

REVIEW OF  
ENVIRONMENTAL FACTORS



PR471 Construction of 132kV Aerotropolis Feeder from Orchard Hills to Luddenham (Stages 4-7)



*In accordance with Part 5 of the Environmental Planning & Assessment Act 1979 & State Environmental Planning Policy (Transport and Infrastructure) 2021.*

August 2022

REF- Construction of 132kV Aerotropolis Feeder from Orchard Hills to Luddenham (Stages 4-7)

*Cover photo taken from: <https://travelradar.aero/western-sydney-airport-aerotropolis/>*

## **EXECUTIVE SUMMARY**

Endeavour Energy (EE) is a network electricity distributor servicing over 2.5 million people living and working across Sydney's Greater West, the Blue Mountains, the Southern Highlands, Illawarra and the South Coast of New South Wales (NSW). EE proposes to install an approximately 22-kilometre (km) long 132 kilovolt (kV) underground transmission feeder route traversing through the suburbs of Bringelly, Luddenham, Badgerys Creek, Kemps Creek and Orchard Hills of the Greater Western Sydney region in NSW; as part of their transmission supply strategy to meet increasing electricity demand from critical infrastructure at the Western Sydney Growth Area including the future Nancy-Bird Walton Airport (Western Sydney Airport) and surrounding supporting development. The installation is proposed over seven construction stages (Stage 1 – Stage 7) commencing from September 2022 through to December 2023.

Approximately 11 km of the proposed transmission feeder route, between Adams Road in Luddenham and Patons Lane in Orchard Hills, will be installed in Stage 4 – Stage 7 and which are the subject of this Review of Environmental Factors (REF).

This Review of Environmental Factors details the possible environmental impacts and identifies mitigating measures to be incorporated into the design, construction and operation of the Feeder to minimise environmental impacts.

EE is the Determining Authority for these works. The works are subject to the provisions of The Code of Practice (The Code) for Authorised Network Operators (ANO), State Environmental Planning Policy (Infrastructure) 2007 (Infrastructure SEPP) and require assessment and approval under Part 5 of the Environmental Planning and Assessment (EP&A) Act, 1979.

No significant environmental constraints to the proposal were identified by the assessment process required under Part 5 of the EP&A Act. Relative to this proposal, EE has concluded that there are no aspects of this proposal that have the potential to lead to, or result in, significant adverse impacts on the environment.

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**LIST OF ABBREVIATIONS AND GLOSSARY OF TERMS**

<b>Term</b>	<b>Meaning</b>
<b>A</b>	amp: the unit of measure for current (or load) which is the amount
<b>AHIMS</b>	Aboriginal Heritage Information Management System
<b>ANO</b>	Authorised Network Operator under the <i>Electricity Networks Assets (Authorised Transactions) Act 2015</i>
<b>ASP</b>	Accredited Service Provider
<b>CEMP</b>	Construction Environmental Management Plan
<b>DAWE</b>	Department of Agriculture, Water and Environment
<b>Determining Authority</b>	Minister or public authority by or on whose behalf the activity is or is to be carried out or any Minister or public authority whose approval is required in order to enable the activity to be carried out.
<b>DBYD</b>	Dial Before You Dig
<b>DC</b>	Direct Current
<b>DPE</b>	Department of Planning and Environment
<b>DM</b>	Demand Management
<b>EE</b>	Endeavour Energy
<b>EP&amp;A Act</b>	<i>Environmental Planning and Assessment Act 1979</i> (NSW). Provides the legislative framework for land use planning and development assessment in NSW.
<b>EP&amp;A Regulations</b>	<i>Environmental Planning and Assessment Regulation 2021</i>
<b>EPA</b>	Environmental Protection Authority
<b>EPBC Act</b>	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth). Provides for the protection of the environment, especially matters of national environmental significance, and provides a national assessment and approvals process.
<b>ES Act</b>	<i>Electricity Supply Act 1995</i>
<b>ESCP</b>	Erosion and Sediment Control Plan
<b>ESD</b>	Ecologically sustainable development: is development which uses, conserves and enhances the resources of the community so that ecological processes on which life depends, are maintained and the total quality of life, now and in the future, can be increased.
<b>EWP</b>	Elevation Work Platform
<b>Feeder</b>	A set of electric conductors that distribute electricity

<b>Term</b>	<b>Meaning</b>
<b>HDD</b>	Horizontal Directional Drilling
<b>HV</b>	High Voltage
<b>Hz</b>	Hertz
<b>Joint bay</b>	Concrete bay constructed in various locations along a feeder route which is used for jointing lengths of cable together
<b>km</b>	Kilometre
<b>kV</b>	Kilovolts
<b>LEP</b>	Local Environmental Plan: a type of EPI made under Part 3 of the EP&A Act.
<b>LGA</b>	Local Government Area
<b>m</b>	metre
<b>MNES</b>	Matter of National Environmental Significance
<b>NP</b>	National Park
<b>NPW Act</b>	<i>National Parks and Wildlife Act 1974</i>
<b>NPWS</b>	National Parks and Wildlife Service (OEH)
<b>OH</b>	Overhead
<b>POEO Act</b>	<i>Protection of the Environment Operations Act 1997</i>
<b>REF</b>	Review of Environmental Factors
<b>Road</b>	Includes the airspace above the surface of the road, the soil beneath the surface of the road and any bridge, tunnel, causeway, road-ferry, ford or other work or structure forming part of the road. The road reserve is inclusive of the carriageway and the footpath.
<b>SCADA</b>	Supervisory Control and Data Acquisition
<b>SEPP</b>	State Environmental Planning Policy: a type of EIP made under Part 3 of the EP&A Act
<b>SER</b>	Summary Environmental Report
<b>SIS</b>	Species Impact Statement
<b>The Code</b>	The Code of Practice for Authorised Network Operators (ANO) designed to regulate the ANOs decision making process as to the appropriate level of environmental assessment required relative to the impacts of a proposed project.
<b>TMP</b>	Traffic Management Plan



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Term	Meaning
<b>TSC Act</b>	<i>Threatened Species Conservation Act 1995</i>
<b>UGOH</b>	Underground to overhead construction- a structure which facilitates the transition of underground cabling to aerial (overhead) construction
<b>V</b>	volt: the unit of measure for voltage which is the pressure that electricity is pushed through the wire
<b>ZS</b>	Zone Substation

**Document Control**

<b>Revision</b>	<b>Prepared by and Company Name</b>	<b>Date</b>	<b>Reviewed by and Company Name</b>	<b>Comments</b>
<b>V1</b>	Ruth Kelly and Tanja Ibsen, EMM Consulting Pty Ltd	24 June 2022	Mohammad Alam Endeavour Energy	Draft review
<b>V2</b>	Ruth Kelly and Tanja Ibsen, EMM Consulting Pty Ltd	18 August 2022		

**Document Approval**

To the best of the knowledge of the below signatories, this REF has been prepared to be neither false nor misleading and is in accordance with The Code of practice for Authorised Network Operators approved under section 171 of the Environmental Planning and Assessment Regulation 2021.

Prepared by	Ruth Kelly
Signed	
Date	
Title	Associate Director, EMM Consulting Pty Ltd
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Approved By	Peter Oxnam
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Date	
Title	Environmental Services Manager, Endeavour Energy

## **1.0 Introduction**

### **1.1 Background**

Endeavour Energy (EE) is a network electricity distributor servicing over 2.5 million people living and working across Sydney's Greater West, the Blue Mountains, the Southern Highlands, Illawarra and the South Coast of New South Wales (NSW). EE proposes to install an approximately 22-kilometre (km) long 132 kilovolt (kV) underground transmission feeder route traversing through the suburbs of Bringelly, Luddenham, Badgerys Creek, Kemps Creek and Orchard Hills of the Greater Western Sydney region in NSW; as part of the transmission supply strategy to meet increasing electricity demand from critical infrastructure at the Western Sydney Growth Area including the future Nancy-Bird Walton Airport (Western Sydney Airport) and surrounding supporting development. The installation is proposed over seven construction stages (Stage 1 – Stage 7) expected to commence from September 2022 through to December 2023.

Approximately 11 km of the proposed transmission feeder route, between Adams Road in Luddenham and Patons Lane in Orchard Hills, will be installed in Stage 4 – Stage 7 and which are the subject of this Review of Environmental Factors (REF) (referred to as the 'project' from hereon in).

EMM Consulting Pty Ltd (EMM) has been engaged by EE to prepare a REF for the project. The project is subject to the provisions of NSW Code of Practice (the Code) for Authorised Network Operators (ANO), State Environmental Planning Policy (Transport and Infrastructure) 2021 (Transport and Infrastructure SEPP), and requires assessment and approval under Division 5.1, section 5.5 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

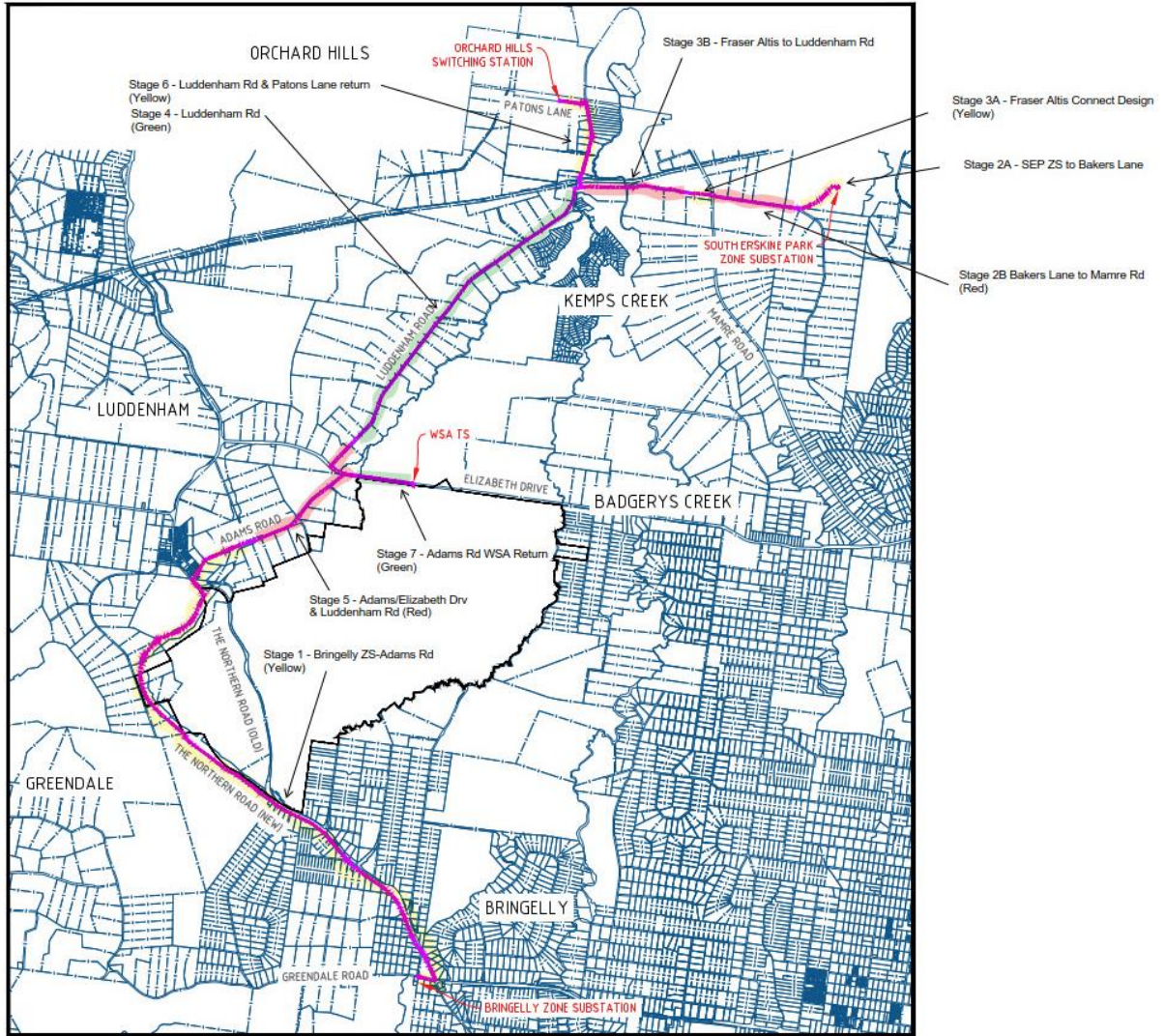
EE is the determining authority under section 5.5 of the EP&A Act for the project. In accordance with requirements under section 5.5 of the EP&A Act, EE is also responsible for assessing all matters affecting or likely to affect the environment as a result of the proposal.

The REF has been developed in accordance with section 171 of the NSW Environmental Planning and Assessment Regulation 2021 (EP&A Regulation) with consideration of measures that will be implemented to avoid or minimise the potential for environmental impacts as a result of construction and operation of the project. This REF is based on a desktop review of potential environmental sensitivities at the site, a site visit undertaken by EMM's project director, technical assessment reports and other relevant project documentation provided by EE.

Other construction stages and sections of the proposed feeder route installation (Stage 1 – Stage 3) have been assessed by EE separately and are not included in this REF.

