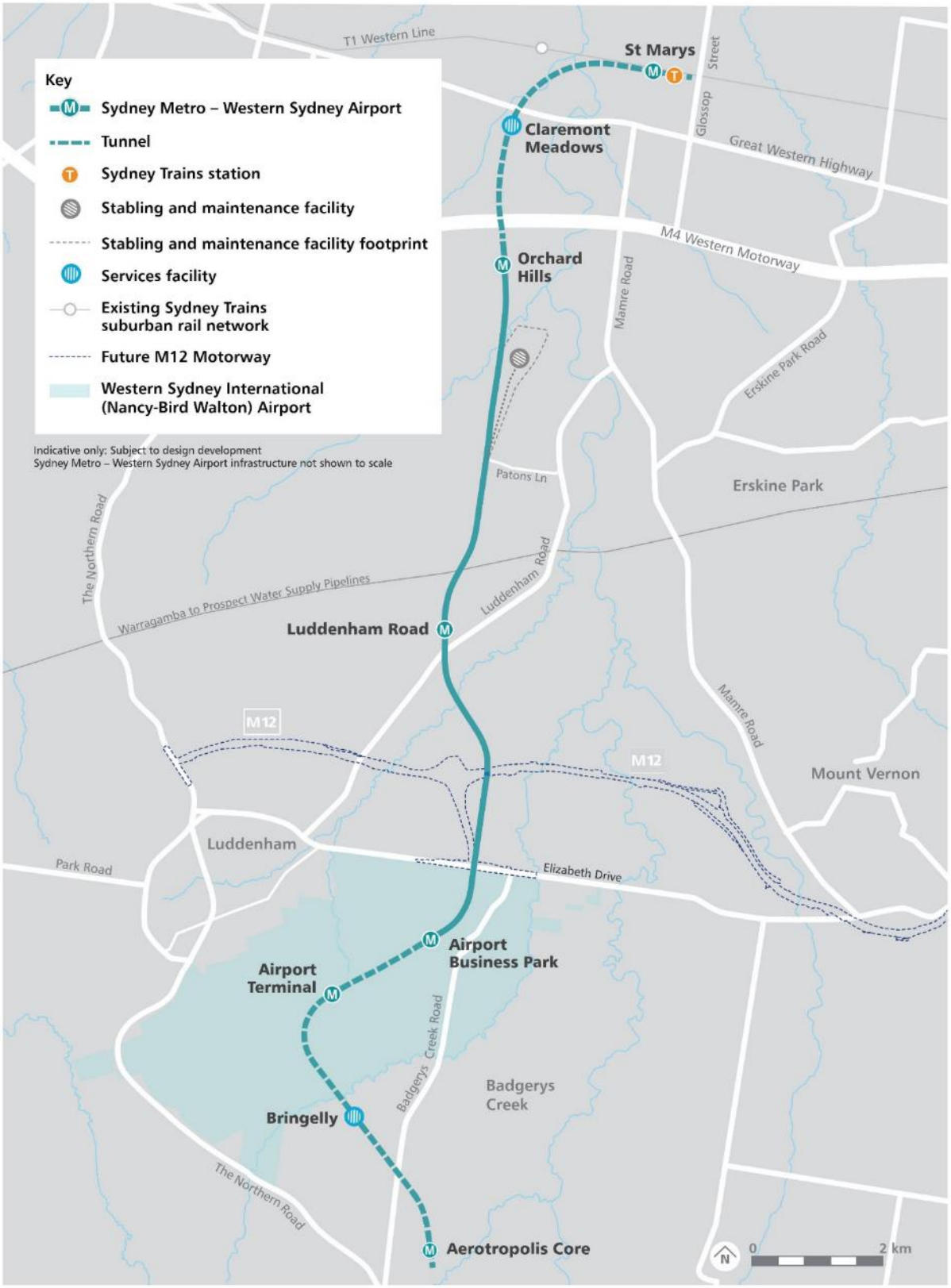



**Figure 1-1 Overview of the project**

## 1.4 Project objectives

A robust set of objectives has been developed to represent the outcomes to be achieved by the project (see Figure 1-2). The objectives have underpinned the options evaluation process and guided decision-making during design development. The objectives will also be used to guide decision-making during future design development for the project.


**Figure 1-2 Project objectives**

## 1.5 Planning approvals

There are three principal statutory schemes that govern the planning and assessment process for the project:

- NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) applies to works located on land outside the footprint of Western Sydney International (off-airport), to be assessed under Division 5.2 as State significant infrastructure
- Commonwealth *Airports Act 1996* (Airports Act) applies to works located within the footprint of Western Sydney International (on-airport) and requires a variation to the existing Airport Plan
- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act):
    - for works located on State land to the north of Western Sydney International (off-airport), assessment and approval is required under Part 8 and 9 of the EPBC Act to address impacts on listed threatened species and communities, and Commonwealth land
    - for works located south of Western Sydney International (off-airport), impacts of the project on matters of national environmental significance and Commonwealth land have already been assessed and approved under a strategic assessment in accordance with Part 10 of the EPBC Act.

This document, including the Revised Biodiversity Development Assessment Report (Appendix A) and Revised Aboriginal Cultural Heritage Assessment Report (Appendix B) provides the assessment required under Part 8 of the EPBC Act for works located off-airport and to the north of Western Sydney International.

## 1.6 Proponent

The proponent for the project is Sydney Metro, a NSW Government agency which has the responsibility for developing and delivering metro railways and managing their operation.

The Preliminary Documentation Guidelines require details of the environmental history of the person proposing to take the proposed action. There has been no change to the environmental record of Sydney Metro (the Proponent for the proposed action) from the history described in Section 6 of the Referral (EPBC 2020/8687). There are no proceedings under a Commonwealth, State or territory law for the protection of the environment, or the conservation and sustainable use of natural resources, against Sydney Metro.

## 1.7 Purpose and structure of this document

The purpose of this document is to set out the information requested for the assessment of the relevant impacts of the proposed action. The information aims to enable interested stakeholders and the Minister to understand the environmental consequences of the proposed development in relation to the matters controlled by the EPBC Act.

This assessment, including the Revised Biodiversity Development Assessment Report (Appendix A) and Revised Aboriginal Cultural Heritage Assessment Report (Appendix B), addresses information requested in the Preliminary Documentation Guidelines. This document is structured to:

- build on information provided in Referral EPBC 2020/8687 (the Referral) published on the Department of Agriculture Water and Environment website
- identify where information listed in the Preliminary Documentation Guidelines is addressed. The section headings in this document follow and adopt those set out in the Preliminary Documentation Guidelines
- respond to the submissions received during the exhibition period for the Draft Environmental Impact Assessment.

The Draft Environmental Impact Assessment was on exhibition from 21 October to 18 November 2020. Two submissions were received during the exhibition period. Submissions were also received during the exhibition period for the *Sydney Metro – Western Sydney Airport, Environmental Impact Statement* (Sydney Metro 2020) (referred to as the Project Environmental Impact Statement in this report) and some of these submissions raised issues relating to the relevant controlling provisions identified in the Referral Decision. A summary of these submissions, and a response to the issues raised by them, is provided in Section 8.3.

In addition, further consultation with stakeholders has been undertaken to identify opportunities to optimise the design of the proposed action. Two minor changes have been identified both of which are considered to be beneficial. They include a change to the location of the temporary bus interchange at St Marys during construction and a small reduction in the construction footprint required in the area to the south of Patons Lane. These changes would not impact on matters of national environmental significance or the relevant controlling provisions for EPBC 2020/8687.

This is the Final Environmental Impact Assessment of the off-airport proposed action.

**Table 1-1 Request for Further Information (Preliminary Documentation Guidelines)**

| Issue | Requirement | Where addressed in this report |
|---|---|---|
| Description of the metro rail link | A broad description of the environment and any surrounding areas that may be affected | Section 2.1 |
| | Detailed description of the different components of the proposed off-airport rail works and the scope of works to be carried out | Section 2.2 |
| | Maps to show the size and location of the construction footprint, and planned facilities | Figures 2-1, 2-2a to 2-2c, 2-3, and 2-4a to 2-4c |

| Issue | Requirement | Where addressed in this report |
|---|---|---|
| Description of listed threatened species & communities (sections 18 & 18A) | A description of the ecological characteristics of the species and ecological communities | Chapter 5 and Chapter 7 of Revised Biodiversity Development Assessment (Appendix A) |
| | A description of the survey effort and methodology | Chapter 3 of Revised Biodiversity Development Assessment (Appendix A) |
| | Results of surveys relating to listed threatened species and ecological communities | Chapter 7 of Revised Biodiversity Development Assessment (Appendix A) |
| | For the Grey-headed Flying-fox, description of the extent of suitable habitat on site and in the region, any important populations, and populations of camps within a distance relevant to the species | Chapter 7 of Revised Biodiversity Development Assessment (Appendix A) |
| | For Coastal Swamp Oak Forest and Cumberland Plain Woodland, identification of habitat connectivity in the landscape | Chapter 7 of Revised Biodiversity Development Assessment (Appendix A) |
| Description of Commonwealth land (s26 & 27A) | Vegetation | Section 4.2.1 and 4.2.2 |
| | Animal species | Section 4.2.3 |
| | Aboriginal heritage | Section 4.3 |
| Impact Assessment | Analysis of relevant impacts, including:<br>• detailed assessment of the nature, timing, extent and consequences of likely impacts;<br>• a statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible;<br>• any technical data and other information used or needed to make a detailed assessment of the relevant impacts; and<br>• details of the methodology and data sources used in informing the assessment. | Section 5.1 |
| | In relation to species and communities that may be impacted by the proposed action:<br>• its occurrence at the site of the proposed action;<br>• the listing status;<br>• the size and placement of impacts relative to the area of occurrence, or in the context of landscape connectivity;<br>• the ecological context;<br>• the total area (hectares) of habitat or vegetation that will be impacted; and<br>• the area impacted (habitat for Grey-headed Flying Fox, Cumberland Plain Woodland & Coastal Swamp Oak Forest) occurring on Commonwealth lands. | Section 5.1 |
| | In relation to relevant nationally listed threatened species and ecological communities: | Section 5.2 |

| Issue | Requirement | Where addressed in this report |
|---|---|---|
| | • how the proposed action is not inconsistent with the Australia's international obligations, specifically the Biodiversity Convention, the Apia Convention and CITES<br>• implications of the proposed action with respect to relevant conservation advices<br>• the actions set out in relevant recovery plans and threat abatement plans in relation to the proposed action that support recovery of each species or community. | |
| | Identify cumulative impacts from Stage 1 development of the airport and this proposed action, and cumulative impacts from the whole north-south rail corridor and this proposed action. | Chapter 10 of Revised Biodiversity Development Assessment Report (Appendix A) |
| Avoidance and mitigation measures | A description of the environmental outcomes | Section 6.1 |
| | A description of proposed safeguards and mitigation measures | Section 6.2, Table 6-1 and Table 6-2 |
| | Assessment of the expected or predicted effectiveness | Section 6.4 |
| | Any statutory or policy basis for the mitigation measures | Section 6.5 |
| | A description of contingency or adaptive management measures | Section 6.6 |
| Offsets | Quantify the offsets required in compensation for residual impacts | Chapter 12 of Revised Biodiversity Development Assessment Report (Appendix A) |
| Consultation | Any consultation about the proposed action | Chapter 8 |
| Environmental history of the person proposing to take the action | Details of any proceedings under a Commonwealth, state or territory law for the protection of the environment, or the conservation and sustainable use of natural resources, against the person proposing to take the action | Section 1.6 |
| Economic and social matters | The economic and social impacts of the proposed action, both positive and negative | Chapter 9 |
| Conclusion | Summarise key environmental impacts, avoidance and mitigation measures, as well as offsets | Section 10.1 |
| | Provide an overall conclusion on the environmental acceptability of the proposed action, include discussion on whether proposed mitigation measures are sufficient to manage the additional impacts to the environment arising from the proposed action | Sections 10.2 and 10.3 |
| | Discuss compliance with principles of ecologically sustainable development | Section 10.4 |

# 2. Description of metro rail link

## 2.1 Broad description of the environment

The proposed action is located within the Penrith Local Government Area, between St Marys in the north and the northern boundary of Western Sydney International. The topography of St Marys is relatively flat, with higher ground towards Claremont Meadows. Elevations are generally flat towards Orchard Hills, with the topography to the east and west of the proposed action more elevated. The area to the north of the M4 Western Motorway is characterised by low-density residential dwellings in St Marys and Claremont Meadows, with some medium density residential development around the edges of St Marys Town Centre.

The landscape to the south of the M4 Western Motorway is a mix of rural residential development and farmland, as well as a largely undeveloped area of Commonwealth land incorporating the Defence Establishment Orchard Hills (DEOH) site. The suburbs of Orchard Hills and Luddenham are likely to be subject to significant land use and development change in the future.

Further details of the environment in which the proposed action is located is described in Chapters 4 to 7 of the Revised Biodiversity Development Assessment Report (Appendix A) and Chapters 5 to 7 of the Revised Aboriginal Cultural Heritage Assessment Report (Appendix B).

## 2.2 Description of the proposed action

### 2.2.1 Operational components

**Overview**

The proposed action comprises the following operational features (see Figure 2-1):

- around 4.3 kilometres of twin rail tunnels (generally located side by side) between St Marys (the northern extent of the proposed action) and Orchard Hills
- a cut-and-cover tunnel around 350 metres long (including tunnel portal), transitioning to an in-cutting rail alignment south of the M4 Western Motorway at Orchard Hills
- around 10 kilometres of rail alignment between Orchard Hills and Western Sydney International (the southern extent of the proposed action), consisting of a combination of viaduct and surface rail alignment
- three new metro stations:
  - St Marys (providing interchange with the T1 Western Line)
  - Orchard Hills
  - Luddenham Road
- grade separation of the track alignment at key locations including:
  - where the alignment interfaces with existing infrastructure such as the Great Western Highway, M4 Western Motorway, Lansdowne Road, Patons Lane, the Warragamba to Prospect Water Supply Pipelines (the pipelines), Luddenham Road, the future M12 Motorway and Elizabeth Drive
  - crossings of Blaxland Creek and Cosgroves Creek and other small waterways to provide flood immunity for the project
- modifications to the existing Sydney Trains station and rail infrastructure at St Marys to support interchange and customer transfer between the new metro station and the T1 Western Line
- a stabling and maintenance facility and operational control centre located to the south of Blaxland Creek and east of the proposed metro track
- an integrated tunnel ventilation system including a potential service facility at Claremont Meadows (the need for this facility is subject to ongoing investigation)

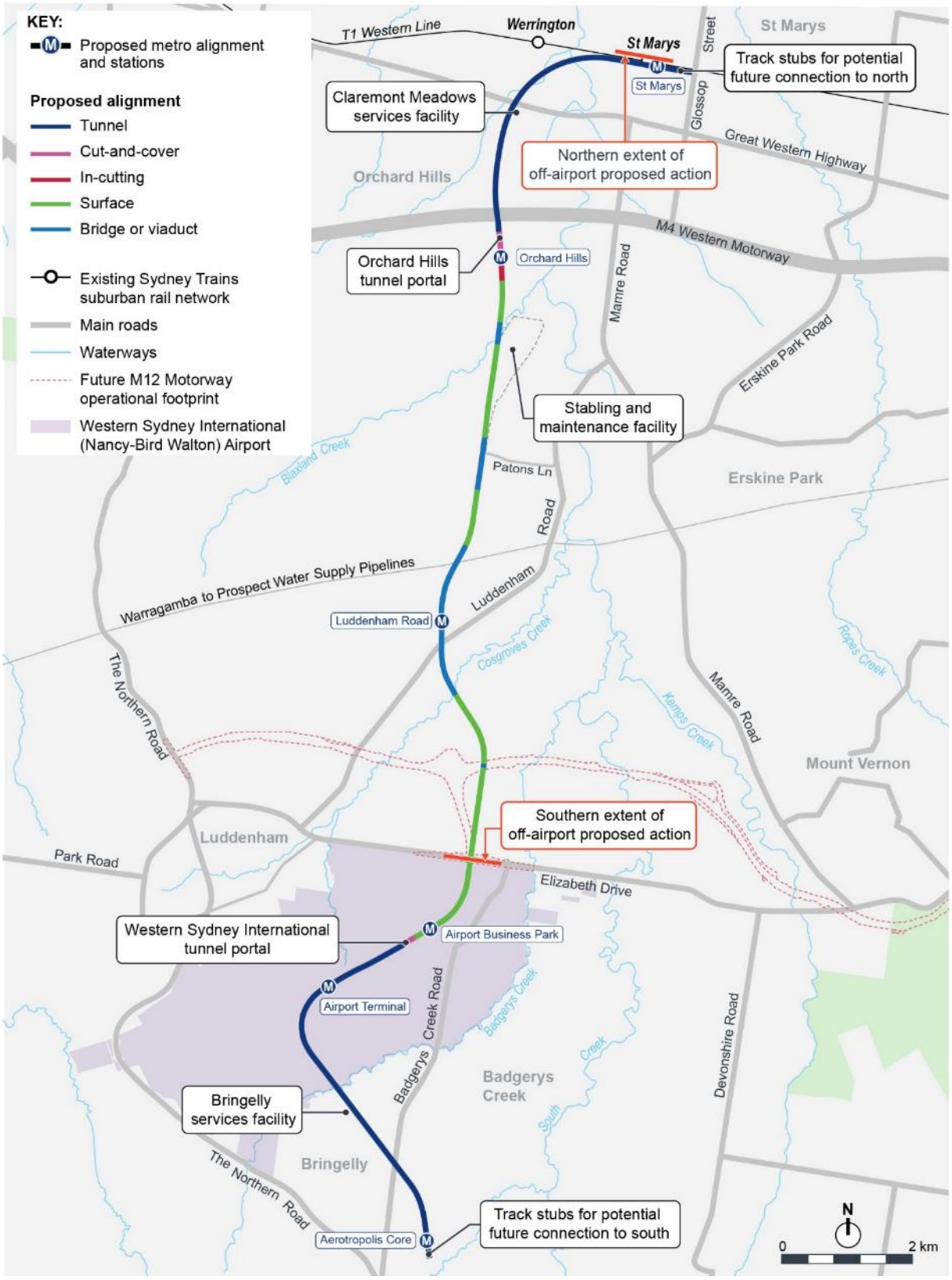



**Figure 2-1 Overview of the proposed action off-airport**

- all operational systems and infrastructure such as crossovers, rail sidings, signalling, communications, overhead wiring, power supply, lighting, fencing, security and access tracks/paths
- retaining walls at required locations along the alignment
- environmental protection measures such as noise barriers (if required), on-site water detention, water quality treatment basins and other drainage works.

The proposed action would be located within a dedicated and restricted access rail corridor. The track alignment for the project would involve:

- track designed with fit-for-purpose horizontal and vertical alignment that consists of a combination of twin rail tunnels, viaduct, surface and in-cutting track types, including connection to the stabling and maintenance facility
- twin standard gauge tracks to allow two-way rail movements, with turnouts and one or more intermediate crossovers at various locations along the alignment
- turnbacks at the northern and southern ends of the project
- additional tunnel stubs to the east of St Marys Station and south of Aerotropolis Core Station to safeguard potential future extensions
- rail sidings to the north of Elizabeth Drive to allow for the temporary storage of trains during operation.

**Metro alignment and track infrastructure**

The alignment has been designed to meet the functional requirements of a metro system including the need to:

- provide a maximum vertical grade of 4.5 per cent
- locate station platforms along a straight and level (i.e. a zero per cent grade) section of track
- provide appropriate curvature to accommodate proposed train operating speeds. Tighter radius curves may be adopted at some locations for a variety of reasons, including avoiding surface or subsurface constraints such as areas of ecological sensitivity, flood prone land and other existing or proposed infrastructure
- consider integration with, or crossing of, existing and proposed future transport and other infrastructure.

The alignment has also aimed to:

- avoid existing development including existing buildings, utilities and infrastructure (including other rail and road infrastructure)
- minimise, as far as practicable, direct impacts on private property
- minimise impacts on environmental features such as ecologically sensitive areas, heritage items, areas of contamination and areas of flood prone land
- minimise impacts on sensitive residential receivers and recreational land uses
- provide future land use and movement connectivity across the corridor, particularly in areas planned for future development, such as the Northern Gateway precinct of the Western Sydney Aerotropolis.

The proposed horizontal and vertical alignment is shown in Figure 2-2a to 2-2c and would continue to be refined as part of ongoing design development.

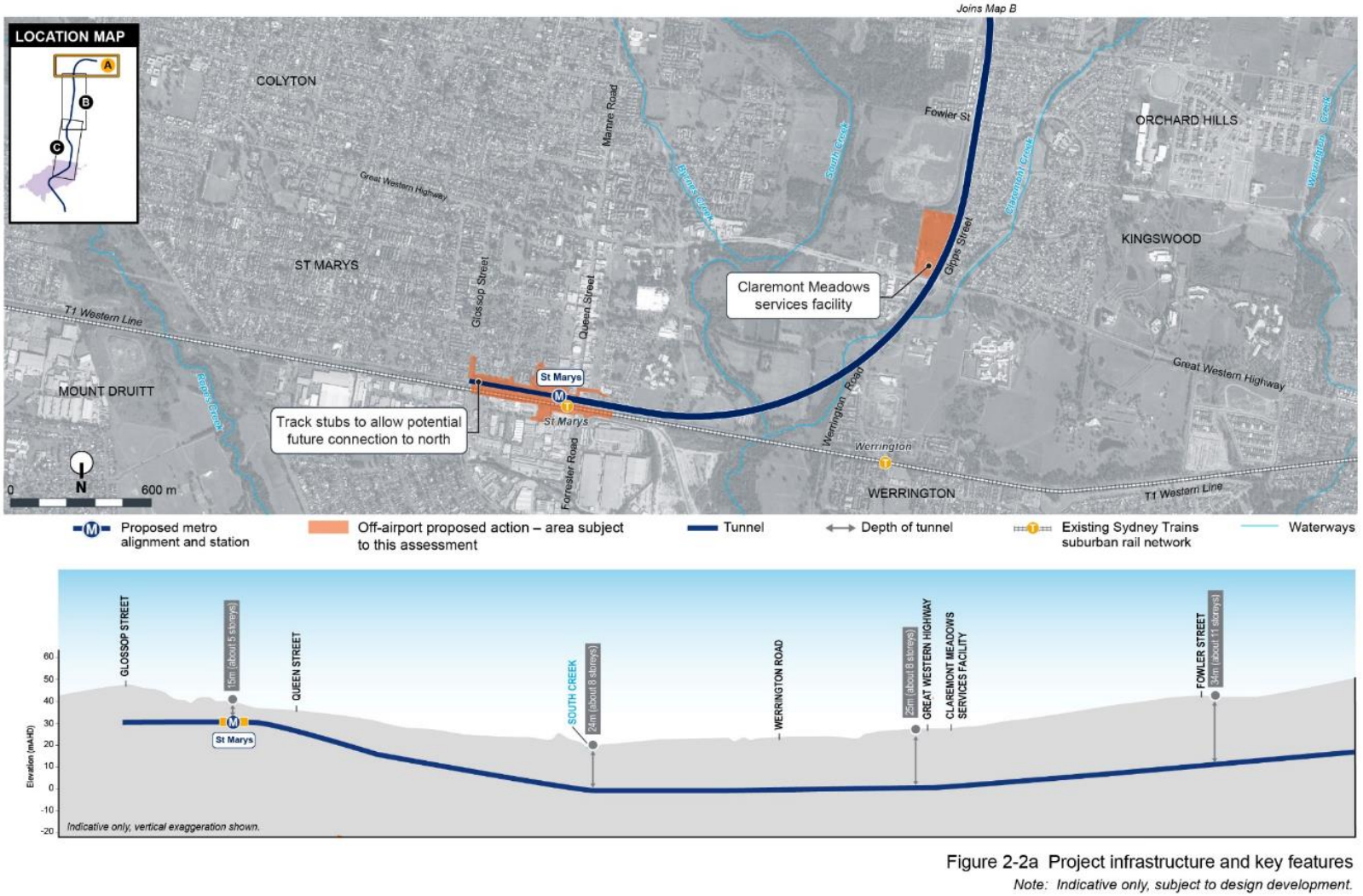



Figure 2-2a Project infrastructure and key features
*Note: Indicative only, subject to design development.*

**Figure 2-2a Project infrastructure and key features**

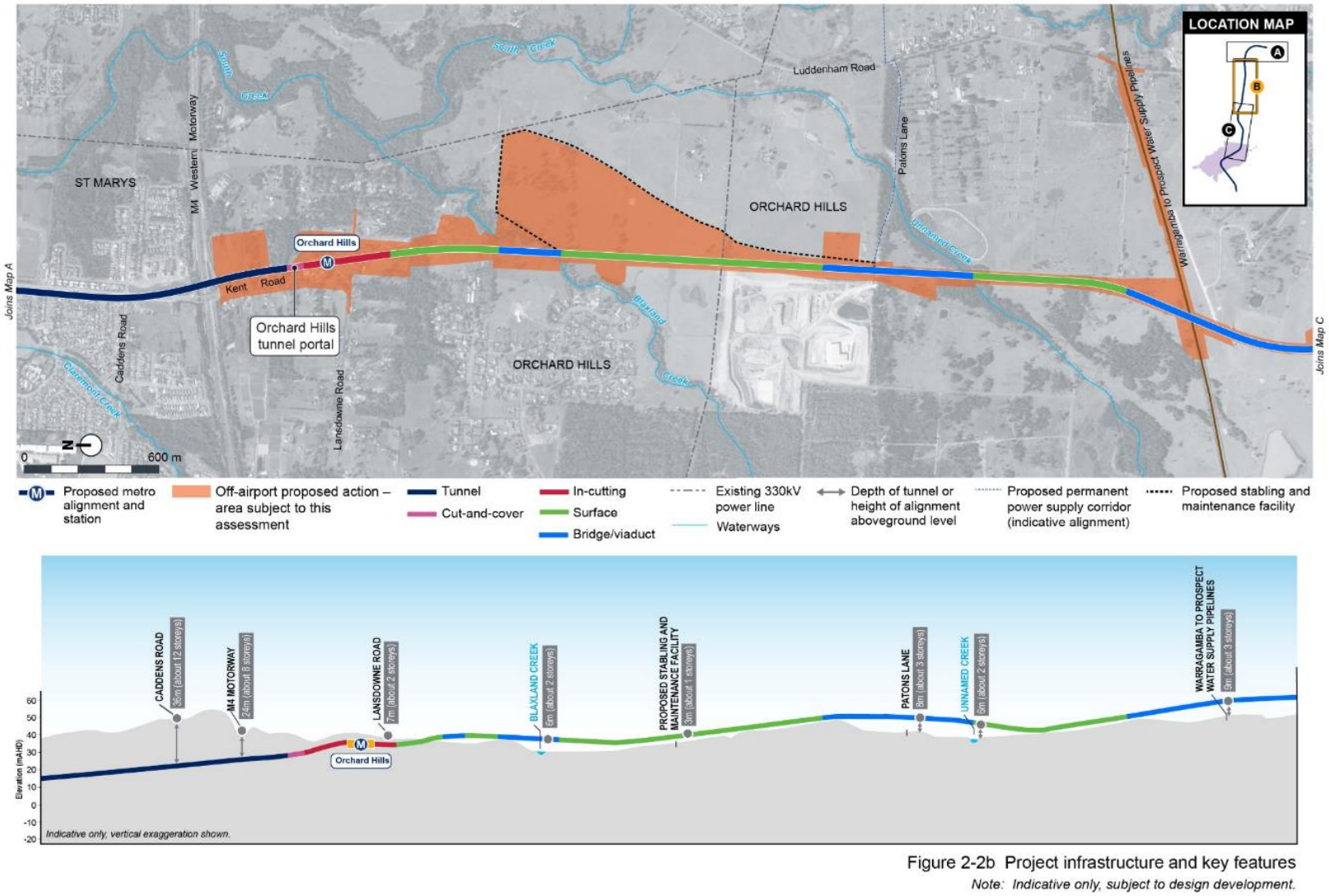



Figure 2-2b Project infrastructure and key features

*Note: Indicative only, subject to design development.*

**Figure 2-2b Project infrastructure and key features**

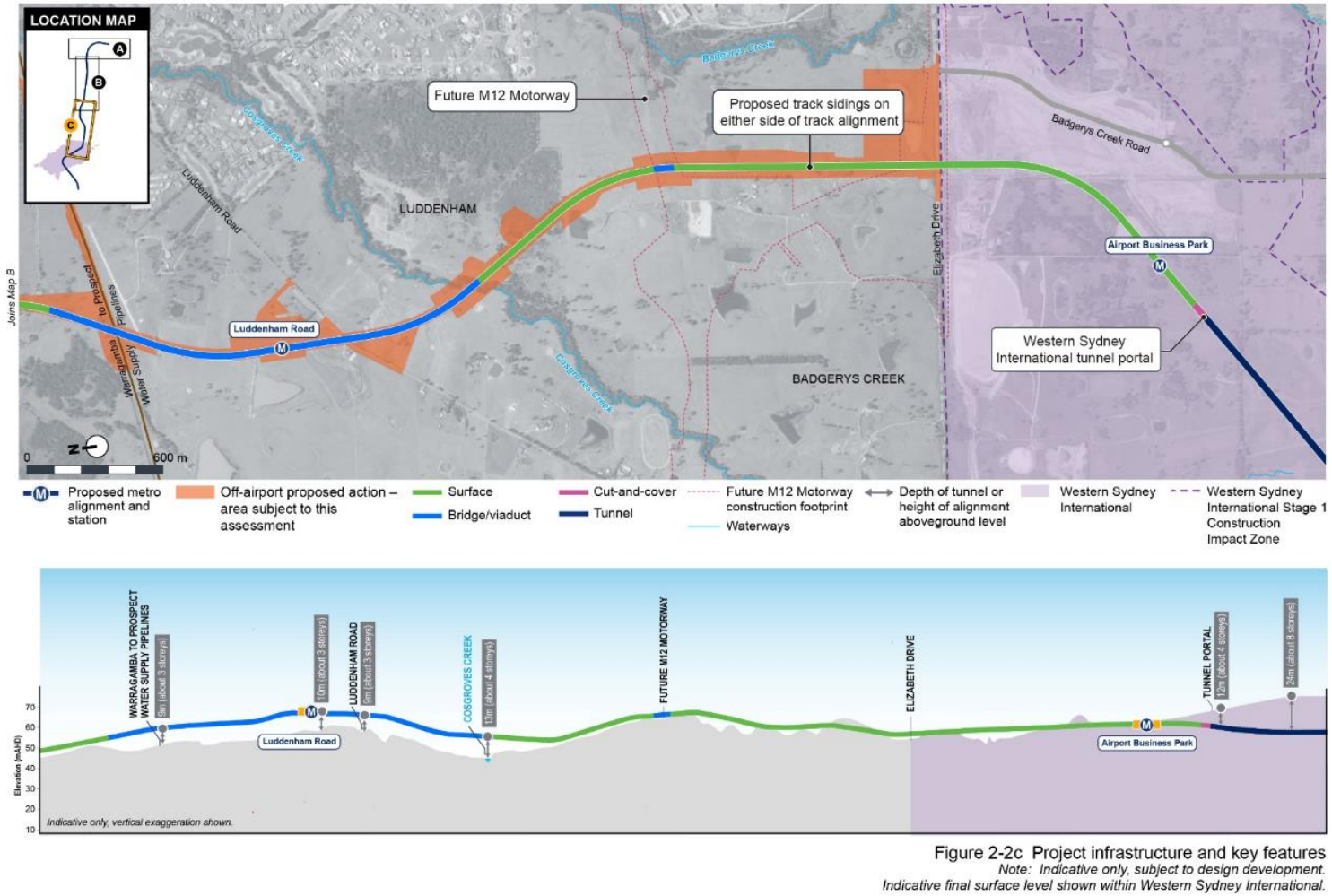



Figure 2-2c Project infrastructure and key features
*Note: Indicative only, subject to design development.*
*Indicative final surface level shown within Western Sydney International.*

**Figure 2-2c Project infrastructure and key features**

A tunnel portal is the transition point for the rail track from below ground to surface. A tunnel portal would be required at Orchard Hills, around 450 metres south of the M4 Western Motorway. Tunnel services buildings, including ventilation facilities, to support operations would also be provided. The proposed tunnels and tunnel portal would be designed to minimise water ingress. Appropriate drainage systems would collect runoff from the open sections of the tunnel portal and groundwater seepage into the tunnel, and direct it to the tunnel low points. The water would be treated to a standard suitable for discharge into the surrounding drainage network.

In addition to the ventilation services provided at the tunnel portal, a services facility is also proposed at Claremont Meadows. If required, it would be located in a cleared area near the south-east corner of the intersection of Gipps Street and the Great Western Highway.

Surface tracks refer to the components of the project alignment that are generally at the same level as the existing ground surface, in addition to sections in cuttings or located on embankments. The surface sections of track would generally consist of a slab or ballast track construction with concrete sleepers.

A series of fill embankments and cuttings would be required along the length of the project due to the varying terrain and locational setting of the project within the existing landscape. Batters for cuts and embankments would be designed to minimise property impacts, maintenance requirements and reduce urban design impacts. The batters would typically be designed to have slopes of around 2:1 (horizontal: vertical). Where required, benches (flatter areas between vertical slopes) would be provided to limit the height of each slope section. All earthworks would be designed to fit the surrounding context, providing a ‘natural fit’ within their landscape setting wherever possible. Retaining walls may be required in the vicinity of stations or along the alignment to suit the new metro tracks or to support new infrastructure as a result of local topography.

The alignment would intersect with infrastructure (such as roads and the Warragamba to Prospect Water Supply Pipelines corridor), a number of watercourses and areas of flood prone land which would require a series of viaduct and bridge structures to cross, as identified in Table 2-1. The viaduct and bridge sections would generally consist of a slab track construction with concrete sleepers.

**Table 2-1 Proposed bridge and viaduct structures**

| Location | Indicative length | Description |
|---|---|---|
| Lansdowne Road | 30 metres | At Lansdowne Road, the track alignment would be in-cutting and perpendicular to the existing Lansdowne Road. At this location, a new road-over-rail bridge would be provided to maintain the existing alignment of Lansdowne Road over the rail track. |
| Blaxland Creek | 360 metres | The proposed viaduct to cross Blaxland Creek would potentially consist of a series of spanning structures that would have an overall length of around 360 metres to clear the potential flood zone at this location. The viaduct structure would typically consist of an elevated concrete structure supported on reinforced concrete piers. |
| Patons Lane | 830 metres | The proposed viaduct to cross Patons Lane and an unnamed tributary of South Creek to the south of Patons Lane would consist of a series of spanning structures and would have an overall length of around 830 metres to clear all existing infrastructure, the potential flood zone and vegetation in this location. |
| Warragamba to Prospect Water Supply Pipelines, Luddenham Road and Cosgroves Creek | 2,500 metres | The proposed viaduct to cross the Warragamba to Prospect Water Supply Pipelines, Luddenham Road and Cosgroves Creek would consist of a series of spanning structures and would have an overall length of around 2.5 kilometres to clear all infrastructure and the potential flood zone in this location. Luddenham Road Station would be located on this viaduct structure. |

| Location | Indicative length | Description |
|---|---|---|
| Future M12 Motorway | 95 metres | The project would cross the proposed alignment of the future M12 Motorway to the north of Elizabeth Drive, before entering Western Sydney International. The project would be grade separated on a new rail-over-road bridge with the future M12 Motorway located in a cutting under the metro rail line. The bridge would be designed to provide the required clearance to the future M12 Motorway. |

**Note**

The design of the proposed bridge and viaduct structures is indicative and subject to ongoing design development.

### Wildlife connectivity

The Cumberland Subregion Biodiversity Investment Opportunities Map (BIO Map) (NSW DPIE, 2015) shows that there are mapped biodiversity corridors of regional significance, known as Regional Corridor 18 along Blaxland Creek and Regional Corridor 20 which leads along Patons Lane, within the proposed action area. Viaducts are proposed in these areas to minimise potential impacts to the two identified regional biodiversity corridors (refer Figure 4-5). The locations of the viaducts are indicative. The viaducts would be subject to design development and would continue to include consideration of maintaining connectivity, minimising vegetation clearance and impacts to the regional corridors.

The design of the proposed action considers wildlife connectivity requirements across the project corridor where security fencing is not required. This has included appropriate design of bridge and drainage structures which would allow for ongoing fauna movements. Locations at which fauna connectivity has been considered and incorporated includes:

- the proposed bridge structures in the vicinity of Blaxland Creek and Cosgroves Creek
- the proposed viaduct structure crossing two existing vegetation corridors at Patons Lane and the unnamed watercourse to the south of Patons Lane
- a culvert measuring around 1.5 metres in diameter providing connectivity for wildlife at an unnamed watercourse (tributary of Blaxland Creek) between Lansdowne Road and Blaxland Creek
- a culvert measuring around 1.5 metres in diameter providing connectivity for the wildlife link around 600 metres north of the Warragamba to Prospect Water Supply Pipelines.

Further design development of viaduct structures over the wildlife/riparian corridors at Blaxland Creek, the unnamed tributary south of Patons Lane and Cosgroves Creek would seek to:

- maximise the span over the wildlife/riparian corridor
- minimise native vegetation removal within the wildlife/riparian corridors
- maintain opportunities for fauna movement along the wildlife/riparian corridors
- provide opportunities to enhance fauna movement where possible.

### Metro stations

Each metro station would have a number of common elements or design features. These would include:

- station concourses (both paid and unpaid), including elements such as ticket vending machines, ticket barriers and access to and from the platform and toilets
- emergency stairwell access (typically at the ends of each station)
- platforms with elements such as seating, help points to enable customers to obtain emergency assistance, real-time customer information display screens and public address systems
- vertical transport, including a combination of escalators, lifts and stairs
- cross-corridor connections which provide access across rail lines to ensure permeability

- station service and utilities buildings/facilities
- signage and wayfinding within the station and the surrounding public domain
- awnings for shade and shelter at station entries as well as along station platforms
- provision of space for potential retail and other uses to activate the stations and station precincts
- enhancements to and/or provision of footpaths in the immediate vicinity of the station entries
- landscaping and street furniture to maintain high quality urban design outcomes.

Further information on the operational features of the three stations within the proposed action can be provided if required.

**Stabling and maintenance facility**

The proposed stabling and maintenance facility would be located in Orchard Hills, to the south of Blaxland Creek and east of the proposed metro track (see Figure 2-3). Trains would be stabled and maintained at this dedicated facility. This would be an integrated facility incorporating most operational functions including the operations control centre and all infrastructure required to maintain the train fleet.

The stabling and maintenance facility layout has been configured to allow for access/egress to the main track alignment at both the northern and southern ends of the stabling and maintenance facility. Vehicular access would be provided via separate access/egress points on Luddenham Road and Patons Lane (for general staff access as well as delivery and large vehicle access). An internal access road network would provide for general circulation while appropriately separated from train movements and with limited crossing points. The site would also be fenced from general public access and lighting would be used at night for safety and security of the site.

The stabling and maintenance facility would include:

- a vehicle equipment measurement system which would provide an automated inspection of the train cars as they enter the stabling and maintenance facility to determine their serviceability and safety
- up to 10 stabling roads to store trains, and test tracks to undertake train testing and commissioning
- an infrastructure maintenance shed
- a train monitoring system to allow for monitoring of vehicle integrity, brake systems, wheels, pantographs and other vehicle equipment
- train wash facilities and wheel lathe
- operations control centre, administration building and driver training facility
- a traction substation and a bulk power supply point
- area for site security personnel
- offices and general storage areas
- staff car parking and internal access roads
- fire control systems including the provision of fire hydrants, hoses and other firefighting equipment within the facility
- on-site water detention, water quality treatment basins and site landscaping.

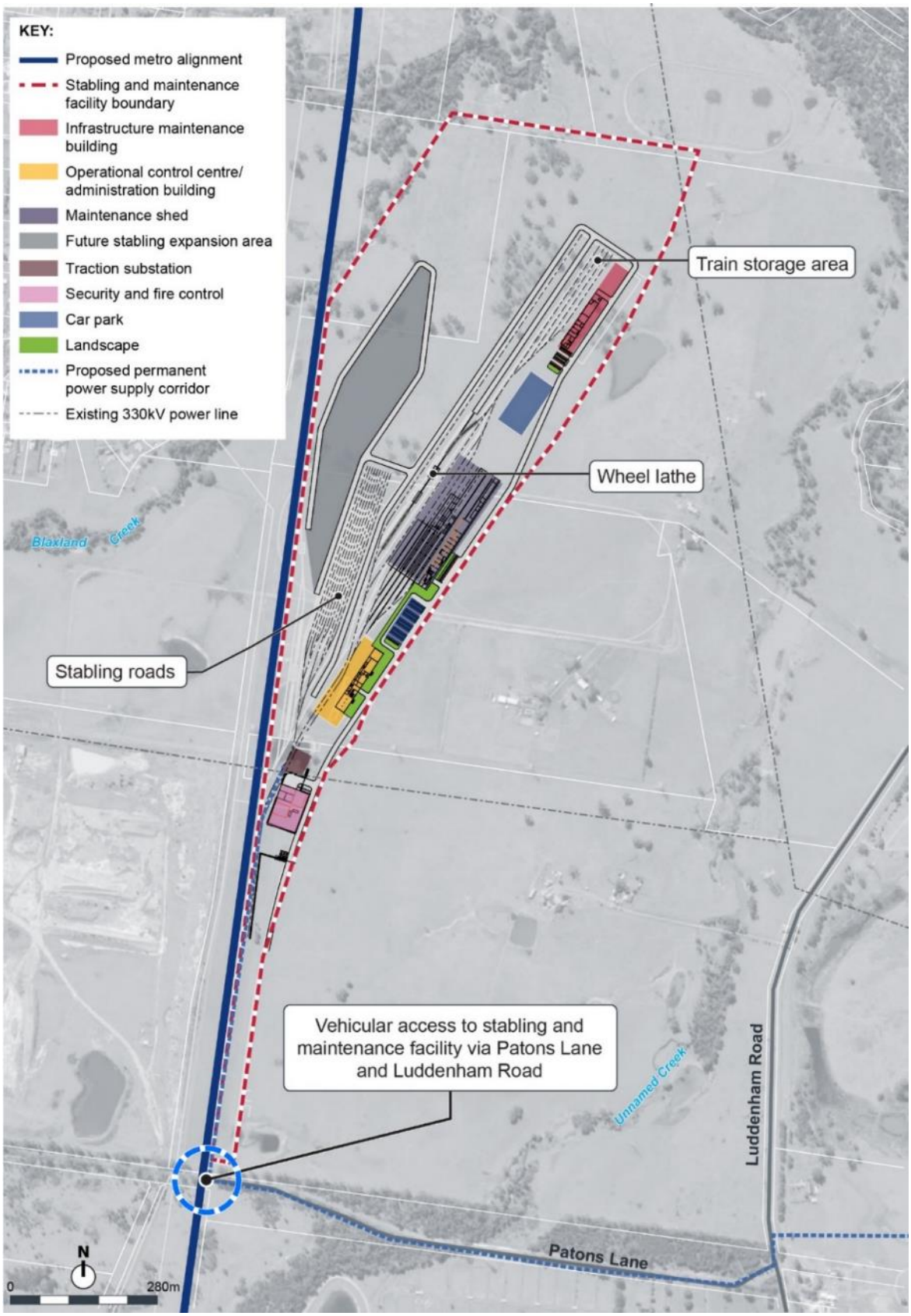



**Figure 2-3 Stabling and maintenance facility**

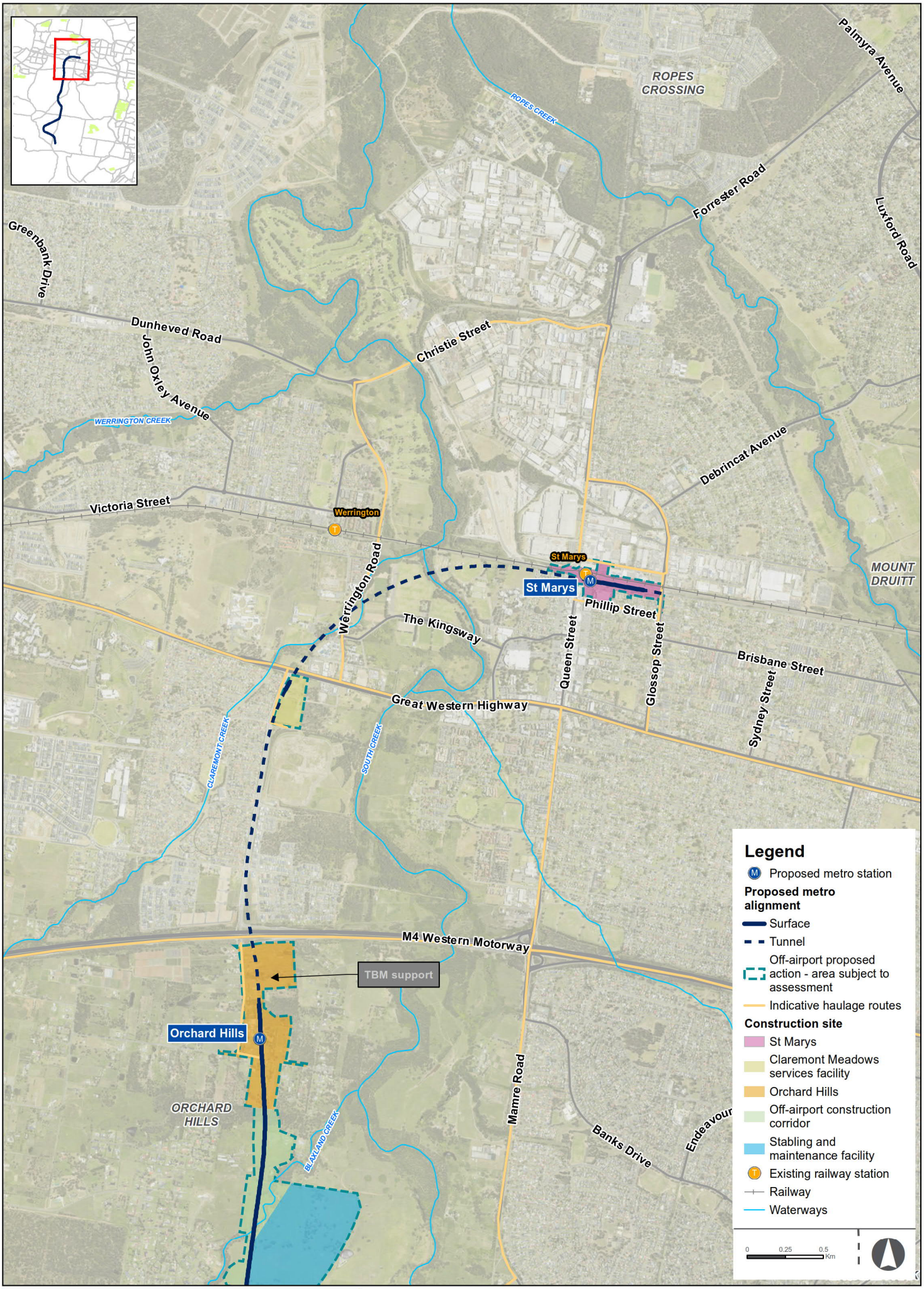
### 2.2.2 Construction elements

The proposed construction activities that would be undertaken for the proposed action include:

- enabling works
- main construction works including:
  - tunnelling and associated works
  - corridor and associated works
  - stations and associated works
  - ancillary facilities and associated works
- rail systems fitout
- finishing works and testing and commissioning.

The proposed action construction footprint and key construction sites proposed for use during construction of the proposed action are shown in Figure 2-4.

Construction of the proposed action is expected to commence in 2021, subject to approvals. The project is anticipated to take around five years to complete.

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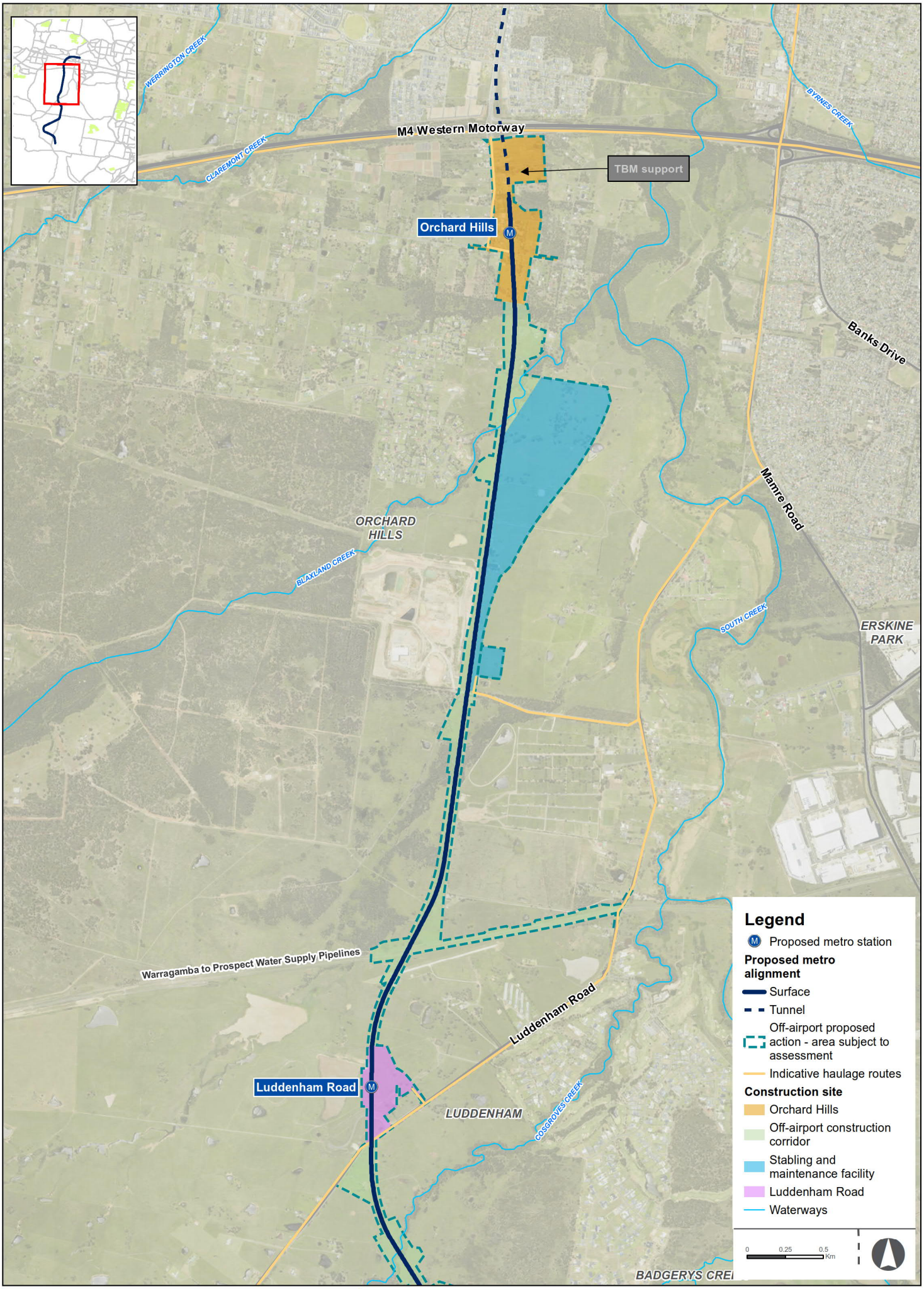
Overview of the construction footprint

**Figure 2-4a**

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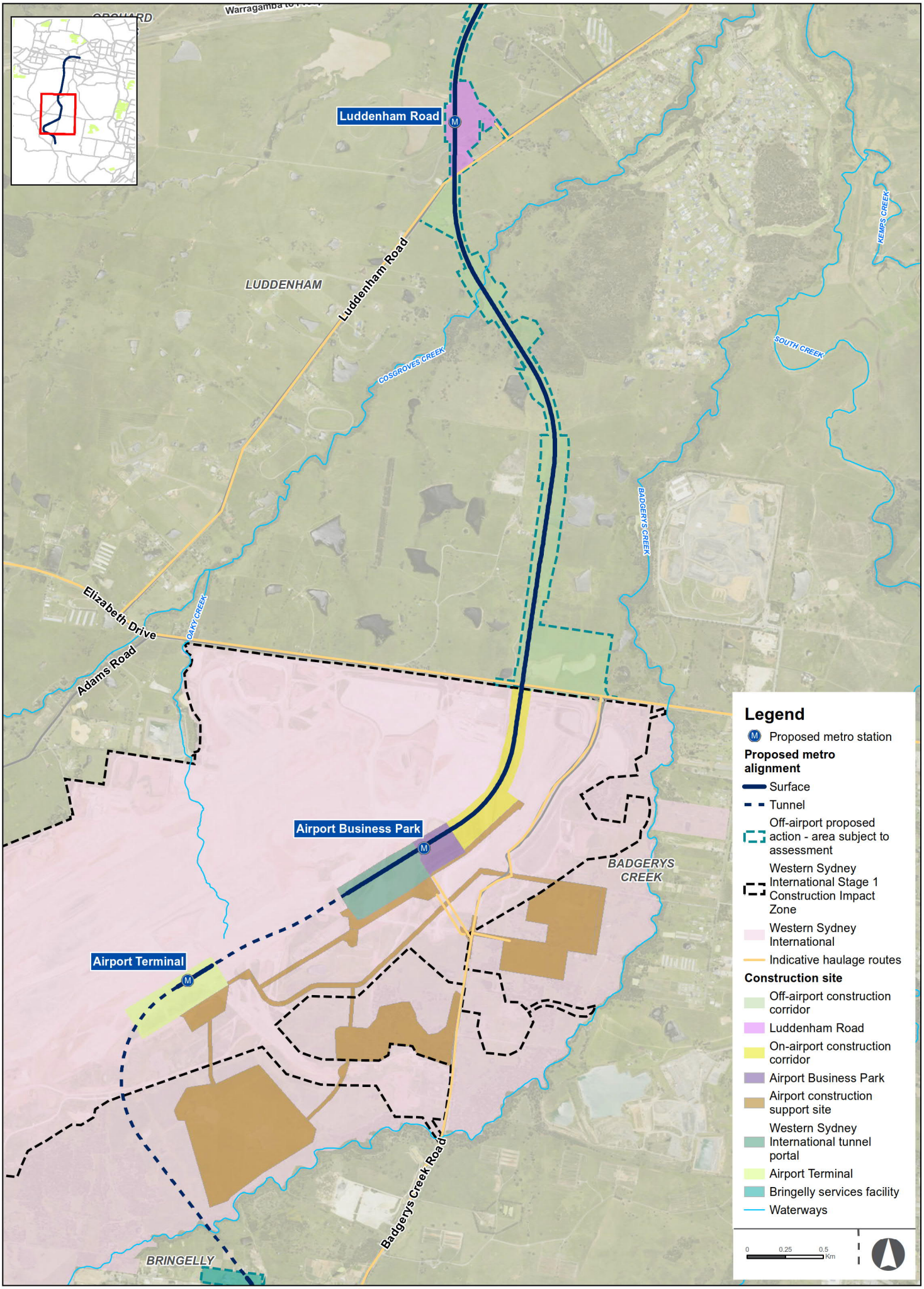
Overview of the construction footprint

**Figure 2-4b**

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Overview of the construction footprint

**Figure 2-4c**

# 3. Description of listed threatened species and communities

## 3.1 Description of ecological characteristics

A description of the ecological characteristics of the listed threatened species and ecological communities is provided in Chapter 5 and Chapter 7 of the Revised Biodiversity Development Assessment Report (Appendix A).