### **1.2 Location of the study area**

The project involves construction and operation associated with Stage 4 – Stage 7 of EE's broader transmission supply installation works, which involve connecting the proposed Orchard Hills Switching Station and South Erskine Park Zone Substation (both of which are located close to the norther end of Luddenham Road), to their Bringelly Zone Substation in Bringelly, and are further described in Chapter 7 and shown in Figure 1-1.

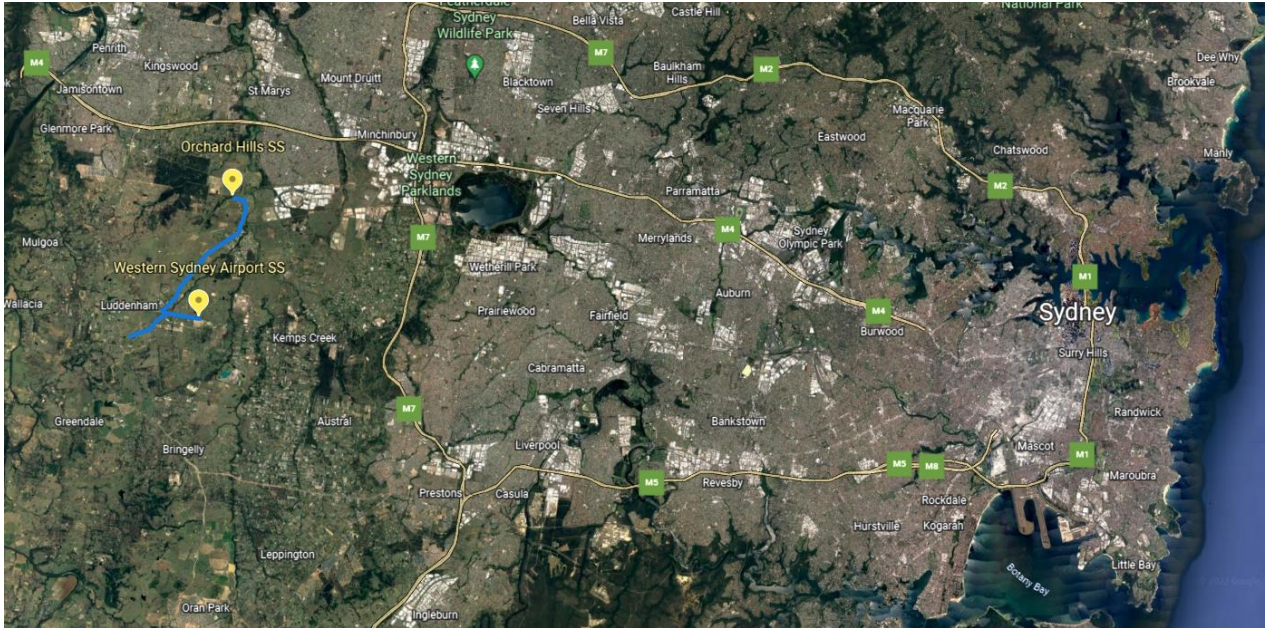


**Figure 1-1 Endeavour Energy's proposed transmission supply route in the Western Sydney Growth Area**

The project works are divided into four construction stages, the locations of which are described below:

- Stage 4** stretches approximately 5.5 km and involves transmission feeder installation works along Luddenham Road, starting approximately 400 metres (m) from the Luddenham Road/ Elizabeth Drive intersection, and following Luddenham Road up to the WaterNSW Warragamba pipelines (approximately 400 m north of the Luddenham Road/ Twin Creeks Drive intersection).





**Figure 1-2 Location map of Stages 4-7**

- **Stage 5** stretches approximately 2.5 km and involves transmission feeder installation works along approximately 1.7 km of Adams Road, approximately 300 m stretch of Elizabeth Drive close to the Elizabeth Drive/Adams Road and Luddenham Road/ Elizabeth Drive intersections. It also includes a 400 m section of Luddenham Road, at its most southern end close to Elizabeth Drive.
- **Stage 6** stretches approximately 1.5 km and encompasses approximately 1.3 km stretch of Luddenham Road from Luddenham Road’s intersection with Warragamba pipelines. It also includes approximately 200 m along Patons Lane up to the proposed Orchard Hills Switching Station.
- **Stage 7** stretches approximately 1 km and involves works along Elizabeth Drive, approximately 100 m south-east from the intersection of Elizabeth Drive/Adams Road intersection.

### 1.3 Proponent

EE is the proponent of the project. EE is a safety focused and customer-centred business determined to be the best performing electricity provider in Australia. Proponent details are provided in the table below.

**Table 1-1 Proponent details**

Specification	Details
Proponent	Endeavour Energy
Address	51 Huntingwood Dr, Huntingwood NSW 2148
Website	<a href="https://www.endeavourenergy.com.au/">https://www.endeavourenergy.com.au/</a>
Contact	Mohammad Alam

#### **1.4 Purpose of this REF**

The purpose of this REF is to assess potential impacts that may result from the construction and operation of the project described in greater detail in Chapter 7 of this report.

The structure of this REF has been prepared in accordance with the table of contents presented on page 21 of EE's *Environmental Management Standard: Environmental impact assessment and environmental management plans (EMS 0001) Amendment no. 5* (EE 2014) and in accordance with requirements set out in the Code, with the exception of a few additional report sections that were added.

## **2 Project justification**

### **2.1 Overview**

The project route traverses the suburbs of Luddenham, Badgerys Creek and Orchard Hills of the Greater Western Sydney region in NSW and is within the area also referred to as the 'Western Sydney Growth Area', 'Western Sydney Aerotropolis' (the Aerotropolis), and, most recently, the 'Western Sydney Parkland'. This chapter serves to describe the strategic context of the project, as well as the need, objectives and benefits of the project.

### **2.2 Strategic context**

#### **2.2.1 Greater Sydney Region Plan 'A Metropolis of Three Cities' – Western Sydney Parkland**

Based on the NSW Government predictions, Sydney's population will continue to grow to nearly eight million people over the next 40 years (NSW Government 2021). For over a decade, the NSW Government has been preparing for the projected increase in population, by formalising strategies and investment that will secure jobs, infrastructure, education, health facilities and services within the different growth centres of Sydney.

One of the key growth areas has been the Western Sydney Growth Area. Government plans for Western Sydney have evolved in the last few decades, and especially with the release of the Greater Sydney Region Plan 'A Metropolis of Three Cities' (the Three Cities Plan) in 2018 (GCC 2018a). This has impacted the land use vision of Western Sydney; in particular, with the creation of the 'three cities' concept. Since the release of the Three Cities Plan, work on infrastructure and housing provision in Sydney's greater west has accelerated with significant investment in infrastructure, particularly with large scale projects such as the Western Sydney Airport, the Metro Rail service, the Bringelly Road, Elizabeth Drive and the Northern Road upgrades, and others (GCC 2022).

The project aligns with Greater Sydney Commission's (GCC) 'Our Greater Sydney 2056 Western City District Plan – connecting communities' (WSD Plan) (GCC 2018b) Planning Priority W1 Planning for a city supported by infrastructure, the objectives of which are to:

- foster infrastructure that supports the three cities;
- align infrastructure with forecast growth;
- adapt infrastructure to meet future needs; and
- optimise infrastructure use.

#### **2.2.2 Western Sydney Aerotropolis Precinct Plan**

Since the Federal Government's announcement of the Western Sydney Airport in 2014, the Government's vision of the land surrounding the airport has been detailed in a number of plans, policies and environmental planning instruments (EPIs). The most recent plan for the Aerotropolis is the Western Sydney Aerotropolis Precinct Plan (DPE 2022a) (the Aerotropolis Plan), which was published in March 2022 to support the provisions of the State Environmental Planning Policy (Western Sydney Aerotropolis) 2020 (WSA SEPP). The WSA SEPP, however, has since been consolidated into the State Environmental Planning Policy (Precincts – Western Parkland City) 2021 (Western Parkland City SEPP), as part of the government's wider suite of reforms to deliver a better planning system for NSW (DPE 2022b). The WSA SEPP has been consolidated into Chapter 4 'Western Sydney Aerotropolis' of the Western Parkland City SEPP. However, DPE is still in the process of adding all maps within the consolidated SEPPs to the NSW Planning Portal and Spatial Viewer and thus previous maps will remain and retain their current titles (DPE 2022b).

The project falls within the land application boundaries of the precinct that the Aerotropolis Plan applies to, and is subject to the land use provisions under the Western Parkland City SEPP (refer to Section 3.4).



The project is crucial in supporting the development and servicing of the new growth area, which the State Government plans to transform into the following key precincts shown in the land use figure (Figure 2-1):

- the Western Sydney Airport (Nancy Bird Walton);
- the Aerotropolis Core Precinct;
- the Agribusiness Precinct;
- the Northern Gateway Precinct; and
- Badgerys Creek Precinct.

The project aligns with a number of objectives outlined in the Aerotropolis Plan under the 'Infrastructure and development staging: infrastructure delivery' theme:

- Ensure utilities and services are planned and delivered to meet demand from development (objective IO2).
- Deliver utilities, roads infrastructure and services in a manner that is safe, efficient and cost effective (objective IO4).
- Ensure utilities design and locations consider space for alternative future services and allow for multi-utility corridors in the future (objective IO6).

Furthermore, construction stages of this project (Stage 4 – Stage 7) all fall within 'first priority' or 'second priority' areas of the precincts defined in the Aerotropolis Plan (see Figure 2-2). 'First priority' areas align with the first stages of transport and utilities infrastructure delivery and are intended to be the initial stages of development, in line with working towards achieving the employment and population targets of the Aerotropolis Plan (DPE 2022).

Objectives of the 'Development sequencing' theme set out in the Aerotropolis Plan, which the project aligns with, are outlined below:

- Ensure that development proceeds in an orderly and efficient sequence, aligned with the efficient delivery of infrastructure (objective DS01).
- To enable the rate of development to keep pace with demand for jobs, housing and services within the Aerotropolis (objective DS02).
- To align the sequence of development with the Aerotropolis with the following criteria (objective DS03):
  - a) efficient infrastructure utility investment extending from existing infrastructure

Thus, the project is crucial in servicing new infrastructure and development in the Western Sydney Growth Area, and in particular, associated with the area surrounding the Aerotropolis. The growth of the entire area is dependent on the delivery of safe, efficient and cost-effective utilities, which EE is committed to providing in line with State Government plans, policies and targets.

It is worthy of note that Western Sydney Aerotropolis Plan includes measures to be protective of Cosgrove Creek (objectives O4, O5 and O6). Cosgrove Creek will be under bored as part of this project which is a construction measure that will be protective of the natural ecology and water quality of the waterway.

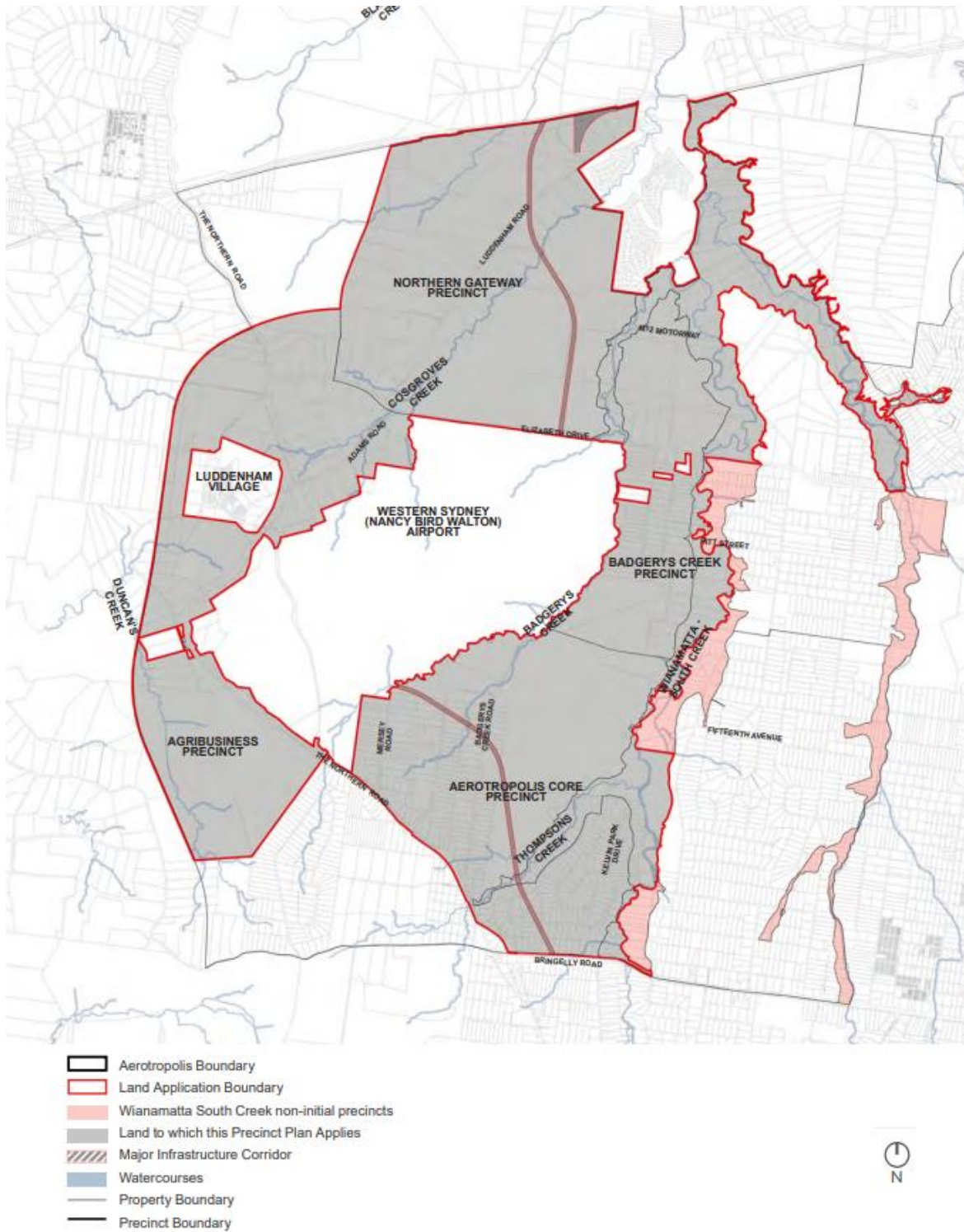


Figure 2-1 Land Application Map (Source: the Aerotropolis Plan DPE 2022a)