The description of the survey effort and methodology is provided in Chapter 3 of the Revised Biodiversity Development Assessment Report. Figure 3-3 of the Revised Biodiversity Development Assessment Report illustrates the survey effort in relation to the alignment of the project. The results of surveys relating to listed threatened species and ecological communities, as well as a description of the distribution and abundance of the species or community are provided in Chapter 7 and Appendix B of the Revised Biodiversity Development Assessment Report.

The location of vegetation types and threatened ecological communities is shown in Figure 5-1 and Figure 5-2 of the Revised Biodiversity Development Assessment Report. Figure 6-1 and Figure 6-2 of the Revised Biodiversity Development Assessment Report illustrate the location of threatened species.

For the Grey-headed Flying-fox, information on habitat and populations is provided in Section 7.2.4 and Appendix B of the Revised Biodiversity Development Assessment Report. Section 7.2.4 of the Revised Biodiversity Development Assessment Report also includes a discussion on the effects of the 2019-2020 bushfires on this species.

Information regarding Coastal Swamp Oak Forest and Cumberland Plain Woodland is provided in Chapter 7 in the Revised Biodiversity Development Assessment Report. Additionally, Section 7.2.2 of the Revised Biodiversity Development Assessment Report includes a discussion of the effects of the 2019-2020 bushfires on these communities.

These referenced sections of the Revised Biodiversity Development Assessment Report address the requirements set out in the Preliminary Documentation guidelines.

# 4. Description of Commonwealth land

## 4.1 Overview

The proposed action would adjoin the eastern boundary of the DEOH site between Patons Lane and the Warragamba to Prospect Water Supply Pipelines as shown in Figure 4-1. It is proposed to be partially constructed on a portion of Commonwealth land within the DEOH site, adjacent to Stockdale Road, Orchard Hills, comprising:

- Lot 1 DP242968
- Lot 2 DP242968
- Lot 3 DP242968
- Lot 1 DP629326.

This Commonwealth land is described in Section 2.7.2 of the Referral (EPBC 2020/8687) and comprises primarily cleared land with areas of remnant vegetation. With the exception of Stockdale Road, there is currently no permanent built infrastructure located within the Commonwealth land. The DEOH site is also shown on Figures 2-3, 2-4 and 2-5 of the Referral.

An area of around 10 hectares (of the 1,600 hectares site area) would be permanently affected and some additional seven hectares would be temporarily affected through construction activities. It is anticipated that the operational footprint of the proposed action within the DEOH site would be acquired by Sydney Metro and would therefore cease to be Commonwealth land.

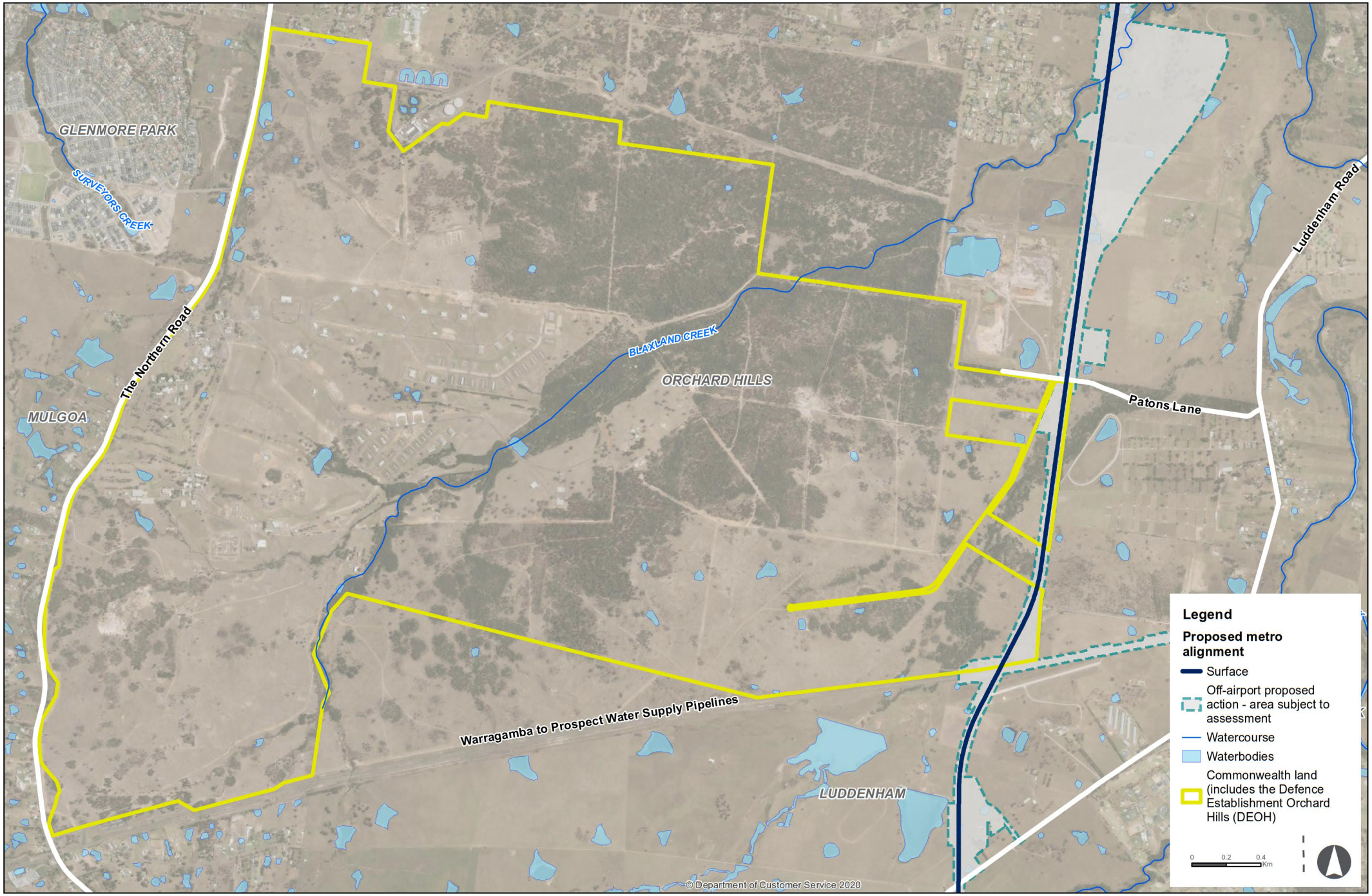
Biodiversity offset obligations associated with the approved works for Western Sydney International are to be met through a number of mechanisms, with the majority of offsets to be delivered through the establishment of the Defence Orchard Hills biodiversity offset areas on the western part of the DEOH site. The Defence Orchard Hills biodiversity offset areas are located a considerable distance from the proposed action construction footprint (approximately 800 metres from the northern offset area and at least 1.7 kilometres from the southern offset area), as shown in Figure 4-4. As such, neither direct nor indirect impacts are anticipated on these areas from the proposed action.

A description of the existing environment of the DEOH site is provided in Table 4-1, excluding biodiversity matters which are discussed in Section 4.2 (Biodiversity) and Aboriginal heritage matters which are discussed in Section 4.3 (Aboriginal heritage).

**Table 4-1 Existing environment on DEOH site**

| Environmental Issue | Existing Environment |
|---|---|
| Traffic and transport | Transport infrastructure within the vicinity of Commonwealth land includes Stockdale Road (internal Defence road) and Patons Lane. Stockdale Road connects with Patons Lane to provide access to Luddenham Road in the east. No other public or active transport services or infrastructure are located within this area. |
| Noise and vibration | The existing noise environment of the Commonwealth land is generally representative of a semi-rural environment. The use of the DEOH site would influence existing noise levels as a result of activities including the use of firing ranges and fire training areas, however this influence would not substantially alter the low-noise character of the land. The nearest noise sensitive receivers are located around one kilometre to the east on Luddenham Road. |
| Non-Aboriginal heritage | There are no local, State or Commonwealth non-Aboriginal heritage items located within or adjacent to the Commonwealth land. The nearest heritage item is the Orchard Hills Cumberland Plain Woodland (Commonwealth heritage item) which is located over 500 metres to the west (see Figure 5-1 and refer to Figure 2-4 of the Referral). |

| Environmental Issue | Existing Environment |
|---|---|
| Land use and property | The site covers an area of around 1,600 hectares. The primary function of the site is munitions storage and distribution however a range of activities are carried out at the site including the use of weapons ranges, firing ranges, fire training areas and fuel storage. |
| Flooding, hydrology and water quality | There is one unnamed watercourse located north of the Warragamba to Prospect Water Supply Pipelines/south of Patons Lane within the Commonwealth land. The land is partially located within the Probable Maximum Flood (PMF) extent for South Creek. The unnamed watercourse forms part of the South Creek catchment which is recognised as having water quality issues resulting from high nutrient concentrations derived from both point and diffuse pollution sources. Water quality in the unnamed watercourse is similarly influenced by diffuse pollution sources associated with historical activities such as vegetation clearing and land uses. |
| Landscape and visual | The existing visual environment consists of areas of cleared rural land and remnant vegetation. The nearest visual sensitive receivers are located around one kilometre to the east on Luddenham Road. The viewshed of the proposed action is considered to be limited and obscured by vegetation and the natural topography in this location. |
| Air quality | Air quality within the surrounding area is generally within air quality criteria however where exceedances have occurred these are generally due to exceptional events related to bushfires, hazard reduction burns and dust storms. |
| Soils and contamination | There is no risk of acid sulphate soils within or adjacent to the Commonwealth land according to acid sulphate soils risk mapping (OEH, 2019). There are no identified contaminated lands regulated under the *Contaminated Lands Management Act 1997* (NSW) within or adjacent to the Commonwealth land. There is the potential for soil contamination based on the historical use of the land as a Commonwealth Department of Defence base including unexploded ordnance, however this is considered to be unlikely within the area of the Commonwealth land impacted by the proposed action (i.e. the eastern-most boundary). |

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Orchard Hills Commonwealth land (includes the Defence Establishment Orchard Hills)

**Figure 4-1**

## 4.2 Biodiversity

### 4.2.1 Vegetation

The Commonwealth land at the DEOH site has been subject to detailed biodiversity field survey for the proposed action. This information supersedes the desktop information provided in the Referral.

The majority of the Commonwealth land that would be impacted by the proposed action is dominated by exotic vegetation associated with historically cleared land. Fragmented remnant native vegetation is generally restricted to riparian areas containing three vegetation communities (PCTs), all of which are listed as threatened ecological communities (TECs) under the NSW *Biodiversity Conservation Act 2016* (BC Act):

- Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (PCT 724 and 849)
- River-flat Eucalypt Forest (PCT 835)
- Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland (PCT 1800).

Vegetation communities are discussed in Chapter 5, Chapter 6 and Chapter 7 of the Revised Biodiversity Development Assessment Report (Appendix A) and the extent of vegetation types is shown in Figure 4-2. These vegetation communities provide terrestrial fauna habitat resources and potential habitat for threatened plants.

There are two TECs listed under the EPBC Act that occurs within the Commonwealth land to be impacted by the proposed action:

- Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest
- Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland.

The River-flat Eucalypt Forest community which occurs on Commonwealth land south of Patons Lane was under EPBC Act listing assessment at the time the project Referral was prepared. On the 15 December 2020, the Minister of the Environment approved the listing assessment of 'River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria'. As of this date, this community is now listed as Critically Endangered under the EPBC Act. As this community was not listed prior to the EPBC Referral and determination by the Commonwealth Minister for the Environment as a controlled action on 14 July 2020, it has not been considered further as an MNES in this assessment.

### 4.2.2 Threatened flora species

One threatened flora species, *Grevillea juniperina* subsp. *juniperina*, listed as vulnerable under the BC Act was recorded within the Commonwealth land. This species is not listed as threatened under the EPBC Act. Targeted seasonal surveys were conducted within optimal survey months for all species of flora with potential habitat.

The *Grevillea juniperina* subsp. *juniperina* recorded within the Commonwealth land was located in two separate patch areas (see Figure 4-3):

- corner of Patons Lane and Stockdale Road (entrance gate area to the DEOH site)
- the central eastern portion of the DEOH site.

The DEOH site has connectivity to a large bushland patch to the west (refer to Figure 4-5). This large patch (about 700 hectares) is isolated in the locality and is known to contain a large population of *Grevillea juniperina* subsp. *juniperina* that is securely conserved within Defence Orchard Hills biodiversity offset areas, located approximately 800 metres and 1.7 kilometres to the west (see Figure 4-4).

### 4.2.3 Threatened fauna species

Fauna is discussed in Chapter 6 and Chapter 7 in the Revised Biodiversity Development Assessment Report (Appendix A).

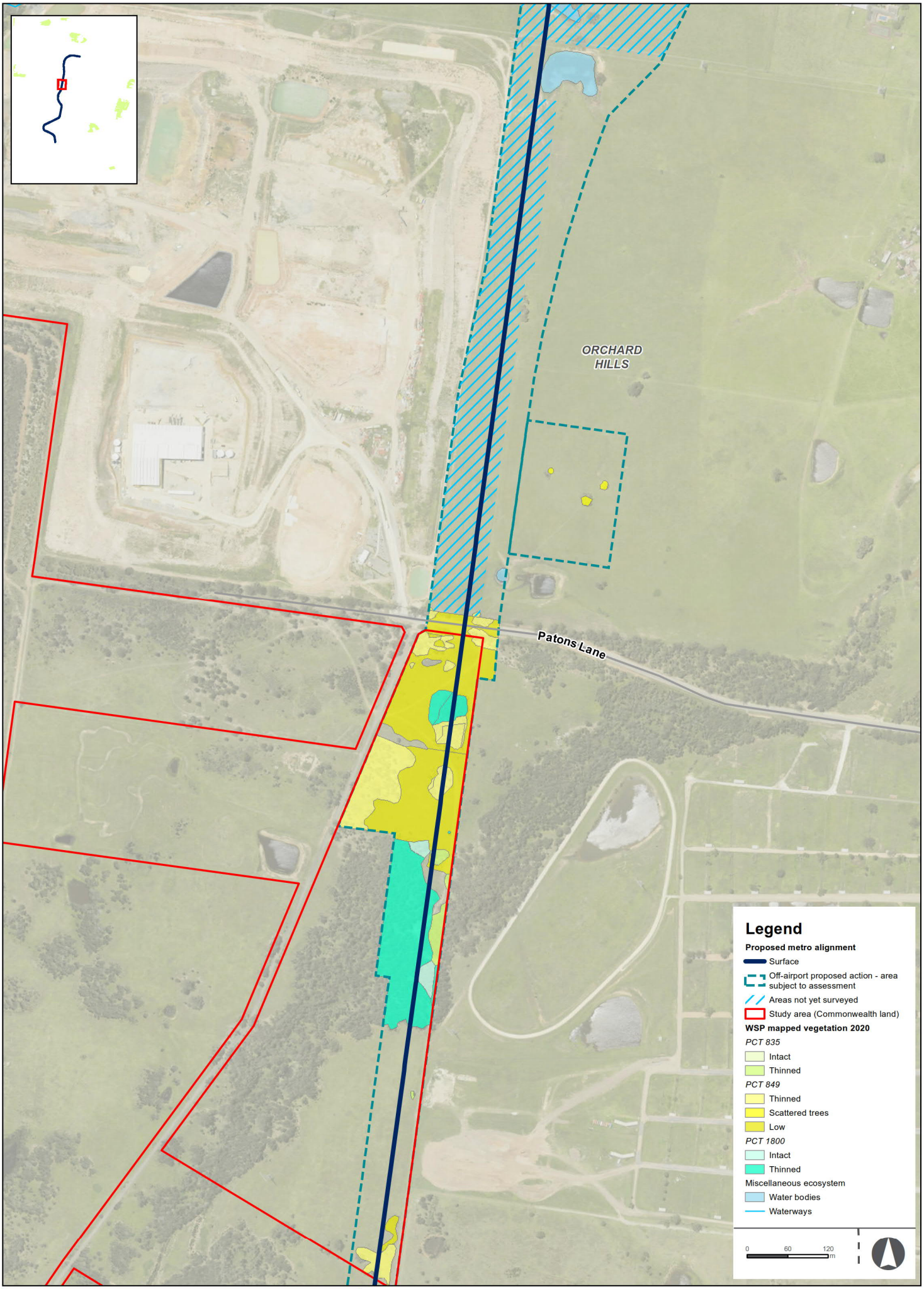
Two threatened fauna species, including the EPBC listed vulnerable Grey-headed Flying-fox and BC Act listed vulnerable *Myotis macropus* (Southern Myotis), have been recorded or assumed present within the Commonwealth land. These species are also known to occur and are considered to be securely conserved within the Defence Orchard Hills biodiversity offset areas.

Identified habitat for the Grey-headed Flying-fox is shown on Figure 4-4 together with identified habitat for the Southern Myotis.

It is noted that the Referral identified the potential for one migratory species in the proposed action area; the white-throated Needletail. Following the field investigations on the DEOH site within the Commonwealth land, an additional three migratory species were either recorded and/or considered to have suitable foraging habitat within the proposed action area. As a result, the potential migratory species within the proposed action area include:

- Latham's Snipe
- White-bellied Sea-eagle
- White-throated Needletail
- Satin Fly-catcher.

The habitat use of each of these species is likely to be restricted to intermittent foraging habitat only and is shown on Figure 4-6.

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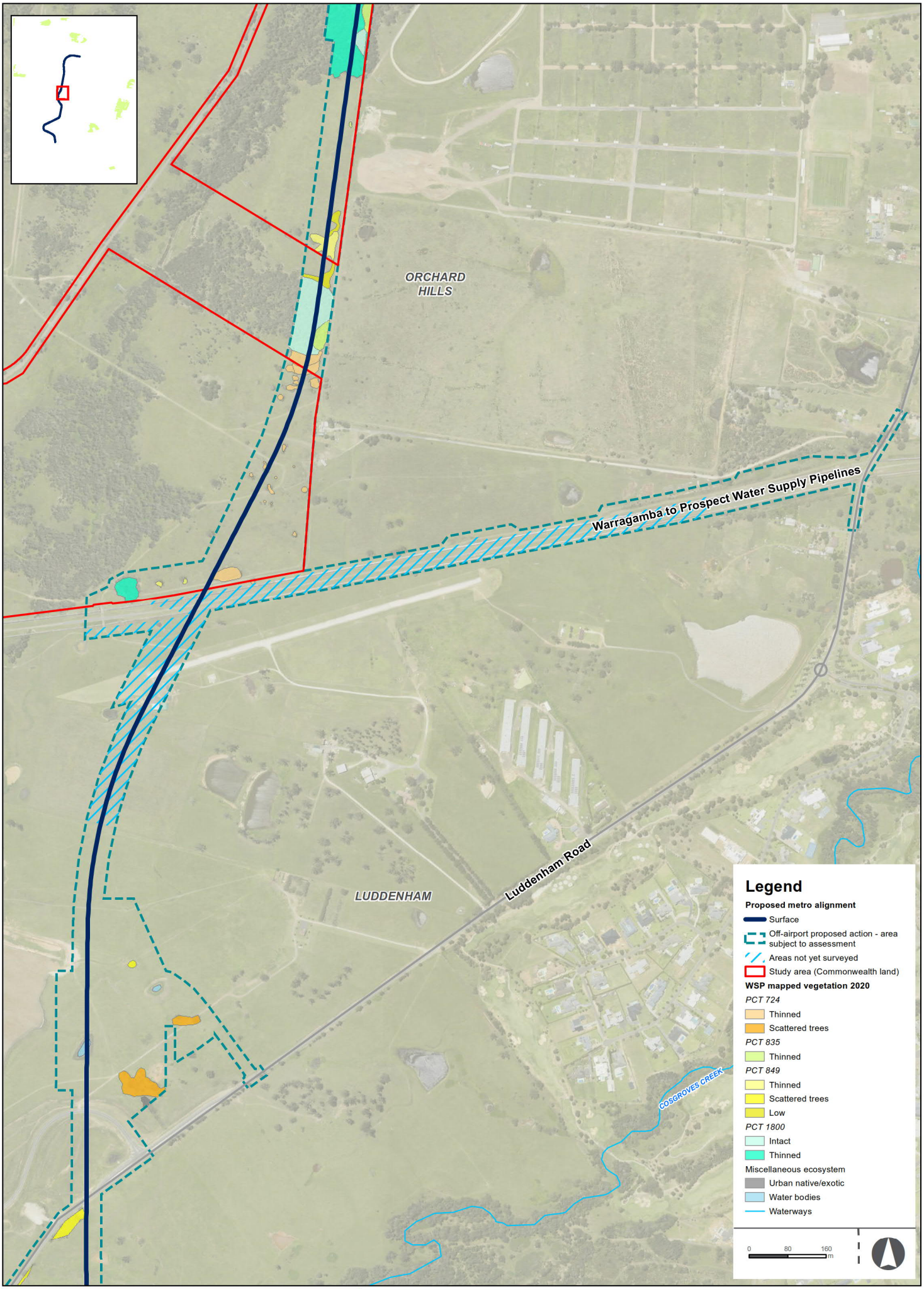
Vegetation types (PCTs) on Commonwealth land

**Figure 4-2a**

*Indicative only, subject to design development*

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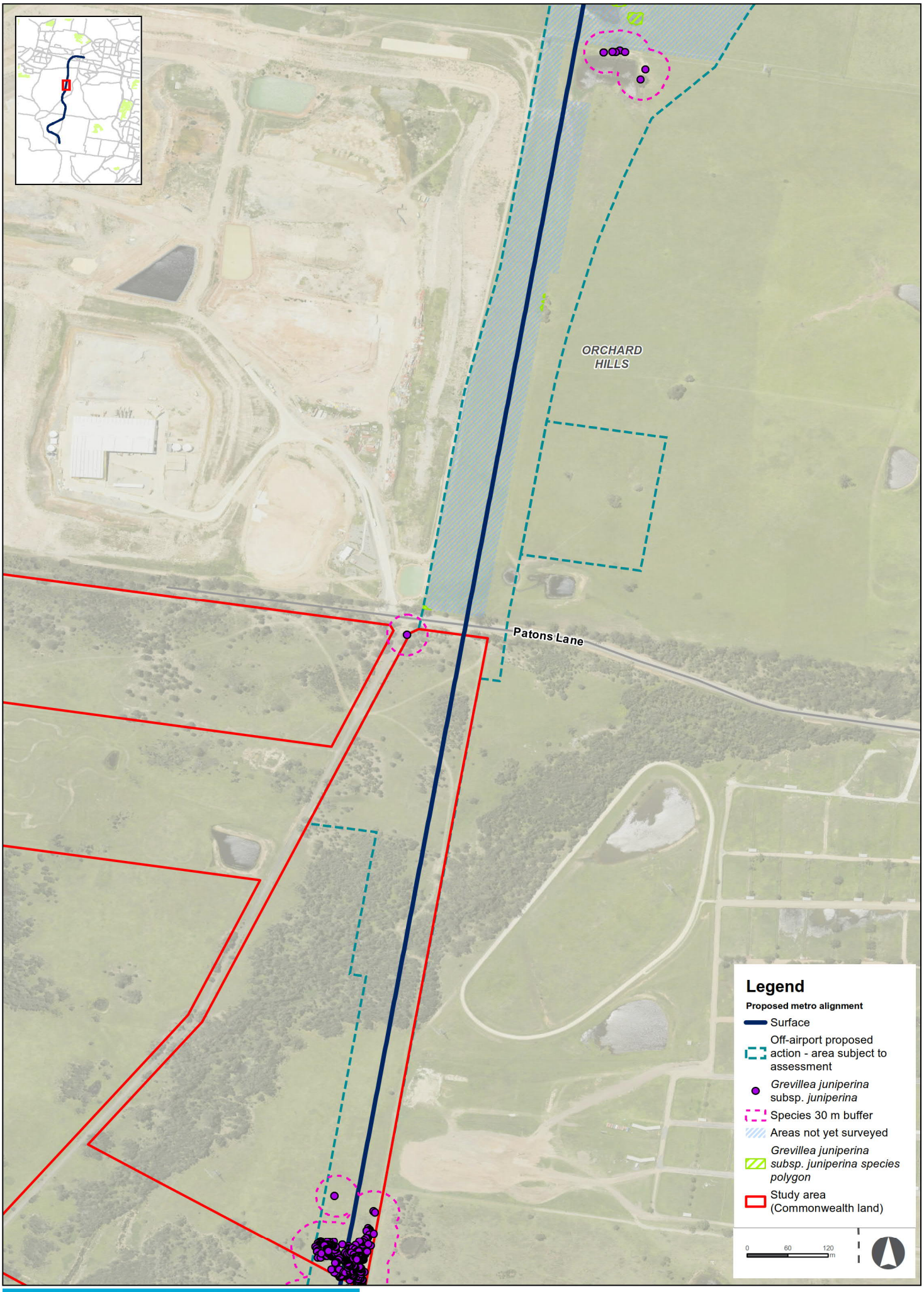
Vegetation types (PCTs) on Commonwealth land

**Figure 4-2b**

*Indicative only, subject to design development*

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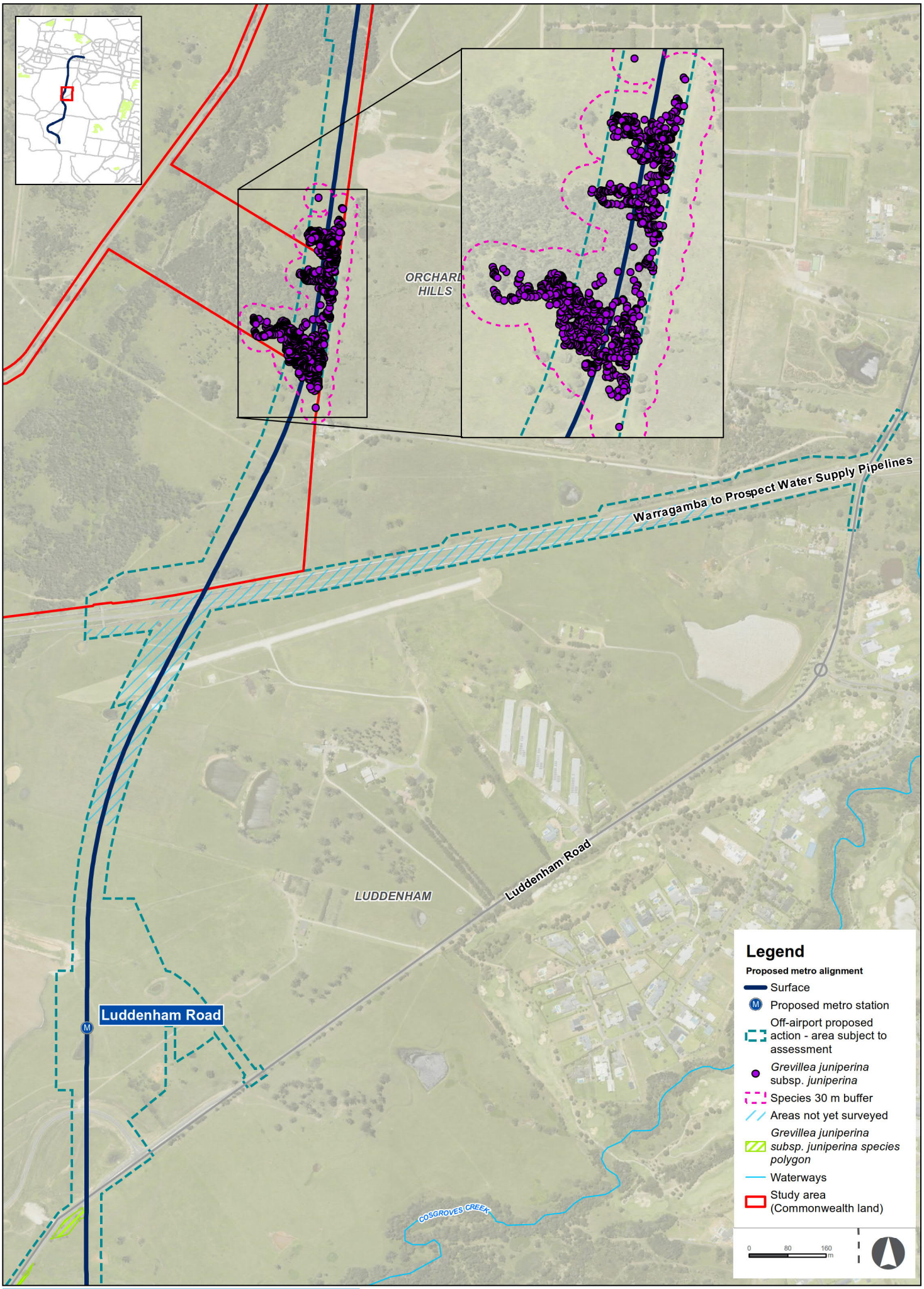
Threatened flora on Commonwealth land

**Figure 4-3a**

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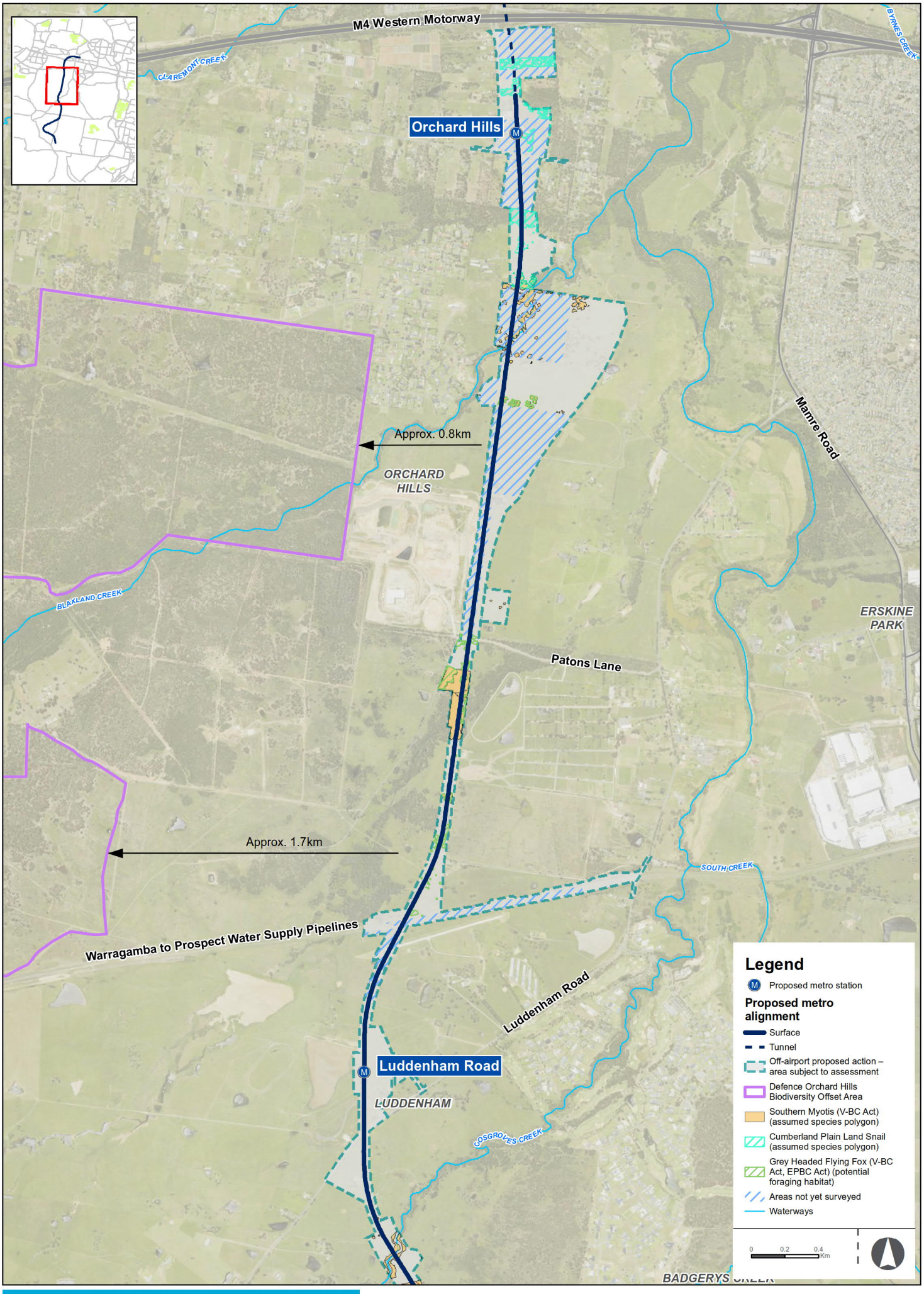
Threatened flora on Commonwealth land

**Figure 4-3b**

*Indicative only, subject to design development*

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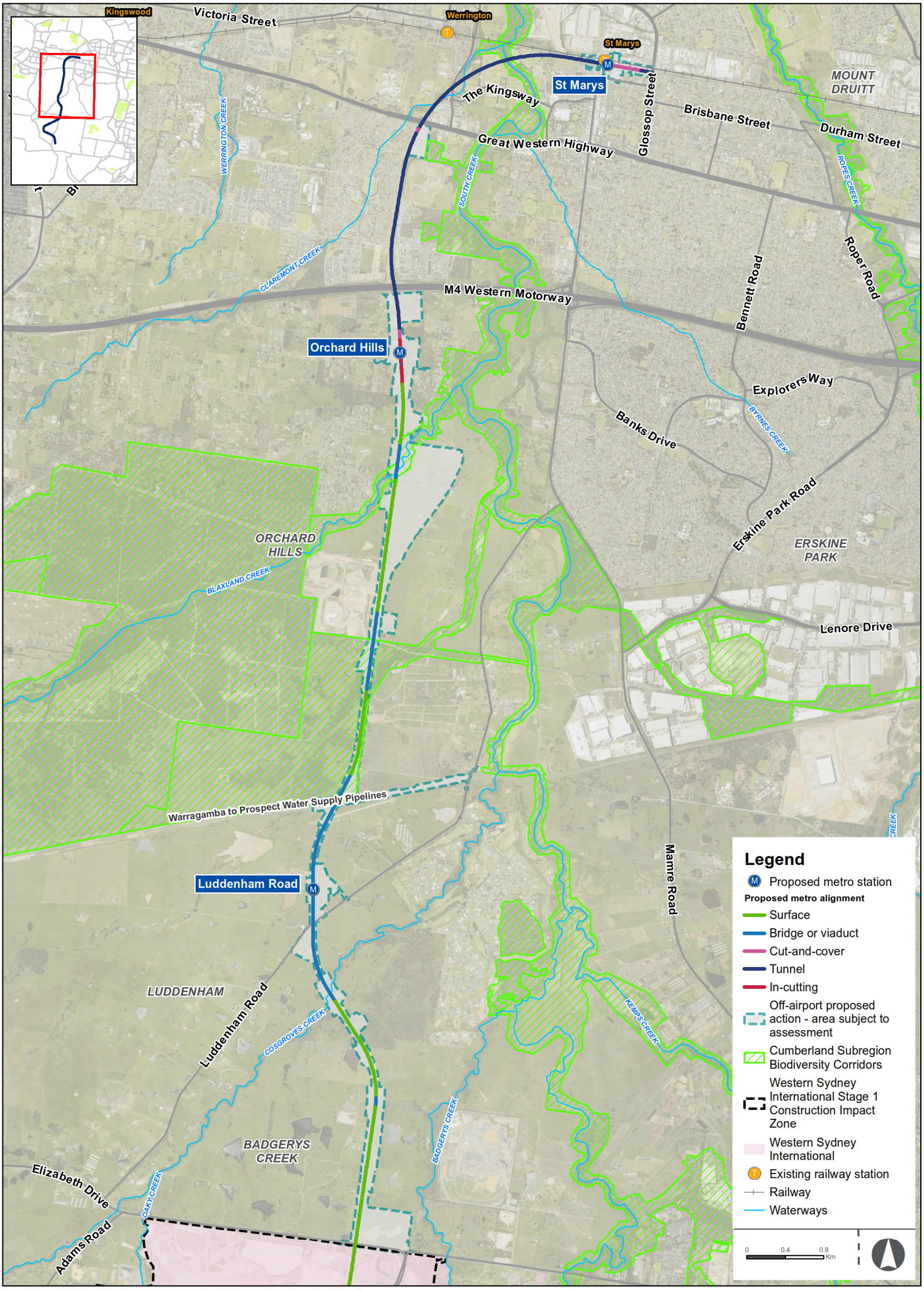
Threatened fauna species polygons and Defence Orchard Hills Biodiversity Offset Area

**Figure 4-4**

*Indicative only, subject to design development*

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Biodiversity corridors of regional significance along the off-airport proposed action

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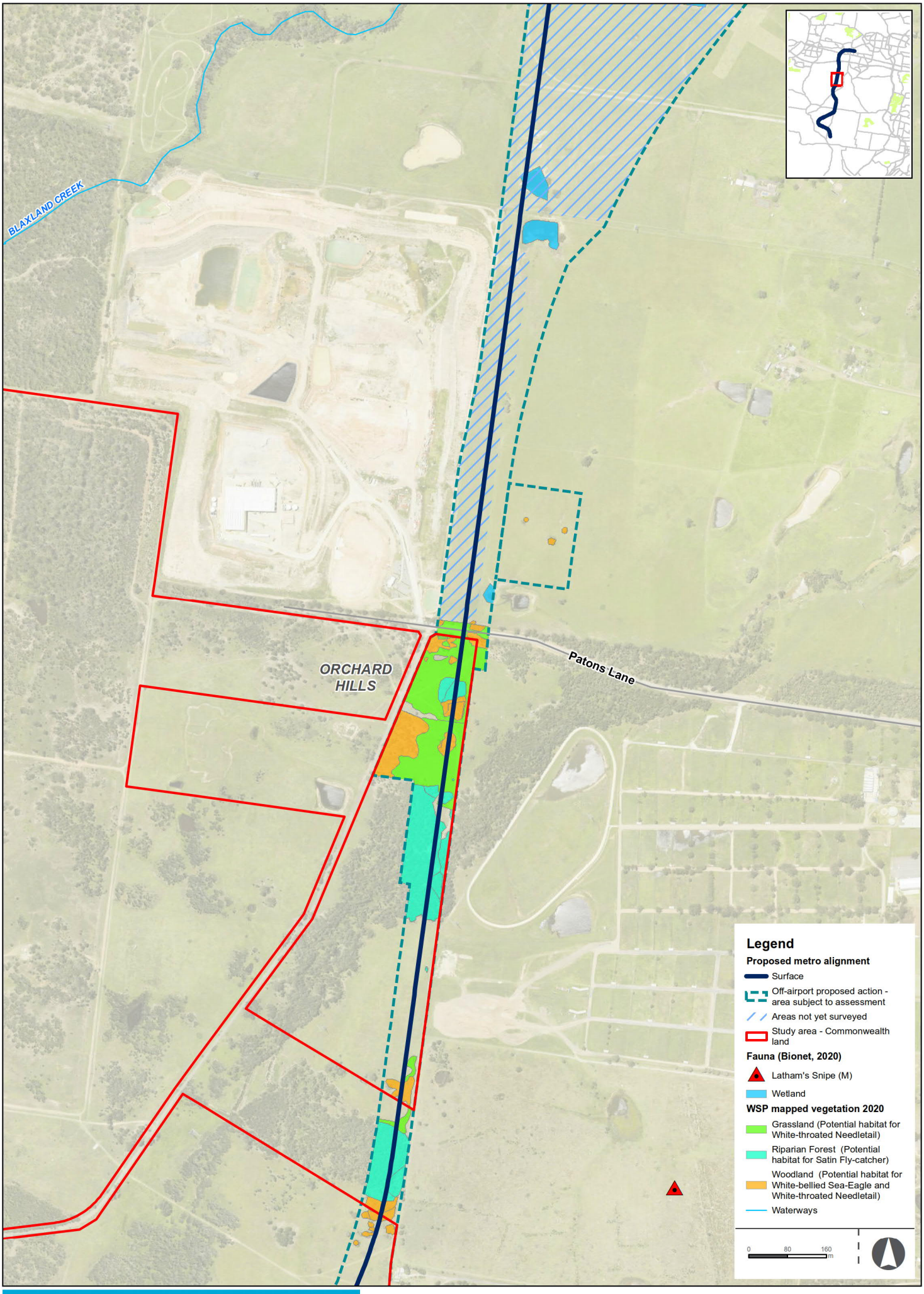
**Figure 4-5**

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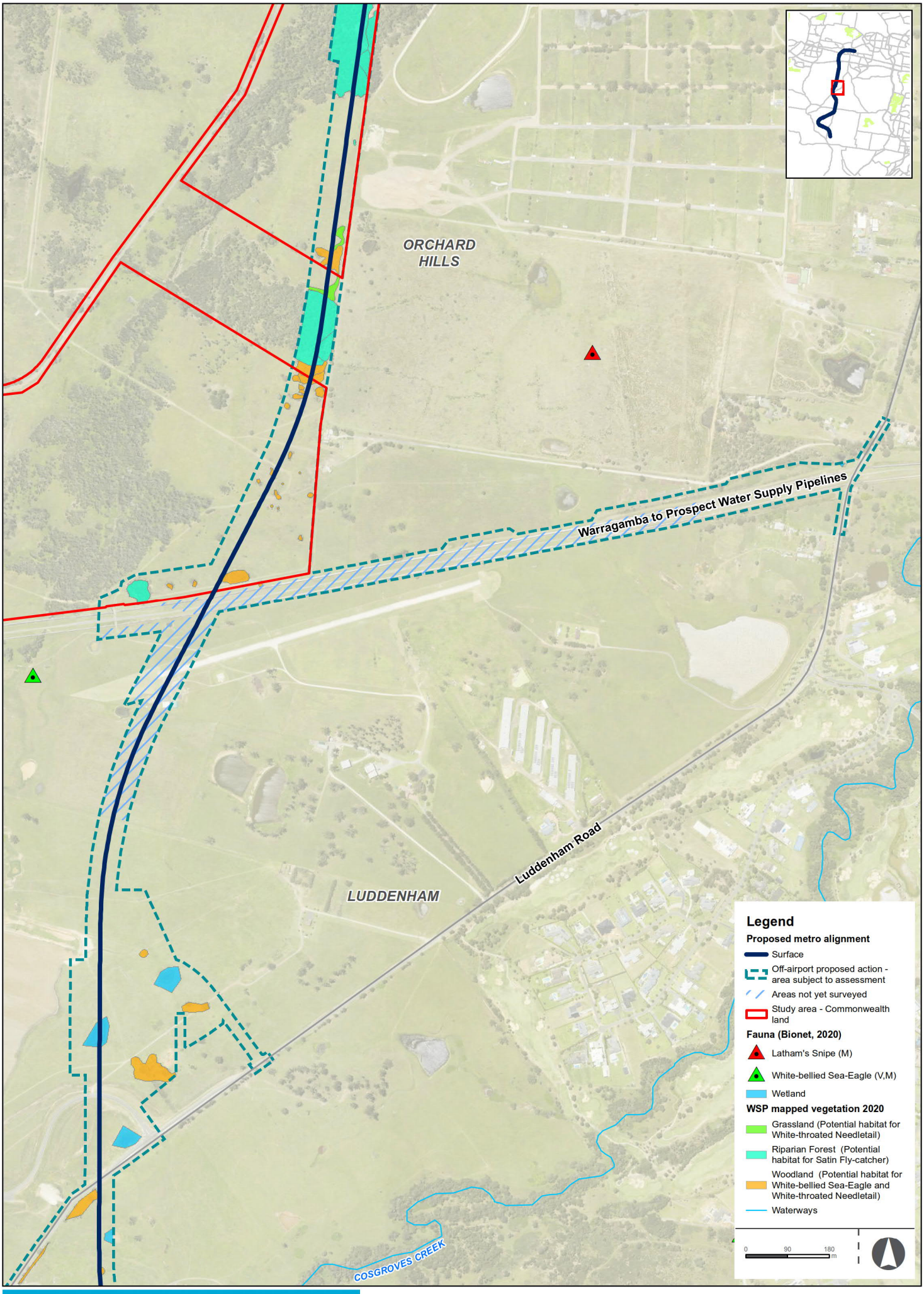
MNES Migratory fauna species potential habitat within Commonwealth land

**Figure 4-6a**

*Indicative only, subject to design development*

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MNES Migratory fauna species potential habitat within Commonwealth land

**Figure 4-6b**

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## 4.3 Aboriginal heritage

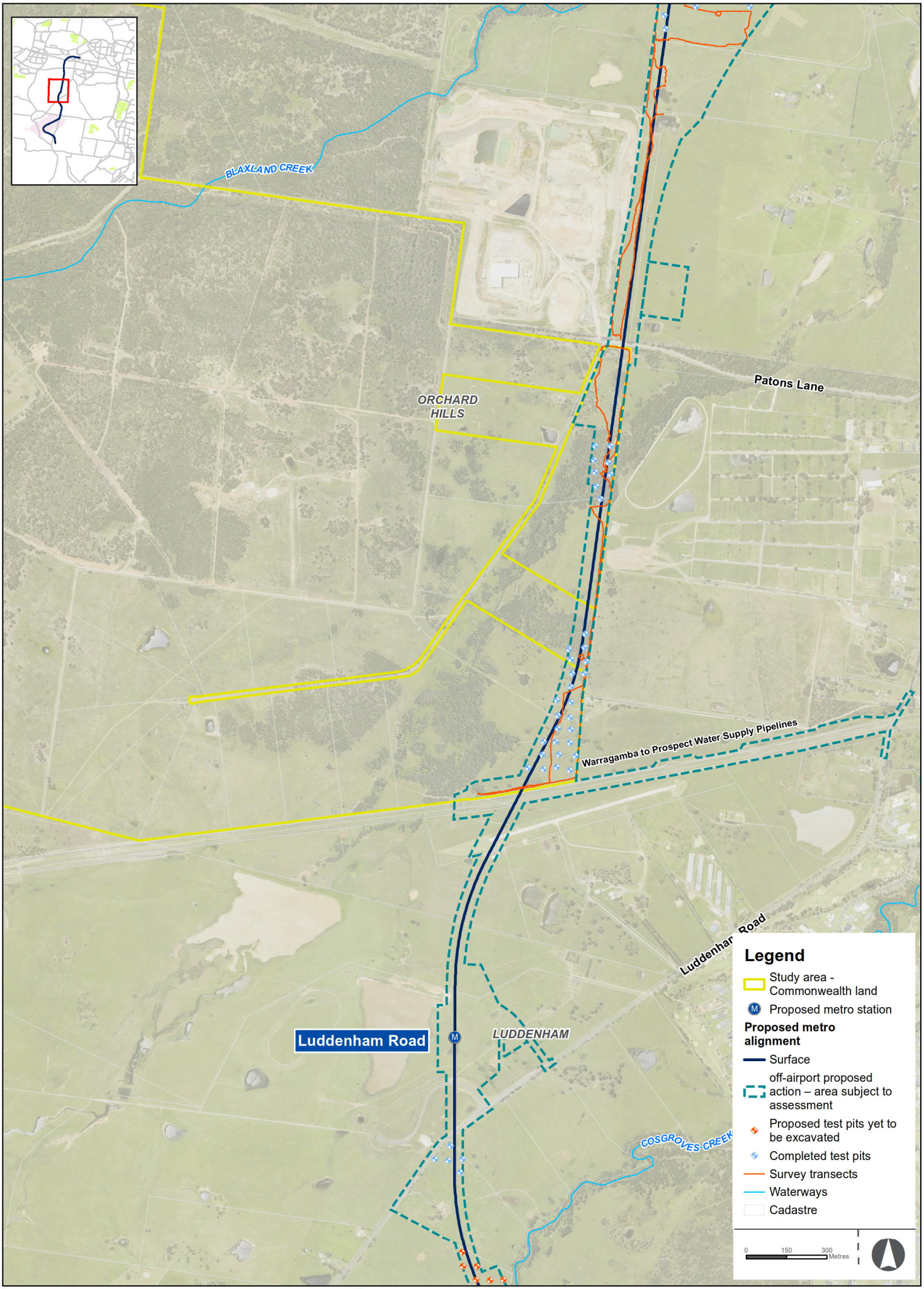
Details on the archaeological field investigations undertaken and the Aboriginal cultural heritage values of the study area are provided in Chapters 5 to 7 of the Revised Aboriginal Cultural Heritage Assessment Report (Appendix B).

The areas where field investigations were undertaken for the Environmental Impact Assessment are shown on Figure 4-7. A search of the Aboriginal Heritage Information Management System (AHIMS) identified one artefact site (#45-5-3773) adjacent to and outside the Commonwealth land boundary.

Field investigations including surface surveys and test pit excavations were conducted within areas of archaeological sensitivity on Commonwealth land as detailed in the Revised Aboriginal Cultural Heritage Assessment Report (Appendix B). The purpose of the field investigations was to verify Aboriginal heritage sites and areas of archaeological sensitivity.

Surface survey and test excavation works undertaken identified two artefact scatter sites within the Commonwealth land at Orchard Hills. This includes SMWSA-AS3 (an artefact scatter site with Potential Archaeological Deposit with moderate integrity) and SMWSA-AS4 (an artefact scatter site with low integrity). The Aboriginal Archaeological Report (Appendix C) for the project also provides a detailed description of Aboriginal archaeology along the project footprint.

The location of AHIMS sites and archaeological sites confirmed during field investigations are not shown in this Final Environmental Impact Assessment.