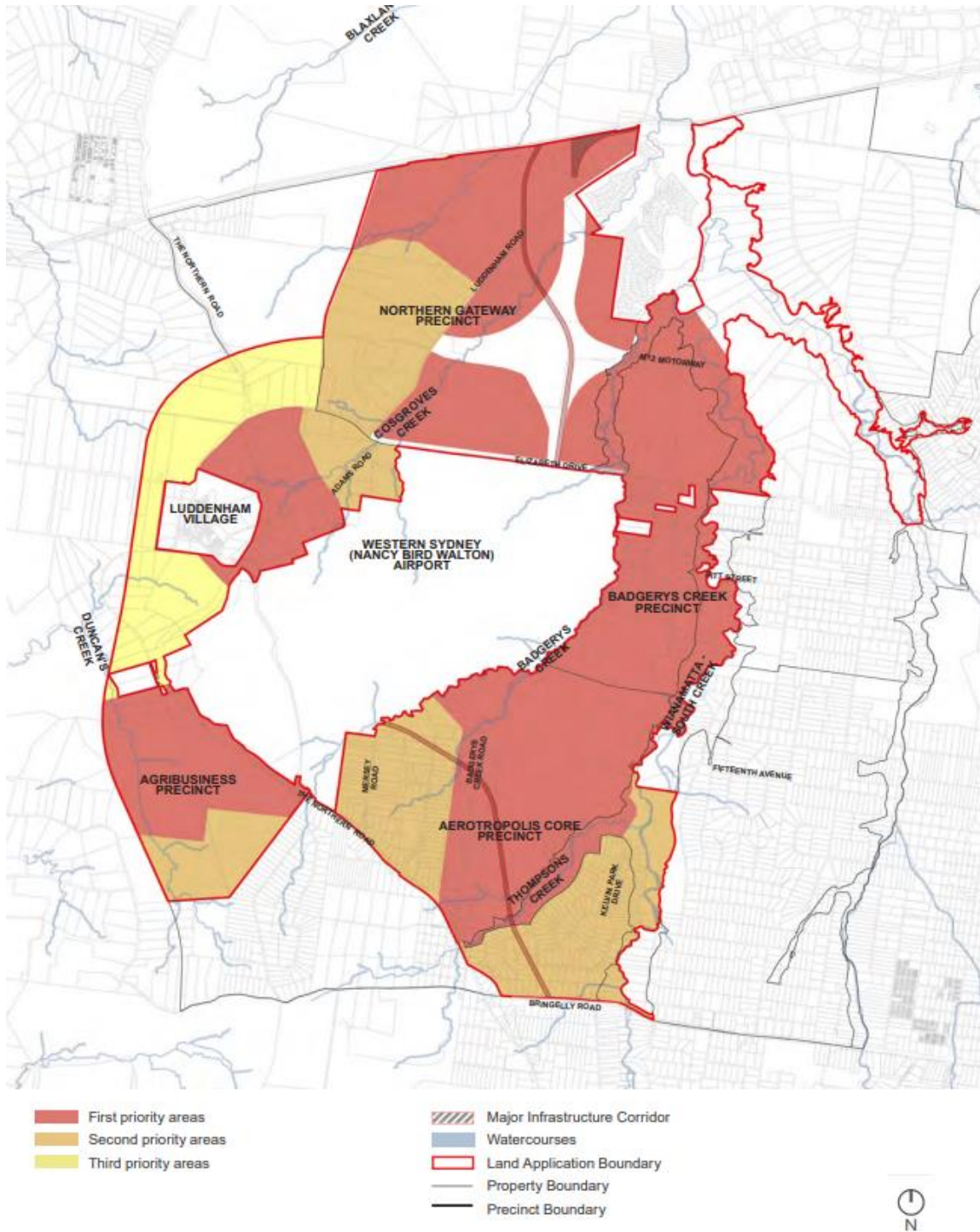


Figure 2-2 Priority areas - development sequencing (Source: the Aerotropolis Plan DPE 2022a)

### **2.3 Project need**

The project is needed to continue to meet increasing electricity demand from critical infrastructure associated with the Western Sydney Growth Area. The Western Sydney Growth Area in Sydney's south-west will provide greater opportunities for brand new homes, jobs, education, health, services, and infrastructure, including the Western Sydney Airport and the Aerotropolis, and is a priority area for the NSW Government.

The project will ensure that electricity continues to be supplied to households, while increasing capacity to service industrial and commercial development growth within this region of Sydney.

### **2.4 Project objectives**

The key objective of the project is to provide a reliable electricity supply and electrical network growth to the Western Sydney Growth Area, including the Western Sydney Airport and surrounding development of the Aerotropolis.

### **2.5 Project benefits**

Residents, commercial and industrial business operators and their customers will all benefit from safe, efficient and cost-effective and continuous electrical supply within this growth region.

The NSW Government will benefit from achieving its goals of transforming the Western Sydney Growth Area into the purposeful precincts that have been intended and planned out in the Aerotropolis Plan and the Western Parkland City SEPP.



### **3 Legislative framework**

#### **3.1 Overview**

This chapter describes the legislative framework that applies to the project, including the approval pathway under the EP&A Act, and the land use context of the new Western Sydney Growth Area. An overview of the potential approval requirements under relevant Commonwealth and NSW legislation and environmental planning instruments (EPIs) is also provided.

#### **3.2 Approval pathway**

##### **3.2.1 NSW Environmental Planning and Assessment Act 1979**

The EP&A Act and the EP&A Regulation provide the framework for assessing environmental impacts and determining environmental approvals for 'development' and 'activities' in NSW. The EP&A Act also establishes state environmental planning policies (SEPPs) and local environmental plans (LEP) which may include provisions relevant to the project.

Under the EP&A Act, EE is classified as a proponent and a determining authority, in accordance with the provisions of Part 5 of the Act. A project can be assessed by a determining authority under Part 5 of the Act if it:

- may be carried out without a development consent;
- is carried out, or approved, by a determining authority;
- is not a prohibited development.

The project does not require development consent under Part 4 of the EP&A Act (refer to Section 3.2.2) and is not classified as State Significant Infrastructure (SSI) under Part 5.1 of the EP&A Act. Therefore, the project has been assessed under Part 5 of the EP&A Act.

This REF has been prepared to determine if the project is likely to have a significant impact on the environment and community. Under section 5.7 of the EP&A Act, if a determining authority decides an activity is likely to significantly affect the environment, it must prepare an environmental impact statement. This project is unlikely to have a significant impact on the environment.

Section 171 of the EP&A Regulation lists factors that must be taken into account when considering the likely impact of an activity on the environment. Table 3-2 includes a consideration of these factors for the project.

##### **3.2.2 Transport and Infrastructure State Environmental Planning Policy 2021**

The aim of the Transport and Infrastructure SEPP is to facilitate the effective delivery of transport and infrastructure across NSW.

Section 2.7 of the Transport and Infrastructure SEPP provides that the SEPP prevails over all other Environmental Planning Instruments including LEPs and SEPPs except in the case where section 2.7 (2) provides that the following SEPPs override all the requirements of the Transport and Infrastructure SEPP to the extent of any inconsistency:

- clauses 10, 11 and 19 of the State Environmental Planning Policy (Coastal Management) 2018 (Coastal Management SEPP); and
- all of the provisions of State Environmental Planning Policy (State Significant Precincts) 2005 (State Significant Precincts SEPP).

It should be noted that the Coastal Management SEPP does not apply to the project. The State Significant Precincts SEPP sets out the process for the rezoning of State Significant Precincts, which is no longer relevant given that the area of the project has already been rezoned under the WSA SEPP (and the more recent Western Parkland City SEPP) (refer Section 3.4). Furthermore, the State Significant Precincts SEPP has been consolidated into the State Environmental Planning Policy (Precincts- Regional) 2021 (Regional SEPP) (DPE 2022b).

By virtue of an ANO's status under the Transport and Infrastructure SEPP, certain activities will be subject to Division 5, Subdivision 1 'Electricity Transmission or Distribution Networks' for the purposes of development connected with electricity transmission or distribution. Under section 2.44 development permitted without consent:

- 1) Development for the purpose of an electricity transmission or distribution network may be carried out by or on behalf of an electricity supply authority or public authority without consent on any land..." excluding land reserved under the National Parks and Wildlife Act.

The Transport and Infrastructure SEPP's definition of an "electricity transmission or distribution network", as per section 2.34 of the SEPP, includes the following components:

- a) above or below ground electricity transmission or distribution lines (and related bridges, cables, conductors, conduits, poles, towers, trenches, tunnels, access structures, access tracks and ventilation structures) and telecommunication facilities that are related to the functioning of the network,
- b) above or below ground electricity kiosks or electricity substations, feeder pillars or transformer housing, substation yards or substation buildings,
- c) systems for electricity storage associated with component specified in paragraphs (a) and (b).

Given that the project can be classified as an 'activity' under Part 5 of the EP&A Act, EE therefore will not be required to submit a development application to the NSW Department of Planning and Environment (DPE) or Liverpool City Council (LCC) and Penrith City Council (PCC). However, LCC and PCC will be notified of the intention to carry out the proposed works and EE will consider any response received from the Councils.

### **3.2.3 NSW Code of Practice for Authorised Network Operators**

#### **3.2.3.1 Determining authority**

The Code is the approved Code under section 201 of the EP&A Regulation. The NSW Government has leased part of NSW's transmission and distribution network to privately managed network businesses, which are referred to as ANOs by the *Electricity Network Assets (Authorised Transactions) Act 2015* (Authorised Transactions Act). ANOs include TransGrid, Ausgrid and EE.

The NSW Government has prescribed the ANOs as prescribed determining authorities for the purposes of section 5.6 of the EP&A Act and the definition of 'public authority' under section 1.4 of the EP&A Act. This allows an ANO to be a Part 5 determining authority for development for the purposes of an electricity transmission or distribution network.

Therefore, as an ANO, EE can assess and self-determine activities that are not likely to significantly affect the environment and are conducted by or on behalf of EE for the purpose of electricity transmission or distribution.

The Code is deemed to be in force until it is revoked or varied in accordance with the EP&A Regulations.

### 3.2.3.2 Assessment class

The Code requires an ANO to classify its proposal into one of six possible assessment classes. The Code applies to Class 3, 4, 5 and 6 proposals only.

- **Class 3:** requires the preparation of a Summary Environmental Report (SER), which refers to projects which are expected on a reasonable basis to be minor and neither extensive nor complex.
- **Class 4:** requires the preparation of an REF and refers to projects which are expected on a reasonable basis to have impacts which go beyond minor, can be extensive and/or complex and at the discretion of the ANO be a project for which it is deemed appropriate to prepare, such as a project which may generate considerable public interest.
- **Class 5:** refers to projects as defined in Class 4, but also require the preparation of a Species Impact Statement (SIS).
- **Class 6:** refers to projects which are “likely to significantly affect the environment” and therefore an EIS is required.

The construction impacts of the project will be confined to the feeder route shown in Appendix A which will be within the road reserve where possible. Some impacts in areas of archaeological and biodiversity interest are not considered to be of such duration and severity that they would be considered significant (as discussed below). As such works are considered minor in nature.

Once construction is complete, work areas will be restored. The proposed work is not likely to significantly affect the environment, including critical habitat, threatened species populations or ecological communities or their habitats, therefore an EIS is not required.

In view of the above, the project is being assessed as a Class 4 proposal under the Code.

### 3.2.3.3 Assessment requirements

Section 2.4.3 of the Code specifies the requirements that must be included and addressed in an REF for a Class 4 proposal. The table below specifies the outlined assessment requirements and where they have been addressed in this REF.