Aboriginal heritage field investigations (AHIMS sites and Aboriginal archaeological sites redacted)

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**Figure 4-7**

# 5. Impact assessment

## 5.1 Biodiversity impacts off-airport

An analysis of relevant impacts on listed threatened species and ecological communities is provided in Chapter 8, Chapter 9 and Appendix F of the Revised Biodiversity Development Assessment Report (Appendix A).

### 5.1.1 Vegetation

The proposed action would have a residual impact on 31.67 hectares of native vegetation (29.86 hectares of direct impact and 1.81 hectares of indirect impact), including:

- 5.87 hectares of the critically endangered Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest
- 4.94 hectares of the endangered Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland.

Buffers have been incorporated into the construction footprint and the area of vegetation covered by these buffers is included in the calculations of impacted vegetation. The construction footprint used to calculate impact is therefore larger than the direct impact of the project. Accordingly, edge effects such as trampling, weed invasion and soil compaction are considered unlikely to extend beyond the project's construction footprint and/or would be avoided through mitigation and management measures. The mitigation measures outlined in Chapter 11 of the Revised Biodiversity Development Assessment Report (Appendix A) would ensure the spread of invasive flora and fauna species is not increased because of the project or extended beyond the construction footprint.

The proposed action would have potential impacts on groundwater dependent ecosystems (around 1.81 hectares of Broad-leaved Ironbark - Grey Box - Melaleuca decora grassy open forest on clay/gravel soils of the Cumberland Plain, Sydney Basin Bioregion) resulting from changes to groundwater level or flow in the vicinity of Orchard Hills Station.

### 5.1.2 Threatened flora and fauna species

One threatened fauna species, Grey-headed Flying-fox listed under the EPBC Act, was recorded within the study area.

Section 7.2.4 of the Revised Biodiversity Development Assessment Report (Appendix A), provides an analysis of potential impacts on the Grey-headed Flying-fox, as well as the extent of Grey-headed Flying-fox habitat impacted by the 2019/2020 bushfires.

In the locality, the extent of Grey-headed Flying-fox habitat impacted by bushfire has been limited to a relatively small proportion of the available foraging habitat, none of which is located within 10 kilometres of the proposed action. The proposed action would result in the potential removal of up to 25 hectares or some 1.5 per cent of available foraging habitat for this species within 10 kilometres which is unlikely to significantly impact this species, given the abundance of higher quality myrtaceous foraging habitat within 10 kilometres. Cumulative impacts on Grey-headed Flying-fox foraging habitat as a result of the project are discussed in the Revised Biodiversity Development Assessment Report (Appendix A).

The proposed action may also have a direct impact or affect the potential habitat of up to nine threatened flora species and two additional fauna species listed under the EPBC Act. No threatened fish species listed under the EPBC Act were recorded or considered likely to occur within the study area and as such the proposed action is unlikely to significantly impact any threatened aquatic species, or their habitats.

## 5.2 Impacted area Commonwealth land located off-airport (DEOH site)

### 5.2.1 Biodiversity

**Vegetation**

The majority of the Commonwealth land (i.e. at the DEOH site) to be impacted by the proposed action is dominated by exotic vegetation associated with historically cleared land. Fragmented patches of remnant vegetation are generally restricted to riparian areas. In relation to the specific impacts to vegetation on Commonwealth land (i.e. at the DEOH site), the proposed action would remove approximately 7.3 hectares of native vegetation communities providing habitat for matters of national environmental significance including:

- 4.79 hectares of Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (PCT 724 and 849) as listed under the BC Act and incorporating 1.21 hectares of TEC under the EPBC Act
- 0.22 hectares of River-flat Eucalypt Forest as listed under the BC Act
- 2.29 hectares Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland (PCT 1800) as listed under the BC Act and incorporating 1.85 hectares of TEC under the EPBC Act.

The removal of vegetation outlined above would be a worst-case impact and opportunities throughout design development and construction management would aim to minimise these impacts.

The construction footprint used to calculate impact is larger than the direct impact of the proposed action. As such, edge effects such as trampling, weed invasion and soil compaction are considered unlikely to extend beyond the construction footprint of the proposed action and/or would be avoided through the mitigation and management measures outlined in Chapter 11 of the Revised Biodiversity Development Assessment Report (Appendix A).

The majority of impacts on vegetation from the proposed action, are associated with small fragmented areas of disturbed condition and/or fringing edges of intact condition areas.

The proposed action would not create new areas of fragmentation to the Cumberland Plain Woodland and only relatively small areas of additional fragmentation to the Coastal Swamp Oak Forest associated with the crossing of the unnamed riparian corridors already subject to disturbances and edge effects.

The proposed action is considered unlikely to cause a substantial change in the species composition of TECs or exacerbate invasive species such that it would substantially reduce the quality or integrity of occurrence of these TECs.

**Threatened flora species**

The Commonwealth land (i.e. at the DEOH site) to be impacted by the proposed action provides known habitat for one threatened flora species, *Grevillea juniperina subsp. juniperina* listed under the BC Act. There are no threatened flora species listed under the EPBC Act within the Commonwealth land (i.e. at the DEOH site) to be impacted by the proposed action.

The recorded individuals of *Grevillea juniperina subsp. juniperina* on Commonwealth land and within the construction footprint would be directly impacted as a result of the proposed action. These impacts will be restricted to two small separate patches (see Figure 4-3), located:

- at the corner of Patons Lane and Stockdale Road (entrance gate area to the DEOH site)
- within the central eastern portion of the DEOH site, being Lot 4 DP242968.

The proposed action would not affect the proportion of the population of *Grevillea juniperina* subsp. *juniperina* securely conserved within the Defence Orchard Hills biodiversity offset areas, located approximately 800 metres and 1.7 kilometres to the west of the proposed action as shown on Figure 4-4.

**Threatened fauna species**

No threatened fish species listed under the BC Act or the EPBC Act were recorded or considered likely to occur within the Commonwealth land and as such the proposed action is unlikely to significantly impact any threatened aquatic species or their habitats.

The proposed action would have a direct impact on a relatively small proportion (5.01 hectares) of the available foraging habitat area of the EPBC Act listed Grey-headed Flying-fox and BC Act listed *Myotis macropus* (Southern Myotis) within Commonwealth land (see Figure 4-6). These species and their habitats are also known to occur within the locally conserved areas of the Defence Orchard Hills biodiversity offset areas.

The proposed action is not considered to fragment any locally occurring populations, disrupt their breeding cycles, introduce disease that may cause the species to decline, or interfere with the recovery of these species. The proposed action is therefore considered unlikely to have a significant impact on these species.

It is also therefore unlikely that the area of the proposed action contains an ecologically significant proportion of the population of migratory species and the proposed action area is unlikely to contain an Important Habitat, as determined by the EPBC Act, as it is not:

- considered to be of critical importance to the species at particular life-cycle stages
- at the limit of the species range
- known to be within an area where the species is declining.

On this basis, it is considered unlikely that the proposed action would have a significant impact on any migratory species.

### 5.2.2 Non-Aboriginal heritage

The Commonwealth non-Aboriginal heritage area is shown in Figure 5-1. Given the distance to the nearest heritage item from the project, there would be no impacts to known non-Aboriginal heritage within Commonwealth land. A field survey was carried out on the DEOH site within the referred action construction footprint to investigate the presence of any potential non-Aboriginal heritage items, however none were identified.

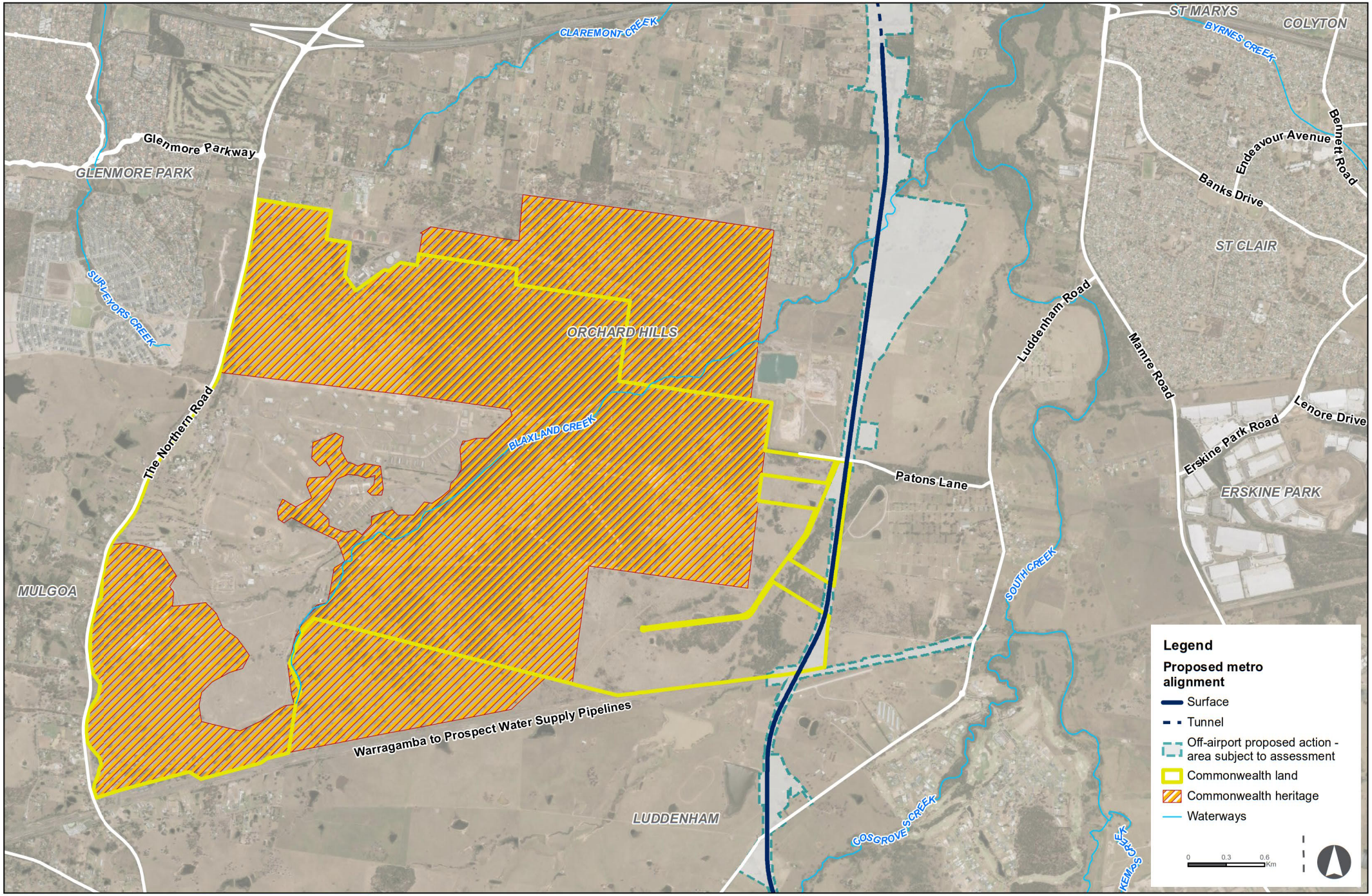
There is the potential to uncover previously unidentified non-Aboriginal heritage items during ground disturbance activities during construction. An unexpected finds protocol would be developed and implemented during construction in accordance with the Construction Environmental Management Framework (Appendix D).

### 5.2.3 Aboriginal heritage

Proposed ground disturbance activities within the construction footprint are anticipated to impact both of the archaeological sites identified within the Commonwealth land (SMWSA-AS3 (moderate integrity) and SMWSA-AS4 (low integrity)). This would result in the total loss of value for both Aboriginal archaeological sites.

Works on Commonwealth land would be managed in accordance with the Aboriginal heritage performance outcomes and mitigation measures identified in Chapter 6 (Avoidance and mitigation measures). Mitigation measure AH6 requires that newly identified sites within the revised boundaries of Defence Establishment Orchard Hills (Commonwealth land) are to be reported to the Department of Defence and are to be managed in accordance with the relevant provisions of *the Defence Establishment Orchard Hills Heritage Management Plan* (GML Heritage Pty Ltd, 2013).

The AHIMS site located adjacent to and outside the Commonwealth land boundary (#45-5-3773) is currently protected by an existing fence between the AHIMS site and the DEOH site. This fence is assumed to remain in place and would serve as a protective fence between the AHIMS site and the project.

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Orchard Hills (Commonwealth land - heritage constraints)

**Figure 5-1**

## 5.3 Consistency with Conventions, conservation advice and recovery plans

The assessment of the proposed action under the Biodiversity Assessment Method (BAM) is consistent with Australia's international obligations (specifically the Convention on Biological Diversity, the Apia Convention and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)), conservation advices and recovery and threat abatement plans.

### 5.3.1 Convention on Biological Diversity

The Convention on Biological Diversity is dedicated to promoting sustainable development. It provides a framework for Australia's integration of natural resources and environment and biodiversity management policies.

A key philosophy of sustainable development and the Convention on Biological Diversity is the principal of 'avoid and minimise impacts to biodiversity', which the project has adopted during the planning and design phase. Avoiding and minimising impacts on biodiversity values is a desired performance outcome for the project and is a mandatory key consideration for biodiversity impact assessment under the BAM.

The project's adherence to this is demonstrated throughout Section 8.1 of the Revised Biodiversity Development Assessment Report (Appendix A).

The biodiversity assessment for the proposed action has been based on the BAM methodology which addresses the ecologically sustainable development hierarchy of avoid, minimise and offset. This has led to the project being designed for avoidance of impacts on biodiversity and where residual impacts are unavoidable, identifying offsets and a strategy to minimise impacts against Commonwealth requirements.

### 5.3.2 Apia Convention

The Convention on Conservation of Nature in the South Pacific (the Apia Convention) obliges States (in general terms) to create protected areas to safeguard representative samples of ecosystems, and places of scenic, geological, aesthetic, historical, cultural or scientific importance. The Convention also prohibits the taking or killing of fauna (including eggs and shells) unless the taking is controlled by the competent authorities of the State concerned, or unless in pursuance of 'duly authorised' scientific investigations.

The biodiversity assessment for the proposed action has been based on the BAM methodology which addresses the ecologically sustainable development hierarchy of avoid, minimise and offset. This has led to the project being designed for avoidance of impacts on biodiversity and where residual impacts are unavoidable, identifying offsets and a strategy to minimise impacts against Commonwealth requirements.

### 5.3.3 CITES

The CITES is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival. The project would not contribute to or result in an increase in the international trade in specimens of wild animals and plants.

### 5.3.4 Conservation advices

The relevant conservation advices for matters of national environmental significance species and communities to be impacted by the proposed action were referenced and considered throughout the preparation of the Revised Biodiversity Development Assessment Report (Appendix A) including in Chapter 3, Chapter 7, Appendix A , Appendix B and Appendix F.

### 5.3.5 Recovery and threat abatement plans

The relevant recovery and threat abatement plans are considered throughout the preparation of the Revised Biodiversity Development Assessment Report (Appendix A), including in Chapter 3, Chapter 7, Table 8.15 and Appendix F.

There is no recovery plan for *Acacia bynoeana* under the EPBC Act. The proposed action would not interfere with any Regional/Local priority actions outlined in the Approved Conservation Advice (Department of the Environment, 2013b).

There is currently no recovery plan for *Allocasuarina glareicola*. The proposed action is unlikely to lead to a decline outlined in the Approved Conservation Advice (Department of the Environment, Water, Heritage and the Arts, 2008a).

There is currently no recovery plan for *Cynanchum elegans*. The proposed action is unlikely to lead to a decline outlined in the Approved Conservation Advice (Department of the Environment, Water, Heritage and the Arts, 2008b).

Currently there is no recovery plan for *Grevillea parviflora subsp. parviflora* under the EPBC Act. The Approved Conservation Advice outlines Regional and Local Priority Actions, none of which would be interfered with by the proposed action (Department of the Environment, Water, Heritage and the Arts, 2008c).

Currently there is no recovery plan for *Micromyrtus minutiflora* under the EPBC Act. The Approved Conservation Advice outlines Regional and Local Priority Actions, none of which would be interfered with by the proposed action (Department of the Environment, Water, Heritage and the Arts, 2008d).

There is currently no recovery plan for *Pimelea curviflora var. curviflora* under the EPBC Act. The Approved Conservation Advice outlines Regional and Local Priority Actions, none of which would be interfered with by the proposed action (Department of the Environment, Water, Heritage and the Arts, 2008e).

There is no recovery plan for *Pultenaea parviflora* under the EPBC Act. The proposed action would not interfere with any Regional/Local priority actions outlined in the Approved Conservation Advice (Department of the Environment, Water, Heritage and the Arts, 2008f).

The Recovery Plan for *Acacia pubescens* (NSW National Parks and Wildlife Service, 2003) outlines 13 recovery actions. The proposed action would not interfere with any of these recovery actions.

The Recovery Plan for *Pimelea spicata* outlines six specific recovery objectives which focus on conserving known populations of *Pimelea spicata* (s 9) (Threatened Species Scientific Committee, 2016). Given this species has not been recorded within the study area, the proposed action is not likely to interfere with any recovery objectives for *Pimelea spicata.*

The Recovery Plan for the Large-eared Pied Bat identifies sandstone escarpments as critical to this species' recovery. It is unlikely that any Large-eared Pied Bat foraging in the study area would be part of an important population or impact on critical habitats listed within the Recovery Plan.

The Action Plan for Australian Birds (Garnett and Crowley 2000) notes pressure on Swift Parrot breeding areas from forestry and firewood collection in Tasmania. On the mainland though, pressures relate to the loss of foraging habitats due to clearing for agriculture and residential development (Garnett and Crowley 2000). A National Recovery Plan for the Swift Parrot (*Lathamus discolour*) was prepared in 2011 (Saunders 2011). Recovery actions outlined in this plan include:

- identify the extent and quality of habitat
- manage and protect Swift Parrot habitat at the landscape scale
- monitor and manage the impact of collisions, competition and disease
- monitor population and habitat.

The impacts of the proposed action on the marginal potential foraging habitat for the Swift Parrot is likely to be in conflict with the second recovery action listed above - to manage and protect Swift Parrot habitat at the landscape scale. However, the extent of native vegetation clearing, and potential foraging habitat associated with the proposed action is considered to be small in terms of available habitat for the species within the Region (<1% in 10 $km^2$).

The NSW Draft Recovery Plan (DECCW 2009) for the Grey-headed Flying-fox outlines criteria for foraging habitat that can be considered critical to survival of the Grey-headed Flying-fox, being:

- productive during winter and spring
- known to support populations of > 30,000 individuals within an area of 50 km radius.

With reference to Department of Agriculture, Water and the Environment's (DAWE) National Flying-fox monitoring viewer, there are no recorded Flying-fox camps within the study area (DoEE 2020).

The closest existing camp to the study area is located at Ropes Creek, approximately 5 km to the northeast of the study area, with anywhere from 500 to 10,000 individuals counted during surveys between 2013 and 2019. Based on a review of the National Flying-fox monitoring viewer, there are therefore likely to be >30,000 individuals of the species within a 50 km radius of the study area.

Occurrences of this species within the study area are not at the limits of the species' distribution, nor are any maternity camps present. As such, the study area can only be considered to represent a part of the foraging range of widely occurring individuals.

An abundance of similar or high quality foraging habitat occurs in the wider locality (>1,700 hectares of mapped native vegetation (Tozer, Turner et al. 2010)). Approximately 1,700 hectares of potential foraging habitat in the form of native vegetation has been mapped within 10 km of the study area which is accessible to this species. The removal of up to 25 hectares would represent 1.5 per cent of available foraging habitat for this species within 10 kilometres. Cumulative impacts on Grey-headed Flying-fox foraging habitat as a result of the project are discussed in the Revised Biodiversity Development Assessment Report (Appendix A).

The proposed action is unlikely to substantially interfere with the recovery of the White-throated Needletail due to the lack of hollow bearing trees that the species may roost in, and it would not exacerbate other threats to the species (collision with wind farm turbines, secondary poisoning).

The Cumberland Plain Recovery Plan (Department of Environment Climate Change and Water, 2010a) lists activities to assist the community's recovery. The proposed action is likely to interfere with one activity OEH has listed, being *protect habitat by minimising further clearing*.

Currently there is no recovery plan for Coastal Swamp Oak Forest. The Approved Conservation Advice outlined four priority conservation actions (Section 6.2, Department of the Environment and Energy, 2018). The proposed action is likely to interfere with one priority conservation action being *conserve remaining patches.*

## 5.4 Identification of cumulative impacts

An assessment of cumulative impacts of the project (including the proposed action) is provided in Chapter 10 of the Revised Biodiversity Development Assessment Report (Appendix A). Projects considered in the cumulative impact assessment include:

- Western Sydney International
- Future M12 Motorway
- The Northern Road
- St Marys Intermodal Facility.

In addition, a number of potential infrastructure upgrade projects in the vicinity of the proposed action have been identified. These potential upgrade projects include:

- St Marys Commuter Car Park Expansion
- Elizabeth Drive upgrade
- Mamre Road upgrade
- Outer Sydney Orbital
- Upper South Creek Advanced Water Recycling Centre.

The Draft Cumberland Plain Conservation Plan (CPCP) (NSW Department of Planning, Industry and Environment (DPIE), 2020) is a strategic conservation plan, prepared by the DPIE, and was placed on public exhibition on 26 August 2020. The Plan is currently being finalised, which includes a review and consideration of the feedback received during exhibition. The CPCP will provide biodiversity approvals for new housing and infrastructure corridors to support the delivery of the Western Parkland City. The proposed action, and the project as a whole, are not included in the CPCP. The Revised Biodiversity Development Assessment Report (Appendix A) has been prepared having regard to the findings and the proposals presented in the CPCP, notwithstanding that the project is not subject to, nor will it have the benefit of the CPCP.

# 6. Avoidance and mitigation measures

The construction footprint has been refined to avoid direct impacts on vegetation and watercourses. A viaduct is proposed over Patons Lane and the unnamed watercourse tributary of South Creek and the Warragamba to Prospect Water Supply Pipelines, reducing impacts to riparian vegetation in this location. Design development has required the maintenance of wildlife linkages including allowances for fauna crossing structures.

Vertical alignment optimisation has enabled increased fauna connectivity, due to improved clearances under bridge and viaduct structures that improve light penetration and encourage fauna movement.

The design development process and construction planning has also aimed to avoid Aboriginal impacts and avoiding AHIMS sites wherever possible. The use of subsurface tunnelling for a large proportion of the project would successfully avoid many known sites and minimise the impacts to areas of both Aboriginal cultural significance and archaeological potential.

A range of measures for the management of potential impacts which have not been avoided from construction are included in the Construction Environmental Management Framework (Appendix D), Overarching Community Communications Strategy (Appendix E), Construction Noise and Vibration Standard (Appendix F) and Construction Traffic Management Framework (Appendix G).

Under these broad frameworks, a series of performance outcomes were developed to define the minimum environmental standards that would be achieved during construction and operation of the Project, and mitigation measures that would be implemented during construction and operation to manage potential identified impacts.

The performance outcomes and mitigation measures for the off-airport proposed action, outlined in Table 6-1 and Table 6-2 respectively, correspond to the performance outcomes and mitigation measures applicable to the broader Sydney Metro – Western Sydney Airport project, as documented in the *Sydney Metro – Western Sydney Airport Submissions Report* (Sydney Metro, 2021a) (referred to as the State Submissions Report in this report). To maintain consistency (including numbering of individual mitigation measures) between the project and the off-airport proposed action, the reference numbers associated with mitigation measures from the State Submissions Report that are not applicable to the proposed action have been included but with the following text: "*Not required/applicable*".

## 6.1 Environmental performance outcomes

Performance outcomes relevant to the proposed action are shown in Table 6-1 and identify measurable, performance-based standards for environmental management.

The performance outcomes applicable to the off-airport proposed action have been revised in response to submissions received during public exhibition of the Project Environmental Impact Statement and/or any minor changes made following exhibition. The revised list of performance outcomes is provided in Table 6-1.

In addition, there are several performance outcomes that are only partially applicable to the off-airport assessment. In this case the entire wording of the performance outcome has been retained, but the elements which are not applicable to the off-airport proposed action are displayed as strikethrough text.

**Table 6-1 Performance outcomes**

| Project performance outcome | Phase |
|---|---|
| **Biodiversity** | |
| Minimise or where possible avoid impacts on threatened flora and fauna species, and ecological communities listed under the *Biodiversity Conservation Act 2016* (NSW) and *Environment Protection and Biodiversity Conservation Act 1999* (Cth) | Construction |

| Project performance outcome | Phase |
|---|---|
| Manage groundwater drawdown at Orchard Hills to avoid or minimise impacts on groundwater dependent ecosystems | Construction |
| Culverts and bridges would be appropriately sized to maintain fauna habitat connectivity | Operation |
| Maintain integrity and functionality of rail corridor fencing to minimise wildlife-train collision while providing opportunities for cross-corridor wildlife movement | Operation |
| Re-establish native vegetation in accordance with the National Airports Safeguarding Framework Principles and Guidelines including *Guideline C: Managing the Risk of Wildlife Strikes in the Vicinity of Airports (*Australian Government, 2014) | Operation |
| Impacts on threatened ecological communities and threatened species are offset in accordance with the requirements of the *NSW Biodiversity Assessment Method* (OEH, 2017) | Construction |
| **Aboriginal heritage** | |
| The heritage significance of Aboriginal objects and places are protected, conserved and/or managed in order to ensure the project does not diminish the story and cultural understanding associated with the objects and places of Aboriginal people in New South Wales | Construction |
| Impacts on areas of archaeological sensitivity and significance are avoided or minimised, where practical | Construction |
| The design of the project incorporates Aboriginal heritage interpretation and Aboriginal cultural design principles in consultation with Aboriginal knowledge holders | Operation |
| **Flooding, hydrology and water quality** | |
| Land and property beyond the construction footprint would not be impacted by construction for the 0.5 Exceedances per Year (EY) storm event | Construction |
| No aspect of construction to materially adversely affect existing water quality in receiving waters to a minimum 0.5 EY storm event, or in line with the 'Blue Book' (*Managing Urban Stormwater: Soils & Construction Volume 1* (Landcom, 2004)) | Construction |
| No material change to channel shape within the construction footprint for the 0.5 EY storm event for streams classified first order and higher | Construction |
| Water discharged from the project, including runoff from hardstand areas, surface and ground water storages would:<br>• contribute towards achieving ANZECC guideline water quality trigger values for physical and chemical stressors for slightly disturbed ecosystems in lowland rivers in southeast NSW, or<br>• meet any water quality criteria determined in consultation with the NSW Environment Protection Authority (off-airport) where an EPL is required~~ or in consultation with Western Sydney Airport in accordance with the Airports (Environmental Protection) Regulations 1997 (on-airport)~~ | Construction and operation |
| Drainage from the project (including the stabling and maintenance facility, service facilities and stations) designed in accordance with local council requirements for managing urban stormwater quality and quantity | Operation |

| Project performance outcome | Phase |
|---|---|
| For all land currently flooded up to the one per cent annual exceedance probability event, no change to peak flood levels up to the following limits, unless otherwise agreed with the affected property owner:<br>• residential, commercial, critical infrastructure – no new above floor flooding, maximum change of 10 millimetres for existing flooded buildings and maximum of 50 millimetres for properties where flooding is below floor level<br>• roads – maximum change of 50 millimetres<br>• Crown land open space, farming, grazing and cropping land – maximum change of 200 millimetres | Operation |
| Where flood water velocities are currently below one metre per second (m/s), the project is designed and operated to ensure they remain below one metre per second. Where velocities are above one m/s, an increase of no more than 20 per cent is permitted | Operation |
| No change to flood hazard vulnerability classification limits for residential and commercial buildings or roads | Operation |
| No change to the one per cent annual exceedance probability duration of inundation up to the following limits:<br>• residential, commercial, critical infrastructure – no increase for above floor flooding<br>• roads – maximum change of 10 per cent increase in duration<br>• agricultural land for cropping – dependant on cropping type | Operation |
| For moderate and high fragility watercourses impacted by the project (as defined by the NSW River Styles mapping (NSW, Department of Planning, Industry and Environment 2019)), maintain existing flow regimes and velocities as best as possible to preserve and minimise changes to the watercourses | Operation |
| Critical infrastructure (including stations entries and tunnel portals) to have immunity against the probable maximum flood event | Operation |

## 6.2 Mitigation measures

The full range of measures to avoid and minimise impacts on biodiversity values is discussed in more detail in Section 8.2 (Avoid and minimise impacts) of the Revised Biodiversity Development Assessment Report (Appendix A). A range of measures for the management of potential impacts from construction are also included in the Construction Environmental Management Framework (Appendix D), Overarching Community Communications Strategy (Appendix E), Construction Noise and Vibration Standard (Appendix F) and Construction Traffic Management Framework (Appendix G).

The mitigation measures applicable to the off-airport proposed action have been revised in response to submissions received during public exhibition of the Project Environmental Impact Statement and/or any minor changes made following exhibition. The revised list of mitigation measures is provided in Table 6-2.

The measures have been identified to manage both construction and operational impacts and some measures have been identified to manage impacts in a site-specific location. The location(s) applicable to each mitigation measure are identified in the table.

There are several mitigation measures that are only partially applicable to the off-airport assessment. In this case the entire wording of the mitigation measure has been retained, but the elements which are not applicable to the off-airport proposed action are displayed as strikethrough text.

**Table 6-2 Environmental mitigation measures**

| ID | Identified mitigation measure | Applicable location/s |
|---|---|---|
| **Biodiversity – construction** | | |
| FF1 | The ~~Biodiversity Construction Environmental Management Plan (on-airport) and~~ Flora and Fauna Management Plan (off-airport) would be prepared by a suitably qualified and experienced person to minimise and manage the clearing of native vegetation and habitat by:<br>• seeking to locate site offices, site compounds and ancillary facilities in areas where there are limited biodiversity values (e.g. cleared land)<br>• delaying the removal of vegetation until absolutely necessary<br>• avoiding the removal of hollow-bearing trees, where possible<br>• using a qualified surveyor and suitably qualified ecologist to mark out exclusion zones and clearing/project boundaries prior to construction<br>• providing contractors with regularly updated sensitive area maps (showing clearing boundaries and exclusion zones)<br>• investigating opportunities for salvage and storage of felled native trees for potential use in landscape design<br>The ~~Biodiversity Construction Environmental Management Plan (on-airport) and~~ Flora and Fauna Management Plan (off-airport) would be implemented throughout construction | Orchard Hills construction site<br>Off-airport construction corridor<br>Stabling and maintenance facility construction site<br>Luddenham Road construction site |
| FF2 | A Nest Box Strategy would be prepared to minimise habitat loss to hollow-dependent fauna in accordance with the Flora and Fauna Management Plan and would include the following requirements:<br>• hollow-bearing trees would be marked/tagged and mapped prior to their removal. The size, type, number and location of nest boxes required would be based on the results of the pre-clearing survey<br>• about 70 per cent of nest boxes would be installed about one month prior to any vegetation removal to provide alternate habitat for hollow-dependent fauna displaced during clearing | Claremont Meadows services facility construction site<br>Off-airport construction corridor |
| FF3 | Not required/applicable | |
| FF4 | A targeted microbat survey (including Eastern Coastal Free-tailed Bat, Large Bent-winged bat and Eastern False Pipistrelle) of dwellings and structures proposed for demolition, removal or modification would be undertaken in accordance with 'Species credit' threatened bats and their habitats NSW survey guide for the Biodiversity Assessment Method (OEH, 2018) prior to disturbance.<br>Other human-made structures such as culverts and other under-road structures within the construction footprint would be surveyed for threatened microbats (e.g. particularly the Southern Myotis) in accordance with the Biodiversity Assessment Method (OEH, 2018). If threatened microbats are detected, a Microbat Management Plan would be developed as part of the Flora and Fauna Management Plan and implemented by a suitably qualified bat specialist | Claremont Meadows services facility construction site<br>Off-airport construction corridor |
| FF5 | Not required/applicable | |

| ID | Identified mitigation measure | Applicable location/s |
|---|---|---|
| FF6 | During construction, shading and artificial light impacts would be minimised in areas adjoining remnant bushland that is in intact condition | Claremont Meadows services facility construction site<br>Orchard Hills construction site<br>Off-airport construction corridor |
| FF7 | Fish passage and fish habitat associated with Cosgrove Creek and Blaxland Creek would be protected in accordance with the *Policy and Guidelines for Fish Habitat Conservation and Management* (DPI (Fisheries NSW), 2013) | Off-airport construction corridor |
| FF8 | A Dewatering Plan would be prepared and implemented for the dewatering of rural dams which are impacted as a result of the construction of the project. This would include measures to manage the transfer of native aquatic fauna, if required, prior to dewatering and removing of dams | Off-airport |
| FF9 | Not required/applicable | |
| FF10 | The impact of Key Threatening Processes as a result of the project would be managed and minimised where possible through:<br>• implementation of weed management measures to prevent the introduction and spread of weeds including exotic vines and scramblers, *Olea europaea* (African Olive), *Chrysanthemoides monilifera*, *Lantana camara*, and exotic perennial grasses<br>• implementation of pathogen management measures to prevent the introduction and spread of pathogens including amphibian chytrid, *Phytophthora implementa*, and Exotic Rust Fungi of the order Pucciniales<br>• implementation of management measures to protect the riparian zone to ensure fish passage and protect fish habitat in accordance with the *Policy and Guidelines for Fish Habitat Conservation and Management* (DPI (Fisheries NSW), 2013), and minimisation of vegetation removal within the riparian zone where possible | All |
| FF11 | A native vegetation seed collection and salvage program would be developed prior to the commencement of construction and implemented during construction. The seed collection and salvage program would target native species prioritising the Cumberland Plain Woodland species to be utilised in landscaping for the project where possible. Opportunities for use of collected and salvaged seed outside of the project would also be investigated | All |

| ID | Identified mitigation measure | Applicable location/s |
|---|---|---|
| **Biodiversity – operation** | | |
| OFF1 | Wildlife connectivity would be maintained (where possible) through the installation of viaduct/bridge structures designed in accordance with the following:<br>• height and width of the area under a bridge to be maximised for all species, noting a minimum height of approximately 3 metres of dry passage will provide connectivity for most terrestrial species<br>• bridges wide enough to encompass water flow, stream bank and riparian vegetation, preferably on both sides of the watercourse<br>• for small and medium sized mammals, provide fauna furniture as shelter (e.g. vegetation, logs, rocks, leaf-litter, refuge pipes, escape poles, roofing tiles, and roofing iron)<br>• height and carriageway separation designed to allow sufficient light and moisture to enhance growth of vegetation under the structure<br>• if used for multiple purposes (e.g. pathways or access roads) aim to provide the 3 metre of natural passage for fauna<br>• relocation or adjustment of the stream bed avoided where possible<br>• the structure to tie in with the natural hydrology of the surrounding habitat such that the width, depth and gradient of the watercourse are maintained in the structure<br>• consistent with the *Policy and Guidelines for Fish Friendly Waterway Crossings* (DPI (Fisheries NSW), 2013) | Off-airport |
| OFF2 | The design of viaduct structures over the wildlife/riparian corridors at Blaxland Creek, the unnamed tributary south of Patons Lane and Cosgroves Creek would seek to:<br>• maximise the span over the wildlife/riparian corridor<br>• minimise native vegetation removal within the wildlife/riparian corridors<br>• maintain opportunities for fauna movement along the wildlife/riparian corridors and<br>• provide opportunities to enhance fauna movement where possible | Off-airport |
| **Aboriginal heritage – construction** | | |
| AH1 | Aboriginal stakeholder consultation would continue to be carried out in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (NSW Office of Environment and Heritage, 2010). Registered Aboriginal Parties would be provided with opportunities to participate in survey and testing in unverified areas of Aboriginal archaeological sensitivity, archaeological salvage works and unexpected find assessments (if required). | Off-airport |
| AH2 | Areas of unverified Aboriginal archaeological sensitivity would be subject to archaeological survey, if required, and test excavation prior to construction in accordance with the Aboriginal Cultural Heritage Management Plan | Off-airport |
| AH3 | Not used | |
| AH4 | Not used | |

| ID | Identified mitigation measure | Applicable location/s |
|---|---|---|
| AH5 | All Aboriginal objects recovered from the construction footprint as a result of test excavation and salvage works would be appropriately secured and under the care of the archaeological consultant while options for their long-term management, as determined through consultation with Registered Aboriginal Parties, are being investigated | Off-airport |
| AH6 | Aboriginal Heritage Information Management System site cards would be produced for all newly identified sites other than those identified on Commonwealth land. These should be submitted to the Aboriginal Heritage Information Management System Registrar as soon as practicable within one month of being identified. Newly identified sites within the revised boundaries of Defence Establishment Orchard Hills (Commonwealth land) would be reported to the Department of Defence to be managed in accordance with the relevant provisions of the *Defence Establishment Orchard Hills Heritage Management Plan* | Off-airport |
| AH7 | Aboriginal Site Impact Recording forms for sites subject to archaeological salvage would be submitted to the Aboriginal Heritage Information Management System register within one month of the completion of salvage works within their bounds | Off-airport |
| AH8 | Not required/applicable | |
| AH9 | Works within the bounds of existing Aboriginal Heritage Impact Permit areas should be undertaken in accordance with the conditions of those permits and with permission from the relevant Aboriginal Heritage Impact Permit holder. Works undertaken within the revised boundaries on Defence Establishment Orchard Hills (Commonwealth land) should be undertaken in accordance with the *Defence Establishment Orchard Hills Heritage Management Plan* | Off-airport |
| AH10 | Impacted Aboriginal Sites would be managed in accordance with the Aboriginal Cultural Heritage Management Plan | Off-airport |
| AH11 | Measures would be implemented to ensure that Aboriginal sites located outside of the construction footprint, but within 100m of it, would not be affected by construction activities | Off-airport |
| AH12 | An Archaeological Salvage Report detailing the results of the archaeological salvage program (including the results of any post-excavation analyses) would be completed within two years of the completion of the fieldwork component of the program. The Archaeological Salvage Report would be consistent with the best practice guidelines suggested by the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010) and the *Aboriginal Cultural Heritage Standards & Guidelines Kit* (NSW NPWS 1997) | Off-airport |
| AH13 | Measures to manage and protect the identified cultural values would be developed collaboratively through a consultation process with knowledge holders to inform construction planning and design development | Off-airport |
| **Aboriginal heritage – operation** | | |
| OAH1 | A heritage interpretation strategy would be prepared for the project in consultation with Aboriginal knowledge holders. Aboriginal heritage interpretation would be developed with reference to the findings of the Aboriginal Cultural Heritage Assessment Report and Aboriginal Archaeological Report, to promote understanding and awareness of cultural heritage values | All |

| ID | Identified mitigation measure | Applicable location/s |
|---|---|---|
| **Flooding, hydrology and water quality – construction** | | |
| HYD1 | Construction planning would consider flood related mitigation, including:<br>• staging construction works to reduce the duration of works within the floodplain<br>• daily and continuous monitoring of weather forecasts and storm events, rainfall levels and water levels in key watercourses to identify potential flooding events and related flood emergency response<br>• consultation with NSW State Emergency Services and relevant local councils to ensure consistent approaches to the management of flood events (off-airport only)<br>• provide flood-proofing to excavations at risk of flooding during construction, where reasonable and feasible, such as raised entry into shafts and/or pump-out facilities to minimise ingress of floodwaters into shafts and the dive structure<br>• review of site layout and staging of construction works to avoid or minimise obstruction of overland flow paths and limit the extent of flow diversion required | Orchard Hills construction site<br>Off-airport construction corridor |
| HYD2 | Minimise works in the main creek channels (at Blaxland Creek, unnamed watercourse south of Patons Lane and Cosgroves Creek) where possible and avoid works in the channel during rainfall events | Off-airport construction corridor |
| HYD3 | Surface water flows during construction would be managed to ensure that there is no increase in flows into or through the Warragamba to Prospect Water Supply Pipelines corridor | Off-airport construction corridor |
| WQ1 | A surface water quality monitoring program would be implemented to monitor water quality during construction. The program would be developed in consultation with (as relevant) ~~Western Sydney Airport,~~ NSW Environment Protection Authority, relevant sections of Department of Planning, Industry and Environment and relevant local councils. The program would consider monitoring being undertaken as part of other infrastructure projects such as the M12 Motorway and Western Sydney International<br>~~On-airport, the water quality monitoring program would ensure that works meet the requirements under Schedule 2 of the Airports (Environment Protection) Regulations 1997~~<br>The program would monitor all construction discharge locations | All |
| WQ2 | Water treatment plants would be designed to ensure that wastewater is treated to a level that is compliant with the ANZECC/ARMCANZ (2000), ANZG (2018) and draft ANZG (2020) default guidelines for 95 per cent species protection and 99 per cent species protection level for toxicants that bioaccumulate unless other discharge criteria are agreed with relevant authorities | All |
| WQ3 | The design and construction of the project would take into account the former NSW Office of Water's Guidelines for controlled activities on waterfront land | Off-airport |

| ID | Identified mitigation measure | Applicable location/s |
|---|---|---|
| **Flooding, hydrology and water quality – operation** | | |
| OHYD1 | The flood model for the project would be updated with regard to flood modelling undertaken for the South Creek Sector Review (anticipated to be released in 2021) and would include updated calibration and validation. The updated flood modelling would be used to inform design development including but not limited to, addressing potential residual flood impacts identified at the following locations:<br>• the viaduct and earthworks in the vicinity of Blaxland Creek so as to minimise the extent of the project within the floodplain<br>• the earthworks arrangement at the stabling and maintenance facility in the area affected by the Probable Maximum Flood<br>The flood model for the project would be updated in consultation with relevant stakeholders | All |
| OHYD2 | Not required/applicable | |
| OHYD3 | Not required/applicable | |
| OHYD4 | The design of the viaduct crossing over the Warragamba to Prospect Water Supply Pipelines would not result in an increase of overland flows into or through the pipelines corridor for each storm event up to and including the 1% AEP event | Off-airport |
| OWQ1 | Design batter slope gradients and surface treatments to minimise erosion risk | All |
| OWQ2 | Drainage and water treatment design to be undertaken in accordance with Water Sensitive Urban Design requirements specified in local council, Transport for NSW ~~and on-airport~~ standards | All |
| OWQ3 | Suitably designed scour and erosion controls should be included at drainage and sedimentation basin outlet discharge points | All |
| OWQ4 | Detailed design of viaducts across waterways would aim to minimise infrastructure within the bed and banks of existing waterways and minimise changes to flood behaviour across the floodplain | Off-airport |
| OWQ5 | Where feasible, on-site detention of stormwater would be introduced where stormwater runoff rates are increased. Where there is insufficient space for the provision of on-site detention, the upgrade of downstream infrastructure would be implemented where feasible and reasonable | All |
| OWQ6 | At all locations where stormwater is discharged, water quality measures such as gross pollutant traps, bio-retention swales and Water Sensitive Urban Design features would be investigated and implemented where feasible and reasonable | All |
| OWQ7 | Not required/applicable | |
| **Groundwater and geology – construction** | | |
| GW1 | Not required/applicable | |
| GW2 | Not required/applicable | |
| GW3 | Not required/applicable | |

| ID | Identified mitigation measure | Applicable location/s |
|---|---|---|
| GW4 | Not required/applicable | |
| GW5 | Detailed hydrogeological and geotechnical models for the project would be developed and progressively updated during design and construction<br><br>These models would:<br>• be informed by the results of groundwater monitoring undertaken before and during construction<br>• identify predicted changes to groundwater levels, including at nearby water supply works and at groundwater dependent ecosystems or other sensitive groundwater receptors<br><br>Where changes to groundwater levels are predicted at nearby water supply works, groundwater dependent ecosystems or other sensitive groundwater receivers, an appropriate groundwater monitoring program would be developed and implemented<br><br>Where changes to groundwater level are close to the ground surface, dryland salinity monitoring would be implemented to allow for management of any identified impacts<br><br>The groundwater monitoring program would aim to confirm no adverse impacts on the receiver during construction or to effectively manage any impacts with the implementation of appropriate mitigation measures. Monitoring at any specific location would be subject to the status of the water supply work and agreement with the landowner | All |
| GW6 | A Groundwater Management Plan would be prepared and implemented. The plan must include the following trigger-action-response measures in relation to groundwater levels in areas identified as subject to potential drawdown (at groundwater dependent ecosystems or other sensitive receivers) but outside the construction footprint and Western Sydney International Stage 1 Construction Impact Zone:<br>a. target criteria, set with reference to relevant standards and site specific parameters<br>b. trigger values and corresponding corrective actions to prevent recurring or long-term exceedance of the target criteria described in (a)<br>c. corrective actions to compensate for any recurring or long-term exceedance of the target criteria described in (a)<br><br>Response measures may include:<br>• targeted ground improvement and grouting to limit groundwater inflows into station excavations, tunnels and cross-passage to reduce groundwater drawdown<br>• design of undrained temporary retention systems to minimise groundwater inflow into station excavations and reduce groundwater drawdown<br>• supplementing groundwater supply at affected groundwater dependent ecosystems or watercourses<br>• make good provisions for groundwater supply wells impacted by changes in groundwater level or quality | All |
| **Groundwater and geology – operation** | | |
| OGW1 | Not required/applicable | |

| ID | Identified mitigation measure | Applicable location/s |
|---|---|---|
| **Landscape and visual – construction** | | |
| LV1 | Not required/applicable | |
| LV2 | Not required/applicable | |
| LV3 | Not required/applicable | |
| **Landscape and visual – operation** | | |
| OLV1 | Not required/applicable | |
| OLV2 | Not required/applicable | |
| OLV3 | Not required/applicable | |
| OLV4 | Not required/applicable | |
| OLV5 | Not required/applicable | |
| OLV6 | Not required/applicable | |
| OLV7 | The landscape design for the project would:<br>• incorporate salvaged native trees (including tree hollows and root balls), to enhance fauna habitat in suitable locations, including riparian corridors, where practicable<br>• use native species from the relevant native vegetation communities within the local area for tree planting programs | All |

These measures will address the impacts of the controlled action discussed in this report in respect of both sets of controlling provisions.

## 6.3 Proposed safeguards

In addition to all practicable steps to avoid or minimise impacts that have been and will continue to occur during design development, mitigation and management measures would be implemented to further reduce potential impacts on biodiversity values. These measures are identified in Table 11-2 of the Revised Biodiversity Development Assessment Report (Appendix A).

Mitigation measures to be implemented during construction for biodiversity matters would be outlined in a Flora and Fauna Management Plan. Additionally, performance outcomes for the project commit to minimising or where possible avoiding impacts to threatened flora and fauna species, and ecological communities listed under the EPBC Act.

## 6.4 Effectiveness of mitigation measures

The proposed approach to environmental management is to prepare an overarching, integrated environmental management strategy for the whole of the project that addresses both the off-airport and on-airport environmental management regimes. The implementation of these mitigation and management measures has been shown to be proven and effective on previous construction projects.

## 6.5 Basis for mitigation measures

Mitigation measures have been developed to mitigate and manage the potential impacts of the project and achieve the performance outcomes. The measures have been identified to manage both construction and operational impacts and some measures have been identified to manage impacts in a site-specific location.

## 6.6 Contingency measures

The Construction Environmental Management Framework (see Appendix D) for the project sets out minimum requirements to be addressed in each Construction Environmental Management Plan (CEMP) that will be prepared for the project.

Requirements include strategies for compliance with environmental management measures and continuous improvement through review of the performance of environmental controls. Augmented with a requirement for environmental inspections and monitoring, auditing and review, and reporting on environmental performance and compliance tracking, these procedures provide a robust, proven mechanism for dealing with contingencies.

# 7. Offsets

A detailed discussion on offsets is provided in Chapter 12 of the Revised Biodiversity Development Assessment Report (Appendix A).

Offset requirements relating to residual impacts to Commonwealth matters of national environmental significance that are not able to be managed through mitigation would be offset in accordance with the Biodiversity Assessment Method (BAM) based on the Biodiversity Assessment Method Calculator (BAMC) calculations for both ecosystem and species credits. The BAM is an endorsed framework under the EPBC Act.

## 7.1 Quantification

The BAM provides a prescribed method to robustly quantify and deliver offsets that provide appropriate environmental gains targeted at the biodiversity values to be impacted. The proponent for the proposed action – Sydney Metro, is committed to delivering an offset strategy that meets the quantum of the offset requirements in accordance with the BAM. The offset requirements will be delivered where possible through the retirement of available credits and/or payment into the Biodiversity Conservation Fund.

The quantification of offset requirements for the project has been undertaken in accordance with the BAM and is provided in Table 12.7 and Table 12.9 of the Revised Biodiversity Development Assessment Report (Appendix A).

## 7.2 Implementation

The biodiversity offset strategy for the project, that would enable the credit obligations to be met, comprises two options. These options are:

- the purchase and retirement of existing biodiversity credits currently available on the biodiversity credit register
- through making a payment into the Biodiversity Conservation Fund.

The offset strategy does not include the establishment of biodiversity stewardship sites.

Credits are currently being sourced and it is anticipated that any NSW approval conditions for the project will specify a timeframe for the securing and retirement of those credits in relation to the commencement of construction activities.

The purchase and retirement of existing biodiversity credits is required to be undertaken based on like for like trading rules as outlined under the NSW Biodiversity Conservation Regulation 2017 and as identified by the BAMC output. The like for like ecosystem credit class options for each biodiversity offset credit obligation are summarised in Table 12.12 of the Revised Biodiversity Development Assessment Report (Appendix A).

# 8. Consultation

## 8.1 Consultation undertaken prior to exhibition

Information on consultation activities was provided as part of the Referral (EPBC 2020/8687). In addition, a detailed description of the consultation undertaken prior to exhibition of the Project Environmental Impact Statement (including the Draft Environmental Impact Assessment) is provided in Chapter 5 (Stakeholder and community engagement) of the Project Environmental Impact Statement.

Sydney Metro has developed a comprehensive stakeholder and community engagement program to proactively engage with local communities, key stakeholders and government agencies during and following exhibition of the Project Environmental Impact Statement.

Consultation for the project has generally been undertaken since June 2015 as part of the Western Sydney corridors and *Western Sydney Rail Needs Scoping Study* (Transport for NSW and Australian Government, 2018), with the project being formally announced in June 2020. Consultation has been undertaken with Commonwealth and NSW State Government departments and agencies, local government, peak organisations, the community and industry. This has involved:

- project briefing forums and meetings with key stakeholders, local councils and government agencies
- project flyer – letterbox drop to around 16,000 residents and businesses
- proactive media strategy, which resulted in broad coverage across Sydney metropolitan and local print, radio and television outlets
- email alerts to registered community members and stakeholders
- social media via the Sydney Metro Facebook page
- online surveys – ‘Have your say’ on the Sydney Metro website
- newsletters - delivered via letterbox drop and posted on the project website.

Aboriginal community consultation has been undertaken in accordance with the requirements of Heritage NSW’s *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (NSW Office of Environment and Heritage, 2010). This has included identification, notification and registration of Aboriginal Parties who hold cultural knowledge relevant to determining the cultural significance of Aboriginal objects and places in the study area.

A total of 68 Aboriginal individuals and organisations (including Registered Aboriginal Parties (RAPs)) have been provided with project information to date, along with the draft assessment methodology, for comment and feedback and an invitation to participate in field survey work.

During preparation of the Revised Aboriginal Cultural Heritage Assessment Report (Appendix B), the following feedback was received from the Aboriginal community regarding Aboriginal cultural heritage values:

- the entire study area would have been once occupied and inhabited by Aboriginal people in the past, and is still culturally significant to the Aboriginal community of today
- in the past Aboriginal people in this area walked the land, participated in ceremonies and dance, had camp sites and used fire for cooking in the hot coals, undertook burials in soft ground, marked trees to indicate culturally significant areas, and fished in watercourses and used them as a source of drinking water. The watercourses and their tributaries that traverse the construction footprint hold cultural significance, and were used in the past for their abundant natural resources and as natural landform boundary markers
- landscape features such as watercourses provide connections between known sites, and connections of continuity from the past landscape to the present environment for the contemporary Aboriginal community

- the watercourses that cross the construction footprint have cultural significance as they were used as pathways and resource areas for Aboriginal people in the past
- previously identified Aboriginal sites are markers of the past providing direct links for the contemporary Aboriginal community to their ancestors
- there is the potential for further, as yet unidentified, sites to occur. Any such sites would have associated cultural values
- there are some cultural sites as yet unregistered on the Aboriginal Heritage Information Management System (AHIMS) known by the Aboriginal community to occur in the area surrounding the construction footprint
- all Aboriginal sites are considered to be of high cultural value to the Aboriginal community as they provide a tangible link to ancestors and are a physical marker in the landscape attesting to the long-term presence of Aboriginal people in this area
- cultural values identified thus far rest in the identified sites, potential sites and landscape features such as watercourses
- evidence of past Aboriginal activity does not form bounded 'sites' for the Aboriginal community but rather is seen as one connected cultural landscape
- the cumulative impact of this project with other development proposed in the region (such as the Aerotropolis) is seen by the Aboriginal community as removing/destroying the remnant Aboriginal sites and associated cultural values across a larger area
- recommendations to undertake further investigations (survey and test excavation), including the proposed methodology for these investigations, are supported prior to impacts occurring.