**Table 3-1 REF requirements specified in the NSW Code for Authorised Network Operators**

Requirement	Summarised description	Addressed
The proposed activity	• Clear description of the activity that is proposed, including the nature, the purpose and the sites where it will take place.	Chapter 7 Proposed works
	• Sufficient detail about the proposed activity to demonstrate potential impact on the environment.	Chapter 7 Proposed works  Chapter 9 Environmental assessment and mitigation

REF- Construction of 132kV Aerotropolis Feeder from Orchard Hills to Luddenham (Stages 4-7)

Requirement	Summarised description	Addressed
	<ul style="list-style-type: none"> <li>Discuss viable alternatives and any mitigation measures to be implemented.</li> </ul>	Chapter 5 Consideration of alternatives
Certification	<ul style="list-style-type: none"> <li>Statement signed and dated by the person with principal responsibility for preparing the REF (being an employee or agent of the ANO), as per the requirement specified on page 22 of the Code.</li> </ul>	Front page of this REF
The proponent, determining authorities and any required approvals	<ul style="list-style-type: none"> <li>Identify the proponent and all determining authorities and required approvals for the activity.</li> </ul>	<p>Section 1.3</p> <p>Section 3.2.33.2.3.1 NSW Code of Practice for Authorised Network Operators, Determining authority</p>
The environment of the activity	<ul style="list-style-type: none"> <li>A description of the environment of the site and the surrounding area, with a focus on the aspects of the environment that are of particularly high value, sensitive to impacts of the type the activity will have, or of importance to the community.</li> </ul>	<p>Section 3.3 Commonwealth Environment Protection and Biodiversity Conservation Act 1999</p> <p>Chapter 6 Existing environment</p> <p>Section 9.4 Biodiversity</p>
	<ul style="list-style-type: none"> <li>The REF must identify and describe Threatened Species Populations and Ecological Communities that are likely to occur in the area affected by the activity.</li> </ul>	Section 9.4 Biodiversity
The impacts of the activity	<ul style="list-style-type: none"> <li>The likely environmental impacts for all phases of the activity and describe their extent, size, scope, intensity and duration.</li> </ul>	Chapter 9 Environmental assessment and mitigation
	<ul style="list-style-type: none"> <li>As a minimum, the REF should document consideration of each of the factors listed in clause 228(2) of the EP&amp;A Regulation and the document consideration of each of the factors listed in section 5A of the EP&amp;A Act in relation to Threatened Species, Populations and Ecological Communities (including fish and marine vegetation), and their Habitats.</li> </ul>	3.5 NSW Environmental Planning and Assessment Regulation 2021
	<ul style="list-style-type: none"> <li>List the sources and data the ANO relied on when preparing the REF.</li> </ul>	References (see end of RFI)



Requirement	Summarised description	Addressed
Mitigating measures that will apply to the activity	<ul style="list-style-type: none"> <li>An ANO may conclude that the activity should be modified or adapted so that certain measures designed to mitigate the environmental impacts of the activity are observed. These mitigating measures should be documented.</li> </ul>	<p>Chapter 8 Environmental Management</p> <p>Chapter 9 Impact assessment and mitigation</p>
Summary of impacts	<ul style="list-style-type: none"> <li>Include a section that summarises the individual impacts of the activity and provides an overarching view of the impacts of the activity on the environment.</li> </ul>	Chapter 10 Conclusion and recommendations
Consultation	<ul style="list-style-type: none"> <li>Record the consultation undertaken for the purposes of preparing the REF in accordance with Section 2.3.7 of the Code.</li> </ul>	Chapter 4 consultation
Conclusions regarding an EIS and/or a SIS	<ul style="list-style-type: none"> <li>The REF should describe:                             <ol style="list-style-type: none"> <li>Whether the activity is likely to significantly affect the environment, in which case an EIS is required; and</li> <li>Whether the activity is likely to significantly affect Threatened Species, Populations, Ecological Communities or their Habitats, in which case a SIS is required.</li> </ol> </li> <li>Describe the reasons for these conclusions, referencing the more detailed assessments in the body of the REF for support.</li> </ul>	<p>Section 3.2.2 Transport and Infrastructure State Environmental Planning Policy 2021</p> <p>Section 9.4 Biodiversity</p> <p>Chapter 10 Conclusion and recommendations</p>
	<ul style="list-style-type: none"> <li>In instances where the REF has been prepared by a third party it is important to note that irrespective of the conclusion of the REF, an ANO is ultimately responsible for deciding whether a proposed activity is likely to significantly affect the environment.</li> </ul>	Chapter 10 Conclusion and recommendations

### 3.3 Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

#### 3.3.1 EPBC Act requirements

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) outlines the Commonwealth Government's role in regards to environmental assessment, biodiversity conservation, the management of protected species, populations and communities and heritage items.

The EPBC Act lists nine matters of national environmental significance (MNES) which must be considered when assessing the impacts of a proposal, including:

- world heritage properties;
- national heritage places;
- Ramsar wetlands of international importance;
- nationally threatened species and ecological communities;
- migratory species;
- Commonwealth marine areas;
- the Great Barrier Reef Marine Park;
- nuclear actions (including uranium mining); and
- a water resource, in relation to coal seam gas development and large coal mining development.

If an action will or is likely to have a significant impact on any of the matters of MNES, it is deemed to be a controlled action and requires approval from the Minister for the Environment and Energy or the Minister's delegate.

### 3.3.2 Assessment against the EPBC Act

A search of the Commonwealth Protected Matters Search Tool (PMST) has been undertaken on 16 June 2022.

The search results indicate that there are no world heritage properties or national heritage places within the vicinity of the site. This finding is supported by the PMST search undertaken by the heritage consultant for the project, who has also concluded that there are no items within or in the immediate vicinity of the project listed on the World Heritage List (WHL), National Heritage List (NHL) or Commonwealth Heritage List (CHL) (Artefact 2022b).

The closest MNES identified are:

- Orchard Hills Cumberland Plain Woodland (Place ID 105317), a Commonwealth Heritage Place located approximately 2 km north-west from Stage 6 of the project;
- Prospect Nature Reserve (Protected Area ID NSW\_N0938), a Terrestrial Protected Area located approximately 10 km north-west from Stage 6 of the project; and
- Kemps Creek Nature Reserve (Protected Area ID NSW\_N0863), a Terrestrial Protected Area located approximately 8 km south-west from Stage 5 of the project.

A PMST search undertaken on 9 June 2022 identified 20 listed threatened flora species recorded from within a 10 km radius of the study area, and 4 threatened fauna species recorded within the same radius. The ecological assessment detailed in Section 9.4 further discusses the PMST search results and concluded that:

- a formal Assessment of Significance needs to be completed in relation to *Grevillea juniperina* subsp. *juniperina*. The Assessment of Significance was completed as part of Chapter 7 of the ecological assessment and concluded that the project is not likely to lead to the local extinction of this flora species; and

- there is no need to provide a Species Impact Statement or a Biodiversity Development Assessment Report (BDAR) for the project.

Thus, it has been concluded that the project will not have a significant impact on any matters of MNES. Accordingly, approval from the Commonwealth is not required under the EPBC Act.

### **3.4 Land use and permissibility**

Section 1.9 of the Liverpool Local Environmental Plan 2008 (Liverpool LEP) and the Penrith Local Environmental Plan 2010 (Penrith LEP) stipulates:

- (1) This Plan is subject to the provisions of any State environmental planning policy that prevails over this Plan as provided by section 3.28 of the Act.

Given that the NSW Government issued the Western Parkland City SEPP in 2020, Part 2 of which outlines the permissibility in relation to land use zones in and surrounding the Aerotropolis, the Liverpool LEP and Penrith LEP no longer take precedence in terms of land use planning along the project route.

The Aerotropolis plan includes a land use plan that shows the land use zoning to which the Western Parkland City SEPP applies (Figure 3-2) including the area of the project route. It is important to note that this zoning map has more detail than the land use zoning map provided in the NSW Government's Planning Portal and Spatial Viewer (the Planning Portal), however it is helpful in showing precinct, road and local creek labels. It shows that

The Aerotropolis plan includes a land use plan that shows the land use zoning to which the WSA SEPP applies including the area of the project route. It shows that:

- Adams Road is surrounded by a mix of Open Space/ Stormwater Land, Environment and Recreation and Agribusiness zoning.
- Elizabeth Drive and Luddenham Road are both labelled as Primary arterial roads, given that they are State roads.
- Patons Lane is not marked on the figure, although it seems to be situated within the Specialised centre mixed use zone.
- Luddenham Road is set among Enterprise and light industry, Outer Sydney Orbital, Open Space/ Stormwater Land and Environment and Recreation, and Specialised centre mixed use.

The Planning Portal land zoning map for the area shows a mix of SP2 Infrastructure (Western Sydney Airport), ENT – Enterprise (wider area surrounding Luddenham Road), AGB – Agribusiness, MU – Mixed use and EN2 Environment and recreation (in the process of being changed to C2 Conservation) (refer Figure3-2).

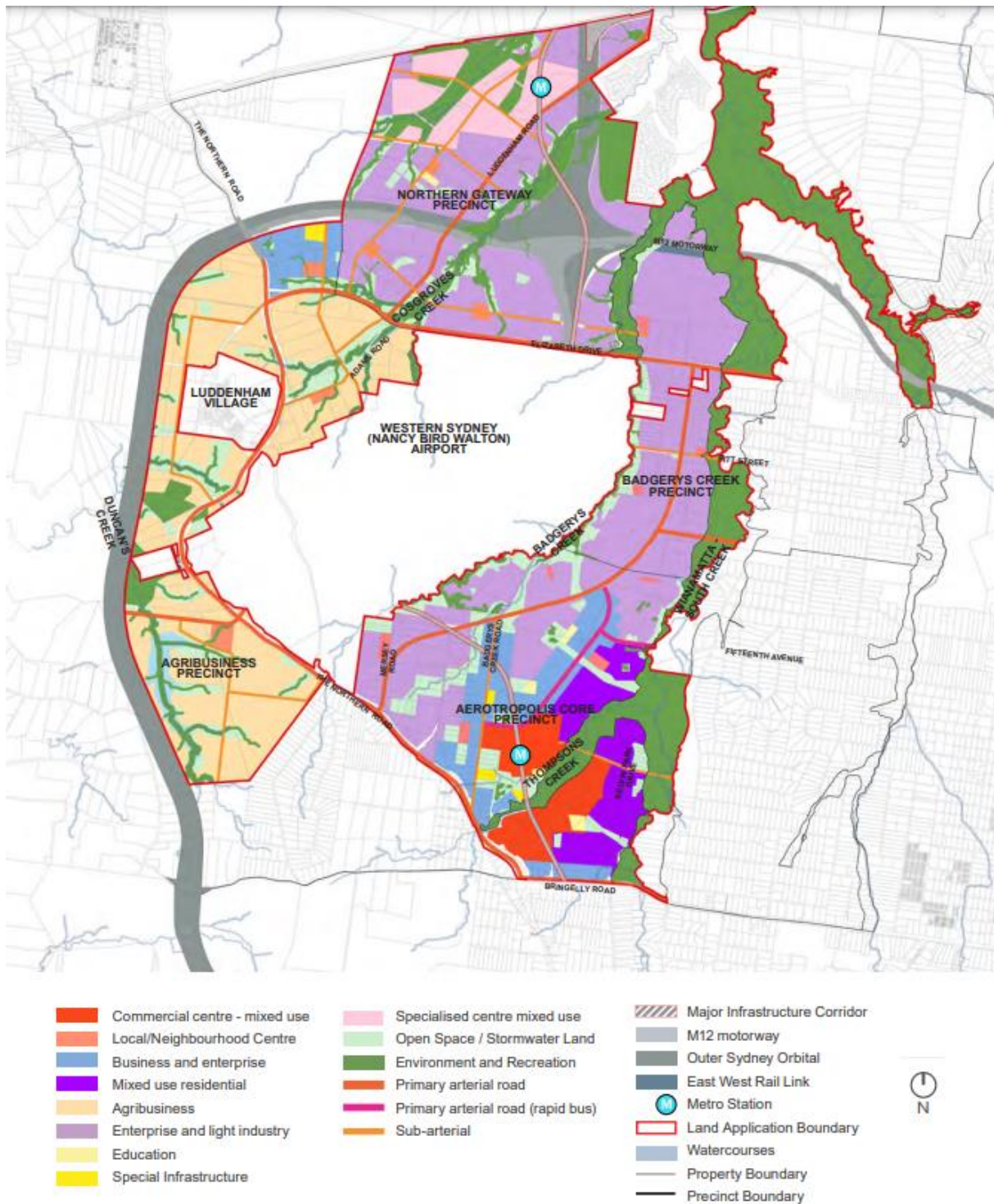
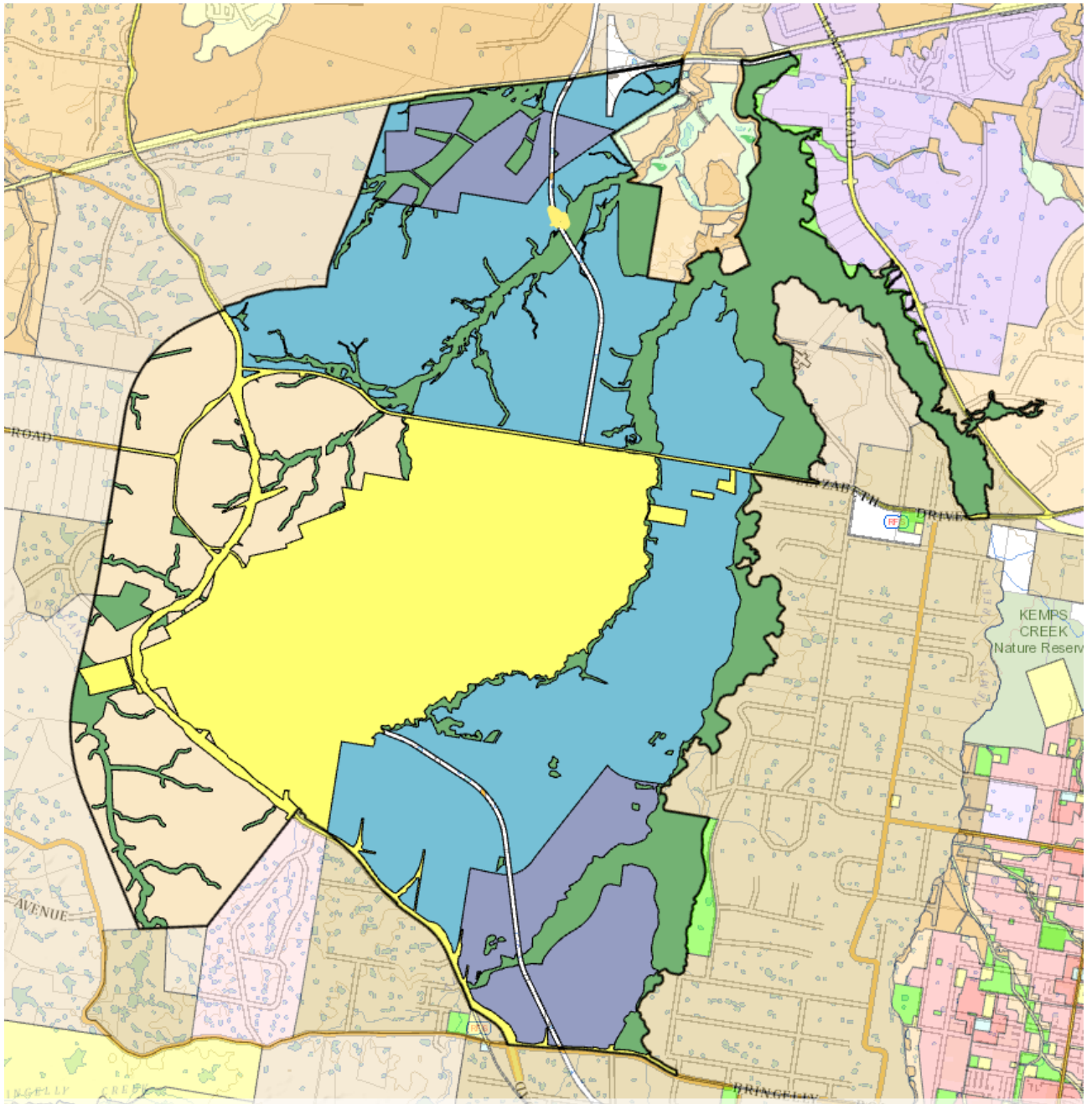