Further details of Aboriginal stakeholder consultation undertaken as part of the Aboriginal heritage assessment is provided in Section 8.4 and in the Revised Aboriginal Cultural Heritage Assessment Report (Appendix B).

A number of channels have also been established to provide information and invite feedback, which are available to the public and are advertised on all external communication materials. These channels have been used throughout the project development phase and exhibition of the Project Environmental Impact Statement.

## 8.2 Public exhibition of the Draft Environmental Impact Assessment

The Draft Environmental Impact Assessment was on public exhibition between 21 October and 18 November in accordance with the provisions of section 95A of the EPBC Act.

During this exhibition period, government agencies, project stakeholders and the community were able to review the Draft Environmental Impact Assessment and make a written submission via **sydneymetrosubmissions@transport.nsw.gov.au** or via post as part of the assessment of the proposed action.

Communication tools and channels that were implemented during public exhibition included:

- project overview book
- newsletter letterbox drop
- project email updates
- online Environmental Impact Statement portal for the Project Environmental Impact Statement featuring a virtual community drop-in session, interactive map, Environmental Impact Statement chapters and appendices, including the Draft Environmental Impact Assessment
- traditional and social media engagement
- videos with Subject Matter Experts
- a project webpage

- displays at local councils and libraries
- stakeholder meetings
- government stakeholder engagement.

At the completion of the exhibition period, two submissions was received in relation to the Draft Environmental Impact Assessment. These submissions and a response is detailed in Table 8-1.

At the completion of the State exhibition period for the Project Environmental Impact Statement, some submissions that raised Commonwealth issues relating to the off-airport proposed action were received under the provisions of the EP&A Act. These submissions are detailed in Table 8-2 and have been taken into consideration in the preparation of this Final Environmental Impact Assessment.

## 8.3 Response to submissions

### 8.3.1 Commonwealth exhibition process

Two submissions from individuals were received through the Commonwealth exhibition period – an individual and a submission from a consortium of landowners. No submissions were received from government agencies, local councils, or other key stakeholders. The submissions received and a response is provided in Table 8-1.

**Table 8-1 Response to submissions – Commonwealth process**

| No. | Submission | Response |
|---|---|---|
| 1 | Suggestion for a fast metro line from Central Station to Western Sydney Airport with stations at Olympic Park and Parramatta. | Planning for Sydney Metro West is currently underway and involves a new 24-kilometre metro line that would connect Greater Parramatta with the Sydney CBD. Confirmed stations include Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock, The Bays, Pyrmont, and Sydney CBD. The location of the Sydney CBD station will be determined following further investigations.<br><br>As shown in the Sydney Metro network figure (Figure 1-5 of the Project Environmental Impact Statement, a future metro line has been identified to extend the Sydney Metro West line through to the Western Sydney International (Nancy-Bird Walton) Airport. The potential future East West Rail Link to connect Greater Sydney's three cities, will provide rail connectivity between the Western Parkland City, the Central River City and the Eastern Harbour City.<br><br>The Sydney Metro – Western Sydney Airport project has been designed to allow for development of future rail lines, including the potential future East West Rail Link and extension of the existing South West Rail Link. This has included provision of space within the corridor, where the rail infrastructure is at surface, from north of Elizabeth Drive to the Aerotropolis Core to allow for development of these potential future rail links. The Airport Business Park, Airport Terminal and Aerotropolis Core stations have also been designed to allow for the future development of these potential rail links. |
| 2 | Full support of the project and the overall benefits of such a project | Sydney Metro notes the support expressed for the project |
| | Suggestion for consideration of direct access for pedestrians and cyclists from the western | Pedestrian and cycle infrastructure is not currently provided within the airport site and is limited in the local area. Pedestrian and cycle facilities that would be provided as part |

| No. | Submission | Response |
|---|---|---|
| | boundary of the airport site to Airport Terminal Station.<br><br>Such access would support the Agribusiness Precinct identified along the western boundary of the airport site and could be achieved (for example) by a tunnel under the western runway.<br><br>The benefits of a proposal could include increased patronage of the Airport Terminal Station, direct connection to the Agribusiness Precinct and a fully integrated and connected Western Sydney Aerotropolis. | of the project are outlined in Section 7.4 of the Project Environmental Impact Statement (for each station precinct).<br><br>The pedestrian and cycle connections to be provided for the wider Western Sydney Aerotropolis are beyond the scope of the Project Environmental Impact Statement.<br><br>Objectives and opportunities for active transport corridors for the Western Sydney Aerotropolis precincts are identified in the *Western Sydney Aerotropolis Plan* (NSW Government, 2020). An extension of Anton Road is identified as part of the principal regional cycle path network (off-road). An active transport connection will be provided from Elizabeth Drive to the Airport Terminal Station via the Airport business park connecting to the wider active transport network. |

### 8.3.2 State exhibition process – community submissions

A submission was received from community interest group through the State exhibition period which raised Commonwealth issues that related to the off-airport proposed action. A summary of these submissions and the response from Sydney Metro are outlined in Table 8-2.

### 8.3.3 State exhibition process – government agency and key stakeholder submissions

Government agency and key stakeholder submissions were received through the State exhibition period raised Commonwealth issues that relate to the off-airport proposed action.

A summary of these submissions and the response from Sydney Metro are outlined in Table 8-3.

**Table 8-2 Response to community submission – State process**

| Submitter | Issue category | Issue raised | Response |
|---|---|---|---|
| Community interest group – Blacktown and District Environment Group | Biodiversity | A submitter raised the following issues about native vegetation and riparian vegetation impacts at the DEOH site and stabling and maintenance facility:<br>• concern that grassland communities on the DEOH site have been inadequately assessed and categorised as pasture grass, stating that it is native grassland protected under the BC Act and that it should be retained to provide sufficient bird foraging habitat<br>• request for further clarification on the layout of the stabling and maintenance facility as it is unclear in the Environmental Impact Statement, meaning they cannot understand impacts on trees at the DEOH site<br>• recommendation to extend the northern tunnel alignment to avoid impacts on native vegetation and riparian land associated with Blaxland Creek<br>• request that the project ensures minimum impacts on riparian vegetation and that there is adequate provision for fauna to move freely under the rail line for foraging and existence. | The DEOH land contains areas of remnant native vegetation (in the form of Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest) and historically cleared areas of grasslands, comprising both of exotic dominated grassland and areas of native dominated derived grassland.<br>The Revised Biodiversity Development Assessment Report (see Appendix A) has mapped the vegetation within these areas following detailed field verification surveys in accordance with the BAM. This updated mapping confirmed the presence of both exotic grassland areas and derived native grasslands and the assessment has considered these grasslands in accordance with BAM.<br>The project would have a direct impact of up to approximately 7.3 hectares of native vegetation communities within the DEOH site in total, including:<br>• 4.79 hectares of the TEC Cumberland Plain Woodland (PCT 849) as listed under the BC Act and 1.21 hectares as listed under the EPBC Act<br>• 0.22 hectares of the TEC River-flat Eucalypt Forest (RFF) (PCT 835) as listed under the BC Act<br>• 2.29 hectares of the TEC Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland (PCT 1800) as listed under the BC Act and 1.85 hectares of as listed under the EPBC Act.<br>The removal of vegetation outlined above would be a worst-case impact and opportunities throughout design development and construction management would aim to minimise these impacts. The majority of impacts on vegetation in this area are associated with small fragmented areas of disturbed condition vegetation and/or fringing edges of intact condition areas. The removal of this vegetation is considered unlikely to cause a substantial loss of significant habitat features (including hollow bearing trees and native grasslands for the threatened Speckled Warbler) relative to the available habitats retained within the DOEH and adjoining areas of Blaxland Creek. |

| Submitter | Issue category | Issue raised | Response |
|---|---|---|---|
| | | | The location and indicative layout plan for the stabling and maintenance facility has been identified in Figure 2-3. All existing vegetation within this site would likely be removed as earthworks are required across the site to manage drainage and minimise potential flooding impacts. However, in accordance with mitigation measure FF1, the Flora and Fauna Management Plan for the project would detail how the clearing of native vegetation and habitat would be minimised where possible, for example by seeking to locate site offices, site compounds and ancillary facilities in areas where there are limited biodiversity values (e.g. cleared land) and by delaying the removal of vegetation until absolutely necessary. Residual impacts that are not able to be avoided or managed through mitigation measures would be offset for both threatened ecological communities (ecosystem credits) and threatened species (species credits).<br><br>Biodiversity credits measure the loss in biodiversity values at a development, activity, clearing or biodiversity certification site and the gain in biodiversity values at a biodiversity stewardship site (BSA). Credits are generated on a BSA from management actions that improve biodiversity values on lands secured for conservation. These credits can be used (retired) to compensate for residual impacts on biodiversity values on development sites.<br><br>Biodiversity credit types include ecosystem and species credits. These are defined as:<br>• ecosystem credits: a measurement of the value of TECs, threatened species habitat for species that can be reliably predicted to occur with a PCT, and PCTs generally<br>• species credits: the class of biodiversity credits created or required for the impact on threatened species that cannot be reliably predicted to use an area of land based on habitat surrogates.<br><br>Chapter 12 of the Revised Biodiversity Development Assessment Report (Appendix A) provides further details on the biodiversity offset strategy or the project. |

| Submitter | Issue category | Issue raised | Response |
|---|---|---|---|
| | | | Regarding the extension of the northern tunnel further south, the vertical alignment was informed by a range of natural constraints, existing or planned infrastructure and property constraints throughout the corridor. Section 6.6.2 of the Project Environmental Impact Statement discusses the constraints that influenced the vertical alignment for the project and a summary of the vertical alignment options considered for this project location. This options analysis focused on avoiding and minimising potential biodiversity impacts where possible, and a combination of tunnel and viaduct structures are proposed to reduce impacts on areas of riparian vegetation and endangered ecological communities. The alignment has specifically considered the minimisation of impacts on Blaxland Creek and the unnamed creek within the DEOH site by including viaduct sections to cross the creeks.<br><br>The alignment returns to surface as it travels south to avoid key constraints including the 330kV and 500kV power lines and to provide a preferred at-surface entry arrangement to the stabling and maintenance facility (see Section 6.7.1 of the Project Environmental Impact Statement). The proposed construction strategy for the project and construction efficiency was also considered in the assessment of alignment options. As a result of these constraints, the project alignment is a mixture of tunnel, in-cutting, elevated/ viaduct, and surface.<br><br>The project would be designed to meet the operational performance outcomes for biodiversity listed in Section 6.1, including the requirement that culverts and bridges would be appropriately sized to maintain fauna habitat connectivity, and that the project would be designed to include rail corridor fencing to minimise wildlife-train collision, while providing opportunities for wildlife movement.<br><br>A new mitigation measure (OFF2) has been added (as detailed in Chapter 6 (Avoidance and mitigation measures) which notes that the design of viaduct structures over the wildlife/riparian corridors at Blaxland Creek, the unnamed tributary south of Patons Lane and Cosgroves Creek would seek to:<br>• maximise the span over the wildlife/riparian corridor |

| Submitter | Issue category | Issue raised | Response |
|---|---|---|---|
| | | | • minimise native vegetation removal within the wildlife/riparian corridors<br>• maintain opportunities for fauna movement along the wildlife/riparian corridors and<br>• provide opportunities to enhance fauna movement where possible. |

**Table 8-3 Response to government agency and key stakeholder submissions – State process**

| Submitter | Issue Category | Issue raised | Response |
|---|---|---|---|
| Penrith City Council | Stabling and maintenance facility | Council recommended existing vegetation within the proposed maintenance facility site be protected to manage heat island effects and habitat connectivity impacts. Council recommended that revegetation and landscape buffers be established before or during construction. | Section 6.7.1 of the Project Environmental Impact Statement describes the options considered for the location of the stabling and maintenance facility and justification for the preferred option. The options assessment considered a range of engineering and environmental constraints, one of which was to minimise impacts on significant biodiversity and heritage items.<br><br>The location and indicative layout plan for the stabling and maintenance facility has been identified in Figure 2-3. All existing vegetation within this site would likely be removed as earthworks are required across the site to manage drainage and minimise potential flooding impacts. However, in accordance with mitigation measure FF1, the Flora and Fauna Management Plan for the project would detail how the clearing of native vegetation and habitat would be minimised where possible, for example by seeking to locate site offices, site compounds and ancillary facilities in areas where there are limited biodiversity values (e.g. cleared land) and by delaying the removal of vegetation until absolutely necessary. Residual impacts that are not able to be avoided or managed through mitigation measures would be offset for both threatened ecological communities (ecosystem credits) and threatened species (species credits). Chapter 12 of the Revised Biodiversity Development Assessment Report (Appendix A) provides further details on the biodiversity offset strategy or the project. The site has also been selected as it provides space for additional stabling roads to support potential future extensions of the project if required (refer to Section 7.5.1 of the Project Environmental Impact Statement). |

| Submitter | Issue Category | Issue raised | Response |
|---|---|---|---|
| | | | The project would be designed to meet the construction performance outcomes for biodiversity listed in Section 6.1, including that impacts on threatened flora and fauna species, and ecological communities listed under the BC Act and EPBC Act, would be avoided or minimised where possible.<br><br>Mitigation measure OLV3 requires that opportunities to provide vegetation screening of the stabling and maintenance facility would be investigated during design development. This measure has been revised in response to submissions received during public exhibition of the Project Environmental Impact Statement to commit to investigating options for establishing screen vegetation planting during construction where possible. |
| Liverpool City Council | Key Threatening Processes | Council raised concern that the assessment of indirect impacts and Key Threatening Processes in Technical Paper 3 – Biodiversity Development Assessment Report (*Sydney Metro – Western Sydney Airport, Biodiversity Development Assessment Report* (Sydney Metro 2020b)) is heavily reliant upon mitigation measures, but these measures are not included in Table 11.2 of Technical Paper 3 – Biodiversity Development Assessment Report. Details therefore appear to be restricted to the high-level information included within the Construction Environmental Management Framework included in Appendix F of the Environmental Impact Statement. | Indirect Key Threatening Process impacts would be managed through the development of a Flora and Fauna Management Plan in line with the Construction Environmental Management Framework (Appendix D) and mitigation measure FF1. A new mitigation measure (FF10) has been included as detailed in Section 6.2, with specific measures to deal with Key Threatening Processes including the management of weeds and pathogens. |
| | Dam dewatering | Council requested further details regarding dam dewatering protocols to minimise harm to fauna, including whether any native vegetation or fauna habitat would be | A new mitigation measure (FF8) has been included as detailed in Section 6.2 which outlines that a Dewatering Plan would be prepared and implemented for the dewatering of rural dams which are to be impacted as a result of the construction of the project. This would include measures to |

| Submitter | Issue Category | Issue raised | Response |
|---|---|---|---|
| | | impacted. Council recommended that if impacts on biodiversity are likely to occur, these should be considered as part of the assessment, noting that Kemps Creek contains known and potential habitat for several threatened flora species. | manage the transfer of native aquatic fauna, if required, prior to dewatering and removing of dams. |
| | Cumberland Plain Woodland | Council recommended replanting an equal or greater quantity of Cumberland Plain Woodland species within the vicinity of where the endangered ecological community is proposed to be removed from. | A new mitigation measure (OLV7) has been included which requires the landscape design for the project to use native species from the relevant native vegetation communities within the local area for tree planting programs. As per the operational performance outcomes for biodiversity outlined in Section 6.1, native vegetation would be re-established in accordance with the *National Airports Safeguarding Framework Principles and Guidelines including Guideline C: Managing the Risk of Wildlife Strikes in the Vicinity of Airports* (Australian Government, 2014). While native species would be used for landscaping, the species may not include Cumberland Plain Woodland.<br>A new mitigation measure (FF11) has also been included which outlines that a native vegetation seed collection and salvage program would be developed prior to the commencement of construction and implemented during construction. The seed collection and salvage program would target native species prioritising the Cumberland Plain Woodland species to be utilised in landscaping for the project where possible. Opportunities for use of collected and salvaged seed outside of the project would also be investigated.<br>A revised performance outcome has been included in response to submissions received during public exhibition of the Project Environmental Impact Statement which outlines the number of trees within the project area is increased at a ratio of 2:1 (for vegetation removal not subject to biodiversity offset); and tree canopy coverage is increased, using a range of local species, subject to the constraints on tree planting associated with safe airport operations.<br>The biodiversity offsets and credit report for the project is detailed in Section 12 of the Revised Biodiversity Development Assessment Report |

| Submitter | Issue Category | Issue raised | Response |
|---|---|---|---|
| | | | (Appendix A). The residual impacts of the project on Cumberland Plain Woodland that are not able to be managed through mitigation would be offset in accordance with the BAM and the biodiversity offset strategy described in Section 11.7.4 of the Project Environmental Impact Statement.<br>The project is committed to meeting its credit requirements for Cumberland Plain Woodland, which would ensure the management and protection of Cumberland Plain Woodland in accordance with the BAM. These credits would be sourced from available existing credits created from secure conservation agreements protecting Cumberland Plain Woodland and/or through the equivalent credit payment into the NSW Biodiversity Conservation Trust for the targeted protection and management of Cumberland Plain Woodland in accordance with BAM and BC Act. |
| Department and Planning, Industry and Environment (Environment, Energy and Science) (EES) | Assessment methodology | EES raised the following comments:<br>• exclusion of the Large Bent-wing Bat from further consideration in Technical Paper 3 – Biodiversity Development Assessment Report is not adequately justified<br>• clarification is required as to whether the site of the previously recorded (2013) *Marsdenia viridiflora ssp viridiflora* species on Badgerys Creek Road was found during on-airport surveys<br>• Table 6.5 of Technical Paper 3 – Biodiversity Development Assessment Report refers to Figure 8 of an expert report undertaken as part of the Cumberland Plain Conservation Plan for *Dillwynia tenuifolia*, but the figure in | The majority of existing structures within the project footprint are associated with current inhabited residential buildings in a residential setting and therefore are considered to have a low likelihood of providing suitable habitat for the Large Bent-wing Bat. The two dwellings that are currently abandoned are in a semi-rural landscape and provide moderate potential for roosting habitat for this species. Given the dwellings are isolated within large areas of cleared land, some distance from core habitat for the species, and given the absence of records of this species from targeted bat surveys within the project study area or locality, breeding habitats are highly unlikely.<br>The habitat constraints for breeding as identified in the Threatened Biodiversity Data Collection are not met for this species in the study area so it has been excluded from further assessment in accordance with Section 6.4.1.13 of the BAM.<br>This further justification of exclusion of the Large Bent-wing Bat has been included in the Revised Biodiversity Development Assessment Report (Appendix A). Mitigation measure FF4 has been revised to require a targeted microbat survey of the Large Bent-wing Bat at structures proposed for demolition or impact. Other human-made structures such as |

| Submitter | Issue Category | Issue raised | Response |
|---|---|---|---|
| | | this expert report does not include the on-airport area<br>• Technical Paper 3 – Biodiversity Development Assessment Report should document the alternative options considered, such as a 'do nothing' option<br>• if further biodiversity surveys proposed to be undertaken in Spring 2020 indicate the presence of any large populations of threatened species, all attempts should be made to avoid these populations, prior to the design and construction plans being finalised. | culverts and other under-road structures within the construction footprint would be surveyed for threatened microbats and, if detected, a Microbat Management Plan would be developed by a suitably qualified bat specialist.<br><br>The majority of *Marsdenia viridiflora ssp viridiflora* records identified on Badgerys Creek Road, including the record mentioned in the EES submission, are within the Western Sydney International Stage 1 Construction Impact Zone where vegetation is to be cleared and earthworks undertaken to enable development of the airport. These records are not located within the Sydney Metro construction footprint. As a result, they were not considered in Technical Paper 3 – Biodiversity Development Assessment Report.<br><br>Reference to the expert report has been removed, noting it does not show the on-airport area, and the Biodiversity Development Assessment Report has been updated with more recent and appropriate references to rounds of surveys conducted on-airport for this species as outlined in the Revised Biodiversity Development Assessment Report (Appendix A).<br><br>Discussion of the 'do-nothing' option has now been included in the Revised Biodiversity Development Assessment Report. Chapter 6 (Project alternatives and options) of the Project Environmental Impact Statement includes discussion of the other options considered during project design development including station precincts, project alignment and ancillary facilities options, and the assessment criteria used in determining preferred options.<br><br>The findings of the additional biodiversity assessment undertaken since exhibition of the Project Environmental Impact Statement is provided in the Revised Biodiversity Development Assessment Report (Appendix A). This assessment has confirmed that following the additional Spring surveys there has been a reduction in the project's impacts to threatened species and communities previously assumed to be present within the off-airport areas. |

| Submitter | Issue Category | Issue raised | Response |
|---|---|---|---|
| | Removal of farm dams | EES raised concern regarding potential impacts on native fauna habitat as a result of the removal and/or relocation of farm dams.<br>EES recommended project approval be subject to a condition that requires a Dewatering Plan to be prepared which includes a Fauna Relocation Plan to outline a strategy for the transfer of native aquatic fauna prior to dewatering and removing the dams. | Refer to response to dam dewatering issue in Liverpool City Council response. |
| | Construction of viaduct/bridge crossings | EES raised concern regarding potential impacts of works required to support construction of the viaduct close to waterways and riparian vegetation, and requested further details on this potential impact. | The project has been designed to minimise impacts on sensitive environmental receivers through the use of bridges and viaducts over creek lines and Key Fish Habitat at Blaxland Creek, an unnamed tributary of South Creek to the south of Patons Lane and Cosgroves Creek, and through the tunnel beneath the ECZ associated with Badgerys Creek riparian area on-airport.<br>Construction of the viaduct to cross Blaxland Creek, an unnamed tributary of South Creek to the south of Patons Lane and Cosgroves Creek would result in impacts on vegetation; however, these impacts would be minimised and localised to construction of the viaduct piers and abutments and maintenance access tracks.<br>A new mitigation measure (OFF2) has been included in response to this submission with the aim to minimise native vegetation removal within the wildlife/riparian corridors. In addition, a new mitigation measure (WQ3) has been included which requires the design and construction of the project to take into account the former NSW Office of Water's Guidelines for controlled activities on waterfront land. This would enable the mitigation of potential impacts on water quality, including within riparian corridors. |

| Submitter | Issue Category | Issue raised | Response |
|---|---|---|---|
| | Design of viaduct/bridge crossings | EES raised the following comments:<br>• concern that Figures 7.4b and 7.4c (of the Project Environmental Impact Statement) show the proposed bridge/viaduct crossings of Cosgroves Creek and the unnamed tributary of South Creek do not completely span the riparian zone along the creeks<br>• viaducts/bridges should be designed to span the full width of the riparian corridor of these creeks to minimise the clearing/disturbance of existing native vegetation<br>• request for clarification as to whether the alignment at Patons Lane would be constructed at the surface or on viaduct/bridge. | The metro rail alignment is on viaduct where it crosses Blaxland Creek, the unnamed tributary of South Creek to the south of Patons Lane and Cosgroves Creek (refer to Figure 2-2b and Figure 2-2c). Figure 3-1 of the Project Environmental Impact Statement only shows surface and underground sections of the metro alignment and does not show the proposed viaduct and bridge sections. The viaducts span the majority of the riparian corridor of Cosgroves Creek and the unnamed tributary of South Creek to the south of Patons Lane and over Patons Lane.<br>Mitigation measure OFF1 and new mitigation measure OFF2 outline design requirements for the viaduct/bridge structures to provide for fauna movement opportunities. |
| | East-west regional corridor | EES raised concerns regarding the elevation of the metro alignment on viaduct or in tunnel in the area of the east–west regional corridor and the stabling and maintenance facility and associated infrastructure to avoid potential severance and connectivity impacts on vegetation and habitat impacts on the east–west regional corridor. | An underground tunnel option for the section of the alignment in the area of the east–west regional corridor is not considered feasible because of the need to provide at-grade access to the stabling and maintenance facility and to avoid tunnelling below critical infrastructure associated with the Warragamba to Prospect Water Supply Pipelines (refer to Section 6.6.2 of the Project Environmental Impact Statement).<br>The design of the project considers the east-west regional corridor through ensuring wildlife connectivity requirements across the project corridor where security fencing is not required. The east-west regional corridor would be maintained through the provision of:<br>• bridge structures in the vicinity of Blaxland Creek (rail corridor fencing would not be provided at ground level below the viaduct sections of the alignment to allow for cross-corridor fauna movement)<br>• a culvert measuring around 1.5 metres in diameter providing connectivity for wildlife at an unnamed watercourse (tributary of Blaxland Creek) between Lansdowne Road and Blaxland Creek |

| Submitter | Issue Category | Issue raised | Response |
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| | | | • a culvert measuring around 1.5 metres in diameter providing fauna connectivity around 600 metres north of the Warragamba to Prospect Water Supply Pipelines.<br><br>For security purposes, property boundary fencing would be required to be reinstated at the revised property boundary between the project and the DEOH as outlined in Table 9.1 of the Revised Biodiversity Development Assessment Report (Appendix A). This existing fencing is currently a partial barrier to large terrestrial species such as the Eastern Grey Kangaroo. As such any current limitation on opportunities for fauna movement across the east-west regional corridor from existing property boundary fencing in this location would remain and the project would not further limit habitat connectivity for fauna species.<br><br>Mitigation measure OFF1 and new mitigation measure OFF2 outline design requirements for the viaduct/bridge structures to provide for fauna movement opportunities.<br><br>Vehicular access to the stabling and maintenance facility would be via Patons Lane and a new access road which would run north from Patons Lane through an area that is already largely cleared of vegetation. The access to the stabling and maintenance facility and the permanent power supply route is not anticipated to impact on the east–west regional corridor connection. |
| | Cumulative biodiversity impacts | EES raised concern that the cumulative assessment does not consider biodiversity as a key construction issue for The Northern Road, particularly as The Northern Road upgrade is intended to improve connectivity between the Mulgoa Nature Reserve and the Defence Establishment Orchard Hills. EES emphasised the importance that both projects protect and improve connectivity along the east–west regional corridor. | The cumulative assessment has been updated to consider biodiversity as a key construction issue for The Northern Road in the Revised Biodiversity Development Assessment Report (Appendix A). This assessment concludes that The Northern Road Upgrade and the project have the potential to impact mapped regional corridors that lead to and from the DEOH site. Measures to manage the potential biodiversity cumulative impact in this area are outlined in Section 8.5.3 of the Revised Biodiversity Development Assessment Report. |