Figure 3-1 Land use and structure plan (Source: the Aerotropolis Plan DPE 2022a)





Note: zoning colours - SP2- yellow, AGB- light orange/apricot colour, ENT- blue, EN2/C2 – green, MU- purple.

**Figure 3-2 Land zoning map for the Western Sydney Aerotropolis (Source: Planning Portal, DPE 2022)**

### 3.5 NSW Environment and Planning Assessment Regulation 2021

**Table 3-2 Section 171(2) Review of environmental factors – the Act, s 5.10(a)**

Clause	Response
(a) the environmental impact on the community	<p>The construction of the project will have temporary impacts on road usage and surrounding residents along the feeder installation route. For example, parts of roads may be obstructed temporarily, or residents may experience elevated noise and visual impacts.</p> <p>It is important to note that any impacts will be short-lived.</p> <p>Should there be any planned electricity outages, relevant residents, commercial and industrial premises will be notified.</p> <p>Furthermore, notification will be provided to affected residents prior to any planned construction works. Construction will be managed in accordance with the recommendations contained in this REF to minimise impacts on affected residents as much as possible.</p>
(b) the transformation of the locality	<p>Once the construction works have been completed, all areas under construction will be rehabilitated and thus the visual amenity of the area will remain unchanged. However, the entire Aerotropolis and surrounding area (precincts) are currently undergoing a transformation. Thus, even though the project may not directly contribute to the transformation, the locality will be transformed by other developments in the area.</p>
(c) the environmental impact on the ecosystems of the locality,	<p>The local ecosystems are not expected to experience any significant impacts, as per the conclusions from the ecological impact assessment summarised in Section 9.4 Biodiversity</p>
(d) reduction of the aesthetic, recreational, scientific or other environmental quality or value of the locality,	<p>The project will be constructed in such a way that it will not reduce the future environmental quality or value for the area. Moreover, it will provide a reliable electricity supply and meet the future electricity requirements of the Aerotropolis and the surrounding area.</p>
(e) the effects on any locality, place or building that has—	<p>Potential impacts to Aboriginal and historic heritage are addressed in Sections 9.2 and 9.3 respectively. No major impacts are expected.</p>
(i) aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance, or	
(ii) other special value for present or future generations,	

**Table 3-2 Section 171(2) Review of environmental factors – the Act, s 5.10(a)**

Clause	Response
(f) the impact on the habitat of protected animals, within the meaning of the Biodiversity Conservation Act 2016,	Potential impacts to biodiversity are addressed in Section 9.4 Biodiversity. Impacts are not expected.
(g) the endangering of a species of animal, plant or other form of life, whether living on land, in water or in the air,	Refer to (f).
(h) long-term effects on the environment,	No long-term negative effects on the environment are expected as a result of project construction. The project is necessary to service the Aerotropolis and other new infrastructure and development in the Western Sydney Growth Area.
(i) degradation of the quality of the environment,	Refer to (h).
(j) risk to the safety of the environment,	<p>Project components will be designed and constructed such that it will comply with all relevant Australian and EE Standards and in accordance with legislative and regulatory requirements.</p> <p>Any potential risks to the environment from construction of the project will be managed and mitigated in accordance with the mitigation measures outlined in this REF, as well as any approval(s) issued for the project.</p>
(k) reduction in the range of beneficial uses of the environment,	The project will not have any long-term impacts that will reduce the beneficial uses of the surrounding environment.
(l) pollution of the environment,	Appropriate pollution controls including erosion and sediment pollution control measures will be in place to prevent pollution occurring during the construction of the project. Any potential risks of pollution from construction works or operation of the project will be mitigated by the works being implemented in accordance with the various requirements of this REF and EE Environmental Management standards.
(m) environmental problems associated with the disposal of waste,	All wastes associated with the project construction and operation will be disposed of at an approved facility and in accordance with EE Environmental Management Standard EMS 0007 Waste Management.

**Table 3-2 Section 171(2) Review of environmental factors – the Act, s 5.10(a)**

Clause	Response
(n) increased demands on natural or other resources that are, or are likely to become, in short supply,	There will be no demand on resources that are in short supply. All of the materials required for the construction of the project All of the materials required for construction of the project are readily commercially available and considered to be generally in supply.
(o) the cumulative environmental effect with other existing or likely future activities,	As noted in Section 9.15, the entire precinct surrounding the project is currently in the process of being transformed, and thus there are roadworks and other developments in the process of being undertaken. These may at some stage contribute to cumulative impacts, in terms of traffic volumes or noise, however the works are largely staged based on priority.
(p) the impact on coastal processes and coastal hazards, including those under projected climate change conditions,	The project is not located in a coastal environment.
(q) applicable local strategic planning statements, regional strategic plans or district strategic plans made under the Act, Division 3.1,	Refer to Chapter 2 Strategic context and Chapter 3 Legislative framework.
(r) other relevant environmental factors.	Refer to Chapter 9 Environmental assessment and mitigation.

### 3.6 Other legislative requirements

#### 3.6.1 NSW *Electricity Supply Act 1995*

The NSW *Electricity Supply Act 1995* (ES Act) defines EE's licencing requirements and provides a framework for the development and maintenance of electrical infrastructure. In summary, it allows EE to trim and remove trees, carry out works on public roads and acquire land. The ES Act also requires that works (other than routine repairs or maintenance works) must not be undertaken unless a minimum of 40 days' notice is supplied to the relevant local council. Any submission received must be considered by EE.

#### 3.6.2 NSW *Protection of the Environment Operations Act 1997*

The NSW *Protection of the Environment Operations Act 1997* (POEO Act) provides a framework for the licensing of certain activities and is administered by the DPE (formerly Office of the Environment and Heritage (OEH)). Under the POEO Act, the construction and operation of the project must be conducted in such a manner so as:

- not to pollute the environment;
- any waste generated must be classified, handled, transported and disposed appropriately; and



- environmental incidents involving actual or potential harm to human health or the environment must be reported to OEH.

### 3.6.3 NSW Biodiversity Conservation Act 2016

In accordance with the NSW *Biodiversity Conservation Act 2016* (BC Act), a number of factors need to be taken into account when making a determination as to whether an action, development or activity is likely to significantly affect threatened species, populations or ecological communities or their habitats. These factors are assessed in the ecological assessment prepared for the project (GES 2022).

The ecological assessment has concluded that the works associated with the project are designed to take place on land which has been cleared and disturbed by past land uses. While some native plant communities may be affected by the proposed trenching works near Luddenham Road (five *Grevillea juniperina* subsp. *juniperina*), significant impact is not likely and a Species Impact Statement (SIS) or a Biodiversity Development Assessment Report (BDAR) is not required.

### 3.6.4 Summary of legislative requirements

**Table 3-3 Other legislative requirements**

Legislation	Authority	Responsibility	Requirement	Comment
NSW <i>Contaminated Land Management Act 1997</i> (CLM Act)	DPE	Project manager/ Project supervisor	Notification – under s60 by a person whose activities have contaminated land or a landowner whose land has been contaminated is required to notify DPE when they become aware of the contamination.	If contamination is discovered the duty to report would be determined.
NSW <i>Electricity Supply Act 1995</i> (ES Act)	Local Council	EE	Notification – under s45, a 40 days' notice is required for proposed electricity works.	Councils will be notified as part of REF notification process.
NSW <i>Heritage Act 1977</i> (Heritage Act)	DPE / Heritage Council	EE/ Project manager	Consideration – under s139 as to whether a permit to excavate or disturb land is required.	No items of non-Aboriginal heritage have been identified on the feeder route. Refer 11.5 heritage and archaeology.

**Table 3-3 Other legislative requirements**

Legislation	Authority	Responsibility	Requirement	Comment
Transport and Infrastructure SEPP	Local Council	EE	Notification – under s13 – 15, 21 days' notice of substantial impact on Council related infrastructure and local heritage works in flood liable land that will change flood patterns other than to a minor extent.	Notified as part of REF notification process.
Transport and Infrastructure SEPP	Local Council	EE	Notification – under s42 of 21 days' notice for works involving new or existing feeders.	Notified as part of REF notification process.
<i>National Greenhouse and Energy Reporting Act 2007</i>	Clean Energy Regulator	EE	Reporting – under s19, a registered corporation is required to report information on energy production, energy consumption, and the amount of greenhouse gas emissions for the facilities under their operational control on an annual basis by 31 October following the financial year for which they are reporting.	Reporting will be undertaken each year by 31 October.
<i>NSW National Parks and Wildlife Act 1979</i>	DPE	Project manager/ Project supervisor	Consideration/ Approval – under s90 to harm or desecrate Aboriginal objects or places.  Determining authority for works on NPWS land.	Aboriginal artefacts have been identified at several locations (refer Section 9.2) for which an Aboriginal Cultural Heritage Assessment is being undertaken and for which an Aboriginal Heritage Impact Permit (AHIP) may be sought.

**Table 3-3 Other legislative requirements**

Legislation	Authority	Responsibility	Requirement	Comment
NSW <i>Protection of the Environment Operations Act 1997</i> (POEO Act)	DPE	Project manager/ Project supervisor	General – under s120 no “dirty water” discharge into stormwater drains.	Refer section 9.5
POEO Waste Regulation	DPE	Project manager/ Project supervisor	General – under section 24 transportation of certain waste must be tracked.	Refer section 9.14
NSW <i>Roads Act 1993</i>	RMS	Project manager / Project supervisor	Approval – under s138 for work on a classified road.	Approval for works on Luddenham Road, Adams Road and Elizabeth Drive will be obtained by the project manager/ project supervisor before commencing any road works.
NSW <i>Rural Fires Act 1997</i>	NSW Rural Fire Service	Project manager/ Project supervisor	Consideration – under s63 public authorities must take all reasonable steps to prevent the occurrence and minimise the spread of bushfires on or from lands vested in or under its control/management.	Refer 9.13
NSW <i>Biodiversity Conservation Act 2016</i> (BC Act)	DPE	EE	Consideration – carry out a test of significance to determine whether the proposal is likely to have a significant impact or not, which requires a species impact statement.	Refer section 9.4

**Table 3-3 Other legislative requirements**

Legislation	Authority	Responsibility	Requirement	Comment
NSW <i>Water Act 1912</i>	Water NSW	Project manager/ Project supervisor	Consideration/ permit – under s113 to extract groundwater via any type of bore, well or excavation	It is not expected that a permit would be required for these works. The extraction of ground water is not part of this project.

## 4 Consultation

### 4.1 Overview

Endeavour Energy have a Stakeholder Engagement Framework that is based on the spectrum of participation developed by IAP2 (the International Association of Public Participation). The principles on which Endeavour Energy's framework is built are, that consultation must be:

- Purposeful
- Timely
- Transparent
- Inclusive
- Responsive
- Best practice
- Collaborative
- Measurable

This is combined into Endeavour Energy's overall framework which is summarised in the figure below.

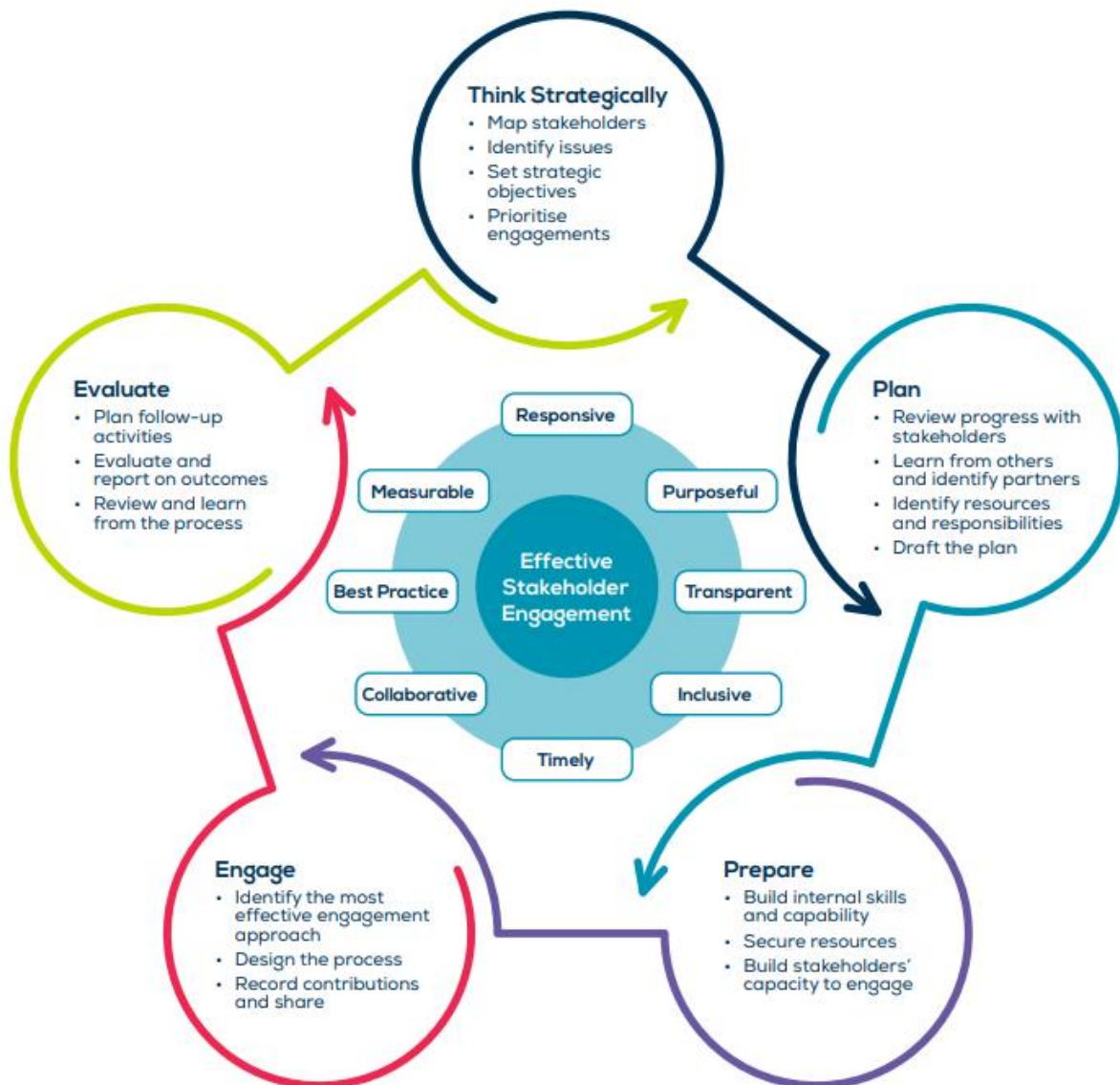


Figure 4-1 Endeavour Energy Stakeholder Engagement Framework

## **4.2 Project specific consultation**

### **4.2.1 Landowner notification and consent**

EE has notified and consulted various parties in relation to the proposed project works. Consultation has been undertaken with the owners of the Twin Creeks Golf Club who own the area which will be required for entry and exit pits for the under bores in that area. Consultation with this landowner is continuing. However, no work to be proceed in private property unless consent from the landowner is gained.

The rest of the alignment is within the road reserve. Should construction planning and detailed under bore design result in direct impacts to a landowners property, Endeavour Energy will immediately engage with them.

### **4.2.2 Council notification and requirements**

In accordance with section 45(4) of the Electricity Supply Act 1995, EE is required to notify Council (in this case Liverpool and Penrith Councils), no less than 40 days prior to the commencement of construction. This allows Councils to provide comment to, or ask questions of, EE on the project and the environmental assessment.

Liverpool and Penrith Councils were notified on 5<sup>th</sup> July 2022. Liverpool Council responded requesting the following actions be observed:

- Obtain Council's Response Plan through Dial Before You Dig (DBYD).
- Avoid any disturbance to Council assets if this cannot be avoided, EE is to apply for a road opening permit.
- If DBYD indicates Environmentally sensitive land, EE is to undertake a Part 5/ REF assessment and submit to Council for review
- EE is to contact Councils customer service and apply for a Road Opening (RO) 138 act permit if these works are to involve excavation of councils assets. This is required for each specified location. If trenching is required, Council requested the use of under boring methods of trenching if possible. If under boring is not possible, EE is to provide reasons as to why this cannot be completed in the permit application.
- EE is to contact Councils customer service and apply for a Road Occupancy (ROC) 138 act permit if any traffic is going to be interfered with.

Penrith Council acknowledged receipt of the notification but no further queries or comments have been received.

### **4.2.3 Notification of nearby landowners**

Endeavour Energy has issued notification to all landowners along the alignment. This consisted of a newsletter with project information and contact information to find out more about the project, to ask questions and to raise any concerns.

Under section 171(4) of the EP&A Regulations 2021 require that all REFs be published on the determining authority's website if above a particular monetary threshold. This project's capital investment value is above that threshold and so, in accordance with the Regulations, will be displayed. As such, if any member of the public has questions or concerns, Endeavour Energy have a connection point via Endeavour Energy's "Your Say" at <https://yoursay.endeavourenergy.com.au/>

In addition, EE will place notifications in local news outlets to ensure people know about the project and have an opportunity to access the REF and provide comments.

### **4.2.4 Future consultation**

The Construction Environmental Management Plan (CEMP) for the project will include site specific control measures as required. In addition, the Project Manager will develop a project specific complaints and grievance handling protocol to be adhered to.

### **4.3 Aboriginal engagement**

An Aboriginal Cultural Heritage Assessment Report (ACHAR) is being undertaken for this project with reference to areas where construction works may not be able to avoid areas of identified archaeological potential. An ACHAR process includes consultation with Registered Aboriginal Parties (RAPs) in accordance with Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW 2010a).

## 5 Consideration of alternatives

A number of alternatives were considered to address the primary objectives of the project. EE's Asset Planning and Performance (APP) division identified the need for network expansion and augmentation to cater for the required demand forecasts of the Western Sydney Aerotropolis Growth Area (WSAGA).

A 132kV transmission electricity supply strategy was proposed by APP, that would interconnect the recently built South Erskine Park zone substation (ZS) in Oakdale West and Bringelly ZS in Bringelly. Two route options were taken forward as outlined below.

Route 1 (shown on Figure 5-1 below as pale blue and magenta) was proposed to commence at the new South Erskine Park ZS in Kemps Creek, then heading south via the new Oakdale West subdivision on to Bakers Lane. From there, the route traversed west via Bakers Lane, crossing Mamre Road and then on to Luddenham Road at Luddenham. From there, the route extended south via Luddenham Road, on to Adams Road and then join the new Northern Road (TNR). The proposal would then traverse south via TNR and connect to Bringelly ZS.

Route 2 (shown on Figure 5-1 below as red and magenta) was proposed to commence at TransGrid's Sydney West Bulk Supply Point (BSP) at Eastern Creek, following the existing 330kV overhead feeder '39' easement to the west, then south through multiple land parcels on to Elizabeth Drive at Luddenham. The route would then traverse east on Elizabeth Drive, then south on to Adams Road and then join the new TNR. Like Route 1, the feeder then traverse south via TNR and connects to Bringelly ZS.

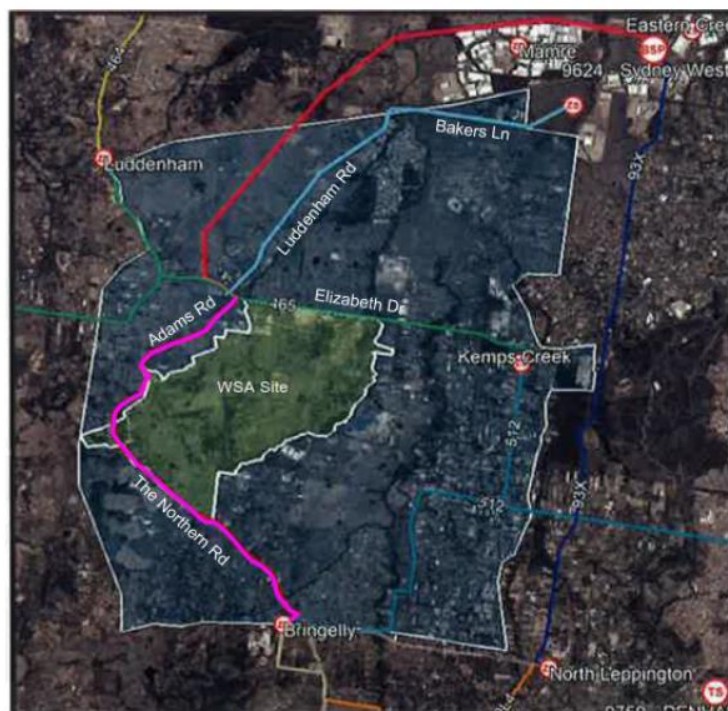


Figure 5-1 Proposed route options

Route 1 was determined as the preferred route. The preferred route was determined by Endeavour Energy following the feeder route options study, and it is in keeping with the essential infrastructure corridors agreed to by the Western Sydney Utilities Collaboration (which includes MOU partners, TransGrid, Transport for NSW and the Department of Planning, Industry & Environment).

The proposed route was short-listed for its existing powerline footprint / corridor, route-length and the presence of an existing public road reserve network.



## 6 Existing environment

### 6.1 General context

The proposed route is within Liverpool and Penrith LGAs in the Greater Western Sydney region of NSW. It is approximately 20 km north-west of the city of Liverpool, 25 km south-west of the city of Parramatta and approximately 43 km south-west of the city of Sydney.

The length of the proposed project route is approximately 10 km along local and State roads. The project route traverses the suburbs of Luddenham, Badgerys Creek and Orchard Hills; and will predominantly traverse within road reserves of the following roads:

- Adams Road, a local Council-managed road, as part of Stage 5 works;
- Elizabeth Drive, a State road, as part of Stage 5 and Stage 7 works;
- Luddenham Road, a local Council-managed road, as part of Stage 4 and Stage 6 works; and
- Patons Lane, a local Council-managed road, as part of Stage 6 works.

The entire project route is dominated by the surrounding rural landscape and gentle undulations. Most of the surrounding rural dwellings are sparsely populated, apart from two areas where they are somewhat denser, including:

- a cluster of residential dwellings either adjacent to, or about 100 – 200 m south-east, of Luddenham Road, approximately 300 – 400 m south of the Warragamba pipelines. This residential cluster is connected to Luddenham Road by the roundabout at the Luddenham Road/ Twin Creeks Drive intersection; and
- a cluster of residential dwellings on either side of Luddenham Road, close to its intersection with Patons Lane.

However, the entire area is transforming given that the construction of the Western Sydney Airport and the Aerotropolis is currently underway, including bulk earthworks and road infrastructure upgrades. The Western Sydney Airport is quickly becoming a dominant land use in the area. Other surrounding land uses include a mix of agricultural, rural industrial and commercial, and rural residential development.

Two Warragamba pipelines intersect with Luddenham Road approximately 1.2 km south of Patons Lane.