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| | Management, mitigation and monitoring of biodiversity impacts | EES provided the following comments and recommendations:<br>• native vegetation impacts are to be avoided/minimised and vegetation reused where it is removed<br>• support for the use of bridges and viaducts over riparian areas, provided the structures and associated security fencing are designed to maintain fauna connectivity, including allowing vegetation to grow under the structures<br>• support for the trenchless installation of the temporary and permanent power supply cables<br>• project approval should be subject to a condition that requires culvert crossings to be designed appropriately to maintain connectivity and fauna passage<br>• fauna surveys should be undertaken by a qualified ecologist prior to clearing of vegetation, and potentially impacted native fauna relocated under the supervision of a qualified professional<br>• project approval should be subject to a condition that requires preparation of a Vegetation Management Plan by a suitably qualified professional and a Flora and Fauna Management Plan to include pre-clearance fauna surveys, relocation of native fauna and a nest box strategy | Section 8.1 of the Revised Biodiversity Development Assessment Report (Appendix A) discusses how the project design and construction planning has sought to avoid and minimise impacts on biodiversity values including vegetation.<br>Section 2.2.1 describes how the project design has considered fauna connectivity at locations such as the proposed viaduct/bridge structures near Blaxland Creek, Cosgroves Creek, the vegetation corridors at Patons Lane and the nearby unnamed watercourse and culvert. Details regarding how connectivity along the watercourses and riparian areas would be maintained would be confirmed during design development.<br>The project would be designed to meet the following performance outcomes as outlined in Section 6.1 to ensure impacts on terrestrial and aquatic biodiversity are avoided or minimised:<br>• maintain integrity and functionality of rail corridor fencing to minimise wildlife–train collision while providing opportunities for wildlife movement<br>• minimise or where possible avoid impacts on threatened flora and fauna species, and ecological communities listed under the Biodiversity Conservation Act 2016 (NSW) and Environment Protection and Biodiversity Conservation Act 1999 (Cth)<br>• appropriately size culverts and bridges to maintain fauna habitat connectivity.<br>A revised performance outcome has also been included in response to submissions received during public exhibition of the Project Environmental Impact Statement which outlines the number of trees within the project area is increased at a ratio of 2:1 (for vegetation removal not subject to biodiversity offset); and tree canopy coverage is increased, using a range of local species, subject to the constraints on tree planting associated with safe airport operations.<br>Mitigation measure FF1 requires preparation of a Flora and Fauna Management Plan (off-airport) to minimise and manage the clearing of native vegetation and habitat by a suitably qualified and experienced professional. The Flora and Fauna Management Plan would outline a |

| Submitter | Issue Category | Issue raised | Response |
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| | | • request for clarification of the number, location and timing of tree hollow removal and nest box installation<br>• seeds, juvenile native vegetation and coarse woody debris should be collected and used for project plantings. Project approval should be subject to a condition that requires a seed collection program<br>• project approval should be subject to a condition that requires a Landscape Plan to be prepared and implemented by an appropriately qualified bush regenerator. The Landscape Plan should include details on factors such as seed collection and the type, species, size, quantity and location of replacement trees<br>• support for mitigation measures LV1 and LV2; however, these measures should be amended to include the retention of remnant native vegetation and fauna habitat<br>• a mitigation measure to ensure weeds are managed appropriately should be included<br>• consultation with local community restoration/rehabilitation groups, Landcare groups, Councils and relevant public authorities should be undertaken if removed native trees cannot be reused<br>• implement a tree replacement ratio of greater than 1:1 for trees that are not | staged clearing process for hollow bearing and habitat tree removal, pre-clearing surveys, fauna relocation and the use of native vegetation of local provenance for tree planting programs. The final total number, location and species of trees to be removed and replanted as part of the project would be determined through the vegetation clearing report required by the Revised Biodiversity Development Assessment Report.<br>A native seed collection and salvage program is currently in development and a new mitigation measure (FF11) has been developed to confirm that this program would be developed and implemented by the project. The seed collection and salvage program would target native species prioritising the Cumberland Plain Woodland species to be utilised in landscaping for the project where possible. Opportunities for use of collected and salvaged seed outside of the project would also be investigated.<br>A native seed collection and salvage program is preferred over replanting of juvenile native plants due to survival rates and maintenance requirements. Sydney Metro understands that better vegetation replacement outcomes can be achieved through implementation of seed salvage and landscaping across the alignment. Seed collection and salvage provides the opportunity for biodiversity to be restabilised while safely preserving seeds for the duration of the project, where landscaping may not be able to be re-established for the duration of construction.<br>EES's in-principle support for installing the power supply at watercourse crossings via directional drilling and the use of bridges and viaducts over key riparian and vegetated areas, provided the structures are designed to maintain fauna connectivity, is noted. The indicative permanent power supply route is shown on Figure 7-42 of the Project Environmental Impact Statement and is proposed to be located within the Patons Lane road reserve, thereby minimising impacts on existing vegetation.<br>The metro rail alignment is on viaduct where it crosses Blaxland Creek, the unnamed tributary of South Creek to the south of Patons Lane and Cosgroves Creek (refer to Figure 2-2b and Figure 2-2c). |

| Submitter | Issue Category | Issue raised | Response |
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| | | covered by a biodiversity offset strategy<br>• request for confirmation of the total number, location and species of trees to be removed and replanted as part of the project<br>• project approval should be subject to a condition outlining the size and species of replacement trees<br>• connectivity along the watercourses and riparian areas should be maintained and where possible improved, particularly at South Creek, Blaxland Creek and Cosgroves Creek. Detailed plans should be provided to show this. | As outlined in Section 7.6.5 of the Project Environmental Impact Statement, for all surface sections of the alignment, the project corridor would be bordered by security fencing. The fencing would prevent public access to the operational rail corridor, preclude native fauna and livestock access and accommodate Sydney Metro's needs in terms of ongoing maintenance access. As per the operational performance outcomes for biodiversity outlined in Table 7-1, the integrity and functionality of rail corridor fencing would be maintained to minimise wildlife-train collision while providing opportunities for cross-corridor wildlife movement.<br><br>Security fencing would not be provided below the viaduct sections of the alignment at ground level allowing for wildlife connectivity across the project corridor.<br><br>Mitigation measure OFF1 and new mitigation measure OFF2 outline design requirements for the viaduct/bridge structures to provide for fauna movement opportunities.<br><br>Other relevant mitigation measures that would be implemented to manage issues raised in EES's submission include:<br>• FF2 requiring a nest box strategy which would also outline the size, type, number and location of nest boxes required<br>• FF10 regarding management of weeds.<br><br>Mitigation measures LV1 and LV2 from the Project Environmental Impact Statement are designed to address landscape and visual impacts during construction and as such do not consider biodiversity impacts. Potential native vegetation and fauna habitat impacts would be managed by revised mitigation measure FF1 which requires minimising clearing of native vegetation and habitat (such as avoiding removal of hollow bearing trees and investigating opportunities for salvage and storage of felled native trees for potential use in landscape design), mitigation measure FF2 which requires implementation of a nest box strategy and mitigation measure FF7 which requires protection of fish passage and fish habitat.<br><br>Sydney Metro does not propose to remove all exotic or invasive species and replace these with local natives, as some exotic species have amenity |

| Submitter | Issue Category | Issue raised | Response |
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| | | | and landscape value, contribute to habitat and reduce urban heat. |
| Department of Primary Industries (DPI Fisheries) | Mitigation, management and monitoring of biodiversity impacts | DPI Fisheries recommended project approval be subject to the following conditions:<br>• all final designs and construction of waterway crossings allow for suitable fish passage<br>• any stream realignment be constructed to ensure habitat values are included. | The project has been designed to minimise impacts on Key Fish Habitat through use of bridges and viaducts over creek lines and Key Fish Habitat (Cosgroves Creek and Blaxland Creek), and the tunnel beneath the on-airport Environmental Conservation Zone. The mobilisation of sediments would be contained within the construction footprint and managed in accordance with mitigation measure OWQ3.<br><br>Mitigation measure FF7 requires fish passage and habitat associated with Cosgrove Creek and Blaxland Creek to be protected in accordance with the *Policy and Guidelines for Fish Habitat Conservation and Management* (DPI Fisheries NSW, 2013). Mitigation measure OFF1 requires wildlife connectivity to be maintained (where possible) through the installation of viaduct/bridge structures designed in accordance with the *Policy and Guidelines for Fish Friendly Waterway Crossings* (DPI Fisheries, 2013b).<br><br>As outlined in mitigation measure OFF1, wildlife connectivity would be maintained (where possible) through the installation of viaduct/bridge structures designed to avoid relocation or adjustment of the stream bed where possible.<br><br>A new mitigation measure (OFF2) notes that the design of viaduct structures over the wildlife/riparian corridors at Blaxland Creek, the unnamed tributary of South Creek to the south of Patons Lane and Cosgroves Creek would seek to:<br><br>• maximise the span over the wildlife/riparian corridor<br>• minimise native vegetation removal within the wildlife/riparian corridors<br>• maintain opportunities for fauna movement along the wildlife/riparian corridors and<br>• provide opportunities to enhance fauna movement where possible. |

| Submitter | Issue Category | Issue raised | Response |
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| Sydney Water | Biodiversity | Sydney Water requested further details of construction methodologies for culverts and creek crossings to identify risks which may adversely affect local biodiversity and water quality. | The project would be designed to meet the following performance outcomes for biodiversity and water quality listed in Section 6.2, including the following requirements:<br>• culverts and bridges would be appropriately sized to maintain fauna habitat connectivity<br>• drainage from the project (including the stabling and maintenance facility, service facilities and stations) designed in accordance with local council requirements for managing urban stormwater quality and quantity.<br><br>A new mitigation measure (WQ3) has been included which identifies the design and construction of the project would take into account the former NSW Office of Water's Guidelines for controlled activities on waterfront land. This would enable the mitigation of potential impacts on water quality including within riparian corridors.<br><br>Sydney Metro would continue to work with Sydney Water to ensure they are informed about the project and have opportunities to provide feedback to the project team. This consultation would continue throughout design development where culvert and crossings design and construction methodologies are refined. |

## 8.4 Consultation to support the Final Environmental Impact Assessment

Sydney Metro continued to undertake community and stakeholder consultation during preparation of the Final Environmental Impact Assessment following exhibition of the Draft Environmental Impact Assessment.

Access was provided to the DOEH site within Commonwealth land in December 2020 for field investigations. During this time this area was subject to surveys and test excavations undertaken in areas of Aboriginal archaeological sensitivity. Participants from various RAP groups were consulted and were in attendance for fieldwork, including, Darug Custodian Aboriginal Corporation, Tocomwall, Murrabidgee, Cubbitch Barta, Deerubbin Local Aboriginal Land Council and Kamilaroi Yankuntjatjara Working Group. Previously unidentified Aboriginal items were identified within the off-airport construction footprint on Commonwealth land, consisting of isolated artefacts and artefact scatters in both surface and subsurface contexts, as a result of survey works and test excavations (see Section 4.3).

Sydney Metro has also undertaken the following consultation with the community, government agencies and key stakeholders in regard to issues relevant to the off-airport proposed action:

- briefing with local community land care group (Mulgoa Landcare group representative) to discuss biodiversity management during further design development
- briefing with EES on the biodiversity field surveys and the Revised Biodiversity Development Assessment Report (Appendix A)
- briefing with NSW Department of Premier and Cabinet (Aboriginal Cultural Heritage) on the Aboriginal heritage field investigations outcomes and Revised Aboriginal Cultural Heritage Assessment Report (Appendix B).

## 8.5 Ongoing consultation and engagement

Sydney Metro will continue to work with stakeholders and the community to ensure they are informed about the proposed action, should it be authorised, and have opportunities to provide feedback to the project team. An OCCS (Appendix E) has been prepared for the project which will guide Sydney Metro's approach to engagement with communities, stakeholders and businesses.

A list of activities that would be undertaken for the project and their timing is provided in Table 8-4.

**Table 8-4 Ongoing consultation and engagement activities**

| Activity | Design | Delivery | Operation |
|---|---|---|---|
| Project overview document | | ● | |
| Media releases | | ● | |
| Community information sessions | ● | | |
| Traditional and social media engagement | ● | ● | ● |
| Doorknocks with neighbouring properties | ● | ● | ● |
| Newsletter letterbox drop | ● | ● | ● |
| Project website and online forums | ● | ● | ● |
| Newsletter advertising | ● | ● | ● |
| Stakeholder meetings | ● | ● | ● |
| Local business engagement | ● | ● | ● |
| Local Aboriginal Land Councils and Aboriginal stakeholder engagement | ● | ● | ● |
| Goverment stakeholder engagement | ● | ● | ● |

### 8.5.1 Consultation during construction and complaints handling

Should the proposed action be authorised, the project team would continue to consult with the community and key stakeholders during construction. In general, this consultation would occur as part of the broader project and involve:

- ongoing consultation liaising with key stakeholders, local councils and other government agencies on relevant environmental issues (and meetings or project briefings where required)
- provision of regular updates to the nearby community
- development and implementation of a community complaints and response management system.

### 8.5.2 Overarching Community Communications Strategy

The OCCS (Appendix E) will guide the approach to stakeholder and community consultation to be adopted during construction. The OCCS:

- identifies relevant communities, individuals or organisations to be consulted during construction
- identifies procedures for the regular distribution of information
- identifies procedures for the community to provide feedback and to resolve issues.

The OCCS comprises a consolidated document to be implemented for the construction of the off-airport and on-airport proposed action.

# 9. Economic and social matters

A detailed discussion of the economic and social impacts of the project is provided at Chapter 21 (Social and economic) of the Project Environmental Impact Statement.

In summary, the project (including the proposed action) would have positive local, regional and national economic and employment impacts through the provision of around 14,000 construction jobs. Potential temporary social impacts during construction would generally be managed through appropriate mitigation of other environmental amenity aspects such as noise, traffic, visual and air quality.

The main social and economic impacts off-airport during construction are:

- temporary disruption to 'way of life', amenity and access of residents, community groups and businesses surrounding construction sites from construction noise, dust, vibration and traffic
- changes to community composition, cohesion, character, function and sense of place through the influx of construction workers, relocation of residents and businesses due to property acquisition, and reduction in availability of cultural meeting places and hubs
- changes to access to and operation of social infrastructure, services and facilities
- potential loss of cultural values due to construction works including Aboriginal and non-Aboriginal heritage values and connection to land
- potential impacts to community health and well-being through property acquisitions and nuisance from construction activities such as noise, vibration, dust
- impacts to the economic livelihoods of people and businesses through construction disruptions and property acquisitions.

The main social and economic impacts off-airport during operation are:

- enhanced accessibility and connectivity within the Western Parkland City and Greater Sydney for social, economic/employment, education, recreational and health purposes
- high quality rail stations and improved community spaces and facilities in the new station precincts including improved access infrastructure
- potential severance of properties, communities and access due to permanent at-surface rail infrastructure
- amenity changes through the operation of rail services.

The operation of the project would provide access to Western Sydney International for workers, commuters and travellers and support the operation and economic benefits of the airport and supporting activities.

The project would have positive regional, and national, economic and employment impacts through facilitating increased trade catchments, efficient freight movements and providing employment connectivity. It would also directly employ people to operate and maintain the trains and stations.

# 10. Conclusion

## 10.1 Summary of impacts, avoidance and mitigation measures, and offsets

Residual impacts of the off-airport components of the project include:

- impact to around 32 hectares of native vegetation off-airport
- clearing of around 5.87 hectares of Cumberland Plain Woodlands and Shale-Gravel Transition Forest and 4.94 hectares of Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland as listed under the EPBC Act
- removal of threatened species and/or their habitat, including:
  - direct removal of one threatened species of flora, *Grevillea juniperina* subsp. *juniperina*, and two threatened fauna species (Cumberland Plain Land Snail and Southern Myotis) listed as vulnerable under the BC Act
  - direct removal of foraging habitat for one fauna species, the Grey-headed Flying-fox listed as vulnerable under the EPBC Act
  - potential habitat for a further eleven threatened flora species listed under the BC Act and nine species under the EPBC Act based on a precautionary approach to assumed presence
  - potential habitat for a further two threatened fauna species listed under the EPBC Act based on a precautionary approach to assumed presence
- potential indirect impacts to threatened species and/or their habitat such as reduced viability of adjacent habitat due to edge effects, noise, dust or light spill
- potential impacts on groundwater dependent ecosystems (around 1.81 hectares of Broad-leaved Ironbark - Grey Box - Melaleuca decora grassy open forest on clay/gravel soils of the Cumberland Plain, Sydney Basin Bioregion) resulting from changes to groundwater level or flow
- impacts on Commonwealth land (i.e. DEOH site) through the removal of approximately 7.3 hectares of native vegetation communities providing habitat for matters of national environmental significance, including:
  - 4.79 hectares of Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest as listed under the BC Act and incorporating 1.21 hectares of TEC under the EPBC Act
  - 0.22 hectares of River-flat Eucalypt Forest as listed under the BC Act
  - 2.29 hectares Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland (PCT 1800) as listed under the BC Act and incorporating 1.85 hectares of Threatened Ecological Community under the EPBC Act
  - impacts on a relatively small proportion (5.01 hectares) of the available potential foraging habitat area within 10 kilometres for the EPBC Act listed Grey-headed Flying-fox and BC Act listed *Myotis macropus* (Southern Myotis)
- direct impacts to two Aboriginal heritage archaeological sites on Commonwealth land (one with moderate integrity and one with low integrity), resulting in total loss of Aboriginal heritage value.

Many potential impacts have been avoided through the project development process. Residual environmental and social impacts of the project have been minimised through the specific design and the construction methods chosen. In addition, the application of comprehensive mitigation and management measures would be implemented, and these measures have been shown to be proven and effective on previous construction projects. Design development and refinements would continue to further minimise any residual impacts.

Specific mitigation measures for residual potential impacts to biodiversity include:

- a targeted microbat survey (including Eastern Coastal Free-tailed Bat, Large Bent-winged bat and Eastern False Pipistrelle) of dwellings and structures proposed for demolition

- during construction, shading and artificial light impacts would be minimised in areas adjoining remnant bushland in intact condition
- fish passage and fish habitat associated with Cosgrove Creek and Blaxland Creek would be protected in accordance with the *Policy and Guidelines for Fish Habitat Conservation and Management* (DPI (Fisheries NSW) 2013)
- wildlife connectivity would be maintained (where possible) through the installation of viaduct/bridge structures designed in accordance with nominated criteria and consistent with the *Policy and Guidelines for Fish Friendly Waterway Crossings* (DPI (Fisheries NSW), 2013)
- the design of viaduct structures over the wildlife/riparian corridors would seek to maximise the span over the corridor, minimise native vegetation removal and maintain opportunities for fauna movement
- implementation of weed and pathogen management measures and management measures to ensure fish passage, protect fish habitat and minimise vegetation removal within the riparian zone
- development and implementation of a native vegetation seed salvage program
- implementation of a surface water quality monitoring program during construction
- construction water treatment plants designed to ensure that wastewater is treated to a level that is compliant with nominated guidelines unless other discharge criteria are agreed with relevant authorities
- design and construction of the project would take into account the former NSW Office of Water's Guidelines for controlled activities on waterfront land
- development and updates to detailed hydrogeological and geotechnical models during design and construction to identify predicted changes in groundwater levels including at groundwater dependent ecosystems. The modelling would be informed by the results of groundwater monitoring undertaken before and during construction
- development and implementation of a Groundwater Management Plan which would include response measures for areas subject to potential groundwater drawdown
- landscape design for the project would incorporate salvaged native trees to enhance fauna habitat in suitable locations and would use native species from relevant native vegetation communities within the local area for tree planting programs.

Residual impacts that are not able to be managed through mitigation would be offset in accordance with BAM as an endorsed offset framework under the EPBC Act. Based on Biodiversity Assessment Method Calculator (BAMC) calculations for both ecosystem and species credits, the project offset obligation of off-airport impacts has been calculated to require the following biodiversity credits:

- up to 848 ecosystem credits
- up to 1,113 species credits.

During further design development and construction planning for the project the biodiversity impacts, offset obligations and credit calculations will be reviewed, and updated if necessary.

## 10.2 Environmental acceptability of proposed action

The potential residual impacts identified would not result in unacceptable impacts and further mitigation would be explored during design development including the decision on appropriate construction methodologies and the implementation of environmental management practices.

## 10.3 Efficacy of mitigation measures

Comprehensive mitigation measures have been developed to mitigate and manage potential impacts of the project (including the proposed action) on the environment and achieve the identified performance outcomes. The implementation of these mitigation and management measures has been shown to be proven and effective on previous construction projects.

## 10.4 Ecologically sustainable development principles

Biophysical, economic and social considerations have been assessed for the project in the context of the principles of ecologically sustainable development.

Ecologically sustainable development principles for the proposed action are the same as those for the project which are discussed in Chapter 27 (Synthesis) and Chapter 28 (Conclusion) of the Project Environmental Impact Statement and are summarised as:

- Precautionary principle: The environmental risk analysis, together with the detailed assessment carried out in preparing the Project Environmental Impact Statement, indicates that there would be no threat of serious or irreversible damage to the environment.
- Intergenerational equity: The objectives of the project are essentially around connecting the Western Parkland City and ensuring an efficient and reliable public transport network to connect to Western Sydney International. This would benefit current and future generations. Once operational, the project would leave a positive legacy for future generations. It would provide long term benefits by providing a new transport linkage to the Western Parkland City and connection to Western Sydney International.
- Conservation of biological diversity and ecological integrity: Conservation of biological diversity and ecological integrity has been considered throughout project and design development. The construction footprint has been developed to avoid or minimise impact to areas of high ecological value. Detailed assessments have been carried out to identify flora and fauna impacts and a range of mitigation measures identified for implementation. Impacts on biological diversity and ecological integrity have been assessed as moderate.
- Improved valuation and pricing of environmental resources: The value placed on the environment was inherent in the development of the design. In addition, the costs associated with the planning and design of measures to avoid/minimise adverse environmental impacts and the costs to implement them have been built into the overall project costs. Ongoing design development together with specific issue-based management plans would represent further commitment to the recognition of the value of protecting environmental resources.

# 11. References

Department of Agriculture, Water and the Environment, 2020. National Flying-fox monitoring viewer.

Department of Environment, Climate Change and Water NSW, 2009. *Draft National Recovery Plan for the Grey-headed Flying-fox Pteropus poliocephalus.*

Department of Environment, Climate Change and Water, 2010a. *Cumberland Plain Recovery Plan.*

Department of Environment, Climate Change and Water, 2010b*. Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW.*

Department of the Environment and Energy, 2018. *Approved Conservation Advice for the Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community*.

Department of the Environment, Water, Heritage and the Arts, 2008a. *Approved Conservation Advice for Allocasuarina glareicola.*

Department of the Environment, Water, Heritage and the Arts, 2008b. *Approved Conservation Advice for Cynanchum elegans.*

Department of the Environment, Water, Heritage and the Arts, 2008c. *Approved Conservation Advice for Grevillea parviflora subsp. Parviflora.*

Department of the Environment, Water, Heritage and the Arts, 2008d. *Approved Conservation Advice for Micromyrtus minutiflora.*

Department of the Environment, Water, Heritage and the Arts, 2008e. *Approved Conservation Advice for Pimelea curviflora var. curviflora.*

Department of the Environment, Water, Heritage and the Arts, 2008f. *Approved Conservation Advice for Pultenaea parviflora.*

Department of the Environment, 2013a. *Significant Impact Guidelines 1.1.*

Department of the Environment, 2013b. *Approved Conservation Advice for Acacia bynoeana.*

Department of Infrastructure, Transport, Cities and Regional Development, 2018. *National Airport Safeguarding Framework (NASF).*

Department of Planning, Industry and Environment, 2015. *Cumberland Subregion BIO Map Biodiversity Corridors of Regional Significance*.

Department of Planning, Industry and Environment, 2020. *Draft Cumberland Plain Conservation Plan 2020-2056*.

Department of Planning, 2006. *Photographic Recording of Heritage Items Using Film or Digital.*

DPI (Fisheries NSW) 2013a. *Policy and Guidelines for Fish Habitat Conservation and Management*.

DPI (Fisheries NSW) 2013b. *Policy and Guidelines for Fish Friendly Waterway Crossings*.

Garnett, S.T., Crowley, G.M, 2000. *The Action Plan for Australian Birds.*

GML Heritage Pty Ltd, 2013. *Defence Establishment Orchard Hills Heritage Management Plan*.

Greater Sydney Commission, 2018a. *Greater Sydney Region Plan.*

NSW Government, 2018. *Western Sydney City Deal.*

NSW Government, 2020. *Draft Aerotropolis Precinct Plan.*

NSW National Parks and Wildlife Service, 2003. *Downy Wattle (Acacia pubescens) Recovery Plan.*

NSW Office of Environment and Heritage, 2010. *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*.

Saunders, D. 2011. *National Recovery Plan for the Swift Parrot Lathamus discolor.*

Sydney Metro, 2020. *Sydney Metro – Western Sydney Airport, Environmental Impact Statement.*

Sydney Metro, 2021a. *Sydney Metro – Western Sydney Airport, Submissions Report .*

Sydney Metro, 2020b. *Sydney Metro – Western Sydney Airport, Biodiversity Development Assessment Report.*

Threatened Species Scientific Committee, 2016. *Recovery Plan for Pimelea spicata.*

Transport for New South Wales, 2014. Draft Wildlife Connectivity Guidelines.

Transport for NSW and Australian Government, 2018. *Western Sydney Rail Needs Scoping Study*.

Tozer, M., et al., 2010. *Native Vegetation of southeast NSW: a revised classification and map for the coast and tablelands. Cunninghamia 11(3).*