**Photograph 6.1** North facing on Luddenham Road at joint bay JB 28



**Photograph 6.2** East facing on Luddenham Road at joint bay JB34 from joint bay JB28



**Photograph 6.3** East facing from Luddenham Road along Warragamba pipeline



**Photograph 6.4** West facing along Elizabeth Drive, west of Western Sydney Airport substation

## **6.2 Physical context**

The project is located within the Sydney Basin and traverses a number of varied geographic formations and landscape profiles, which are further described in Section 9.5.2xxi (Artefact 2022a). The project covers a topography of gently undulating rises over Wianamatta Shale, where local relief is between 10-30 m and slopes are generally 5% in gradient. The topography over Luddenham soils has a relief between 50-120 m and slope gradients between 5-20%, and the topography over south creek soil landscape is a flat to gently sloping alluvial plain of <5% with occasional terraces or levees. Local relief is <10 m.

The project route is located within cleared land. The site inspections undertaken by the heritage and ecology consultants have identified that most of the original natural vegetation has been cleared (Artefact 2022a; GES 2022). Scattered trees and shrubs are present in the surrounding landscape, and close to Luddenham Road. There is a relatively wide strip of riparian vegetation along Cosgroves Creek



and a narrower and more disjointed strip along South Creek, the main drainage lines within the area (GES 2022).

Native trees remaining in the area are characteristic of the open forest and woodland that once used to dominate the area, and include species such as spotted gum, broad-leaved ironbark, woollybutt, forest red gum, narrow-leaved ironbark, grey box and spotted gym. Grasses found in the area include speargrass, bordered panic, kangaroo grass and paddock lovegrass.

### **6.3 Cultural setting**

The area surrounding the project has been subject to agricultural land use for about 200 years, until more recent times when subdivisions have changed the dominant land use in the area (GES 2022).

As previously noted, the area surrounding the project is sparsely populated. The closest densely populated areas are the suburbs of Luddenham and Orchard Hills, which belong to the 'Mulgoa – Luddenham – Orchard Hills region' as categorised by the Australian Bureau of Statistics (ABS 2020). The total estimated resident population of this region is 11 934 persons, spaced over an area of 15,868 hectares (ha). Approximately 1.7 ha of the entire region includes protected land area.

At present, the area has about 1,308 businesses, with 65.7% of the population classified as working age population (aged 15-64 years).

The area has a rich Aboriginal and European history, which is further discussed in Section 9.2 and Section 9.3 respectively.

## 7 Proposed works

### 7.1 Overview

EE is proposing to construct a new approximately 22 km long 132 kV underground transmission feeder route traversing through the suburbs of Bringelly, Luddenham and Orchard Hills of the Greater Western Sydney region in NSW. The project will be constructed over seven stages (Stage 1 – Stage 7), four of which are the subject of this REF (Stage 4 – Stage 7), which combined total a length of approximately 11km.

### 7.2 Description of work

The project will involve installing the majority of the feeder route beneath the road pavement on Luddenham Road, Elizabeth Drive and Adams Road. Two feeder routes will exit the proposed Orchard Hills Switching Station (SS) on Patons Lane, Orchard Hills. The two feeder routes will part at the Warragamba Pipeline under bore, with one continuing south to the proposed Western Sydney Airport (WSA) substation (which is the subject of this REF) and the other traversing east (which will be subject to a separate assessment).

Another feeder will traverse north via Adams Lane, joining the single feeder from Stage 4, and also connecting to the proposed WSA substation. As such, Stage 5 will be a single feed construction until it meets the other single feed coming south via Luddenham Road. These feeders will both traverse Elizabeth Drive then to the WSA substation.

Each of the stages covered by this REF are connected as shown in Figure 7-1 and described in the subsequent sections.



Figure 7-1 Overview of alignment stages

## 7.2.1 Stages of construction

### 7.2.1.1 Stage 4

Stage 4 involves works along Luddenham Road, starting north-east of the Luddenham Road/ Elizabeth Drive intersection, and following Luddenham Road where it connects to Stage 6 (see Section 7.2.1.3 below) at the Warragamba above ground pipeline.

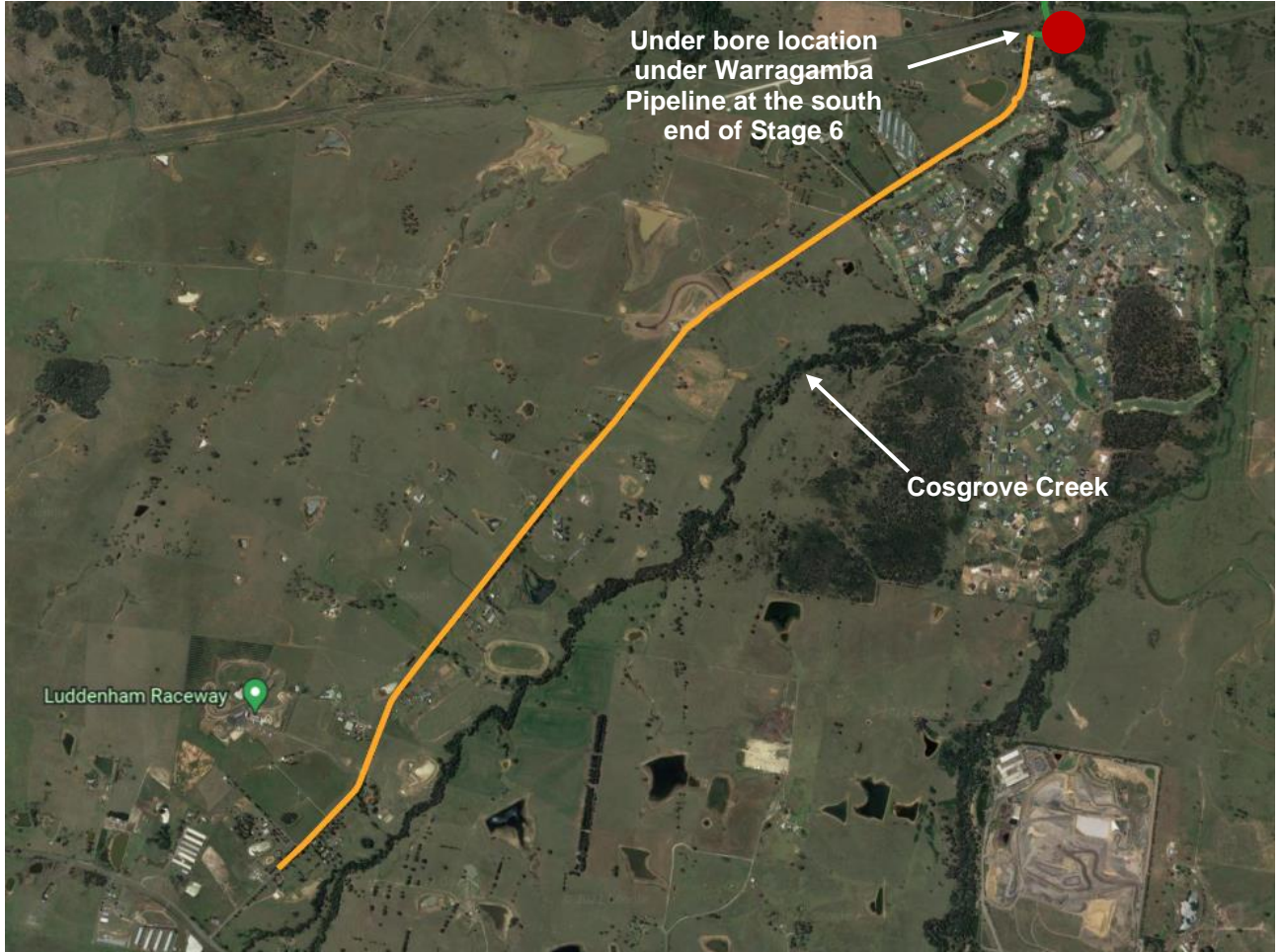


Figure 7-2 Stage 4 alignment

### 7.2.1.2 Stage 5

Stage 5 involves works along a 2.5 km stretch of Adams Road then traversing north-west along Elizabeth Drive for approximately 220m before turning north-east onto Luddenham Road.

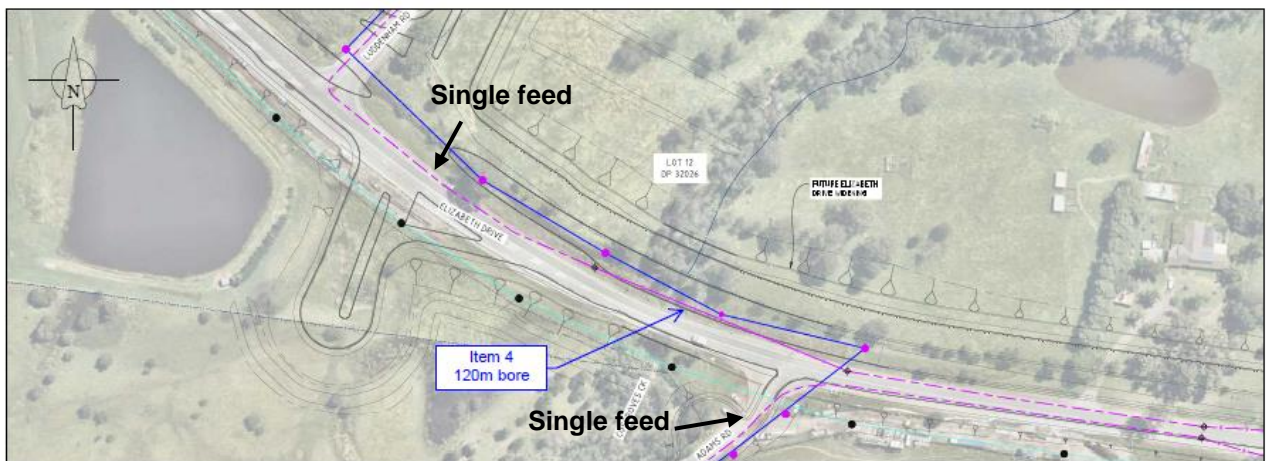




**Figure 7-3 Stage 5 alignment**

There is an under bore in this stage of the alignment, under Cosgroves Creek, as shown in the figure below. This under bore is sequential (although separated by 3-5m) from the Oak Creek under bore which is discussed further below.

In the figure below it can also be seen where a single feeder traverses north from Adams Road to join the single feeder traversing south via Luddenham Road.



**Figure 7-4 Stage 5 under bore at Cosgrove Creek**

### 7.2.1.3 Stage 6

Stage 6 begins at the proposed Orchard Hills Switching Station on Patons Lane where two transmission feeders will traverse Patons Lane to join Luddenham Road. This Switching station is not yet constructed but will be assessed under a separate REF. The works follow Patons Lane then then aligns south to

traverse Luddenham Road. The Warragamba Pipeline traverses east-east across Luddenham Road and so the feeder route will under bore the Warragamba Pipeline from a launch pit on Luddenham Road, as shown on Figure 7-5 below.



**Figure 7-5 Stage 6 alignment**

The under bore in this location will be where the twin feeders split, with one heading east (subject to a separate assessment) and the other heading south along Luddenham Road in what becomes Stage 4 of this project. A close up of the under bore and splitting of the feeders is shown on Figure 7-6 below.



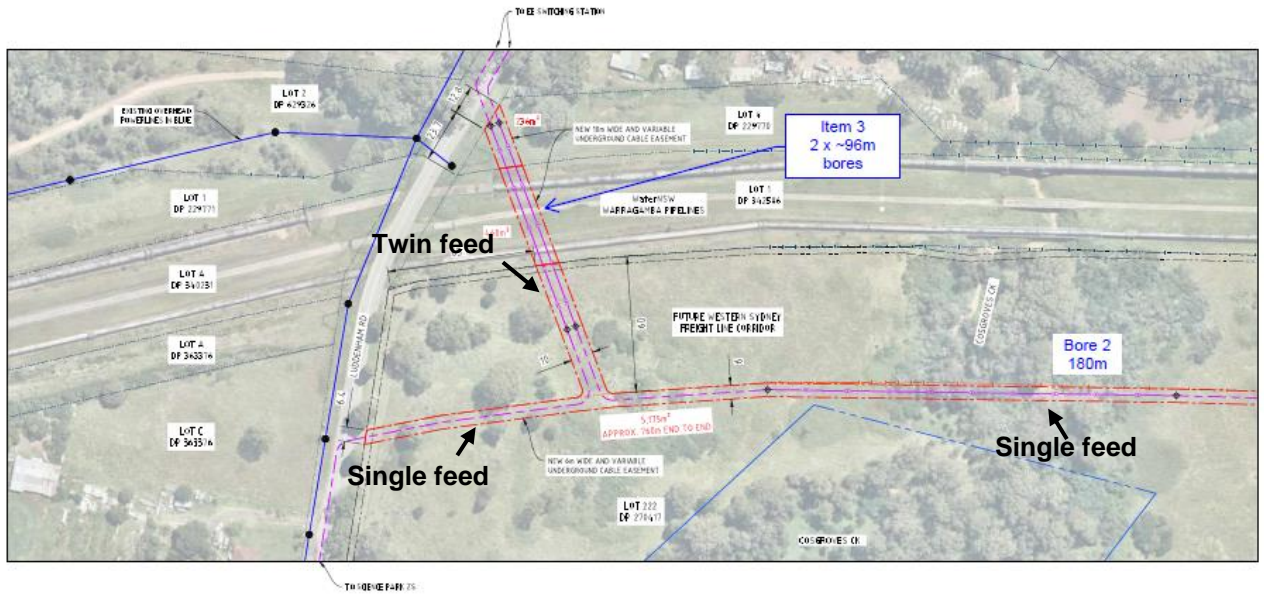


Figure 7-6 Stage 6 under bore at the Warragamba Pipeline

#### 7.2.1.4 Stage 7

Stage 7 involves 1 km of works along Elizabeth Drive. These works include an under bore under Oaky Creek as shown on Figure 7-7 below.

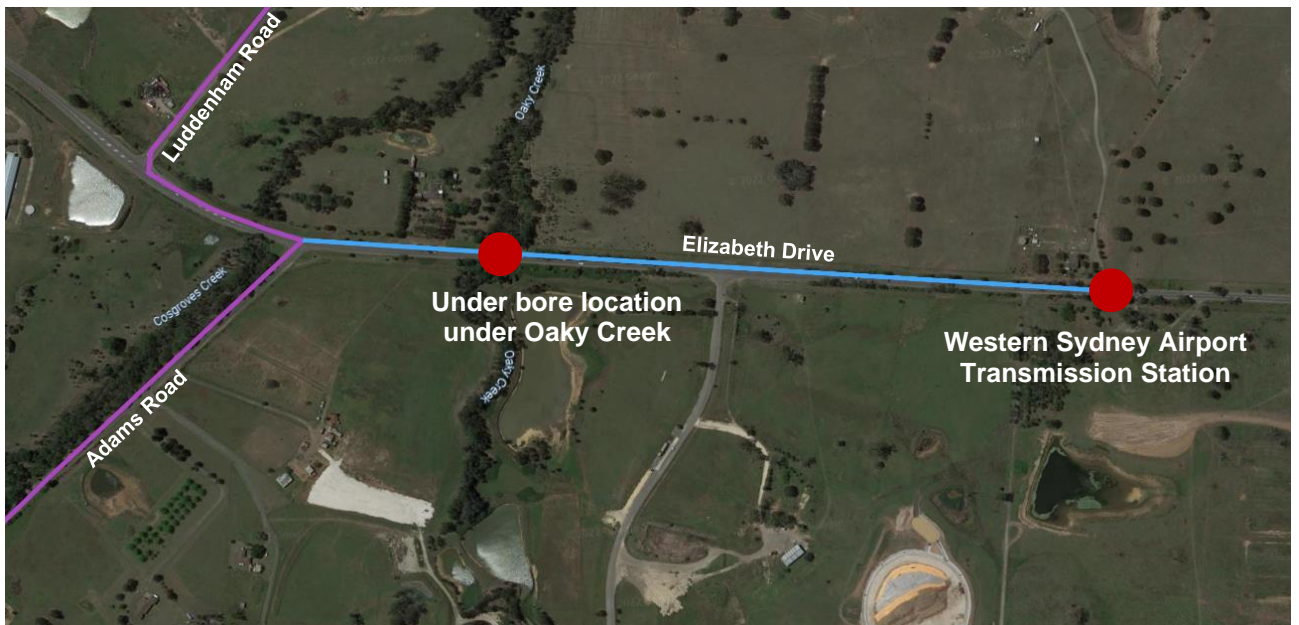


Figure 7-7 Stage 7 alignment

There is an under bore in this stage of the alignment, under Oaky Creek, as shown in the figure below.

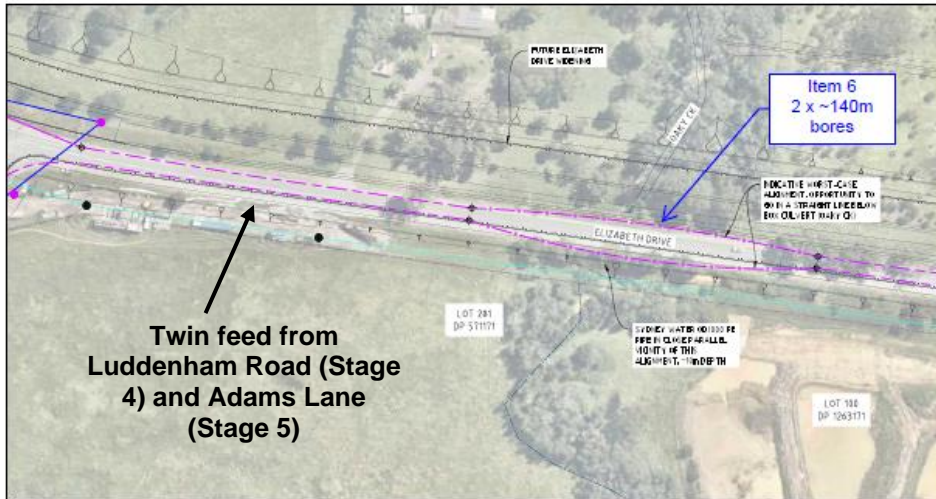


Figure 7-8 Stage 7 under bore at Oaky Creek

### 7.3 Methods to be used

#### 7.3.1 Trenching

Trenching will occur beneath the road pavement and no closer than 0.5 m to the white line markings on either side of the paved road surface, as shown in Figure 7-9 below. This method means that verge and other undisturbed areas can largely be avoided. Construction would occur wholly within the paved road area, with traffic management measures in place. This would consist of one closed lane for construction. Any activities that require additional space are discussed further in sections 7.3.2 and 7.3.3.

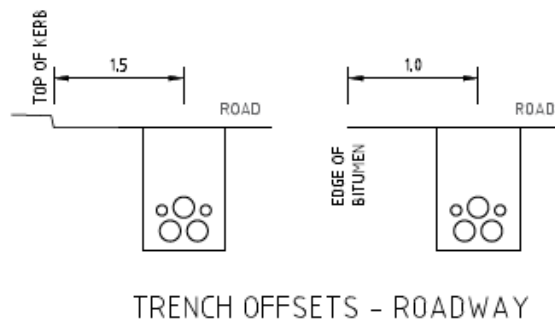


Figure 7-9 Typical trench offsets within a roadway

Typically, trenches are 0.9m wide and approximately 1.3 m deep. To achieve this construction, a 5m wide construction spread is required along the length of the trenching activities. A cross section of a typical trench is shown in Figure 7-10 below. The trench is excavated and the concrete conduits placed in a bed of 14:1 sand mix. The rest of the excavated trench is filled with road base or river sand.

This means that approximately 26,000m<sup>3</sup> of fill material is removed from site. This is based on 0.9m x 1.3m x 22km of excavated trench. Assuming a 13-tonne end tipper truck with a 33m<sup>3</sup> capacity, this will mean that 788 trucks of material will need to be moved from the 22km-long construction over the course of the excavation works.

Assuming that 14:1 sand mix and a road base or similar top constitutes around 70% of the trench fill (the other 30% of area taken up by the conduits) this will mean that just over 18,000m<sup>3</sup> of material will need to be brought to site. Assuming the same sized truck, this will require approximately 545 trucks of material to be brought to the construction area. The trenching and backfill activities would be undertaken over 6 months and so the removal of waste plus the incoming fill materials would mean 1,333 trucks,

or 2,666 truck movements (ie to site and away again). This averages at 26 trucks/52 truck movements per week.

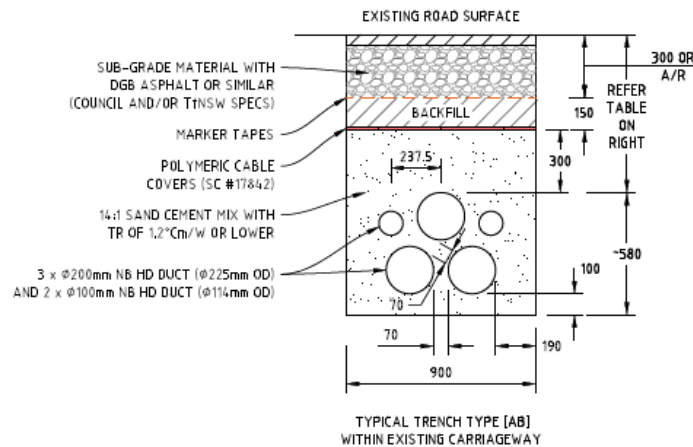


Figure 7-10 Typical cross section of trenched activities for a transmission feeder route

### 7.3.2 Under boring

In three key locations, as noted above, under boring would be required to avoid sensitive areas. In this case, the aboveground Warragamba pipeline in Stage 6, Cosgrove Creek in Stage 5 and Oaky Creek in Stage 7. The depth of under boring can vary dependant on the geology and specific conditions in the area. A typical cross section is shown on Figure 7-11.

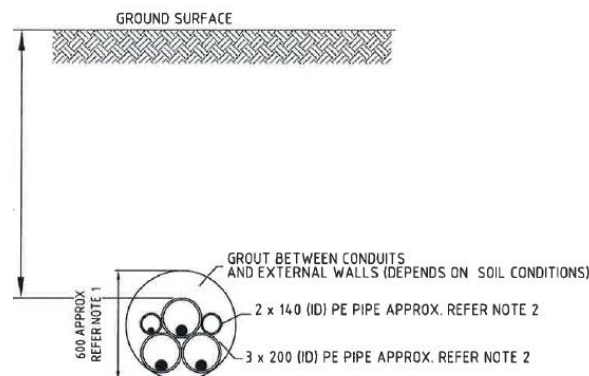


Figure 7-11 Typical cross section of under boring construction

Typically, an under bore operation requires a launch pit and an exit pit on either side of the item being under bored. The size of the launch and exit pits can depend on the context of the immediate locale but typically require 20m x 10m of space to allow the drilling activities to occur.

This means that under boring activities will need additional areas and will not be able to be undertaken wholly within the paved road reserve. For example, for the under bore at the Twin Creeks Golf Club under the Warragamba pipeline, there will be an exit pit in an area of undeveloped land to bring the two feeders from Orchard Hills SS. With 3-5m separation, this area will also then contain an entry pit for the twin feeders to be separated, with one heading east and the other heading west to Luddenham Road (which is the subject of this REF).

Similarly, at the Elizabeth Drive section of the project, the single feeder from Luddenham Road will under bore Cosgroves Creek. Then, with a separation of 3-5m, a second under bore of Oaky Creek will



occur with the feeder from Luddenham Drive, along with the feeder from Adams Lane. This work will require more space than available in the paved road reserve.

This has been taken into account in the technical environmental studies undertaken for this REF.

### 7.3.3 Joint bays

In addition to the trenching and under boring, construction works will involve the formation of joint bays. These are larger pits, which are normally concrete lined and wider than the trenches. Joint bays allow the pulling of the cables through the conduits and provide the space for cable connection and earthing.

Typically, the construction of a joint bay is 3m x 8m and so requires an area of 5m x 10m for construction. As with the under boring, there are some areas where the joint bays will need additional space for construction. As with the under bores, this has been taken into account in the technical environmental studies undertaken for this REF.



Figure 7-12 Joint bay during construction

### 7.4 Timing, duration, hours of work

As noted above, the trenching, conduit laying and back filling is scheduled to commence in September 2022 over approximately 6-months. This will be followed by cable pulling and jointing with the former occurring for approximately another 6 months with the latter completed in 9-10 months from March 2023 to December 2023. Impacted landowners will be notified about proposed construction activities in a timely manner.

In general, trenched construction works progress at approximately 60m per day, with 2 weeks required at each joint bay.

Construction works will be undertaken during standard working hours:

- 7am to 6pm Monday to Friday
- 8am to 1pm on Saturdays
- No works on Sundays or public holidays.

Where there may be a variation to this is at intersections where works need to be completed to avoid disruption to road users. Should this eventuate, the standard EE Out of Works procedure will apply.



Endeavour Energy can construct for two consecutive nights without approval. However, this eventuality would not be undertaken without consultation with nearby residents.

Should any longer than two consecutive nights of out of hours work be required, the construction manager would apply to Endeavour Energy to progress approval for those works.

## **7.5 Equipment and materials required**

The general plant and equipment required for the works include:

- Trenching, conduit laying and backfilling:
  - Excavators
  - Tippers
  - Agitators
  - flatbed trucks
  - bob cat,
  - crew/tool truck
  - vac truck.
- cable pulling at the joint bays:
  - crane
  - winch
  - cable trailers
  - drum stand
  - crew/ tool truck.
- under boring:
  - Excavators
  - tippers
  - agitators
  - flat-bed trucks
  - crane
  - boring machine
  - vac truck.

## **7.6 Workforce and construction laydown areas**

The construction workforce numbers would include:

- Civil construction crew (ie the trenching and backfilling works) of 8-12 people per crew
- Cable installation crew of up to 12 people
- Cable joining crew of up to 8 people.

There may be multiple crews working concurrently.

Construction laydown areas would include where needed, parking for construction works, office areas and ablutions as well as storage areas for raw materials and plant and equipment.

These laydown areas have not been nominated at this point and are expected to be nominated by the construction contractor. Where areas are nominated by the contractor, an environmental assessment (REF or Summary Environmental Report (SER) with a CEMP) of those areas will be required to demonstrate that there would be no environmental impacts and to receive approval from EE. The environmental assessment will be based on a broader area.

## **8 Environmental management**

### **8.1 Environmental management standards**

To ensure that appropriate steps are taken to manage environmental aspects of infrastructure projects, EE has developed a number of Environmental Management Standards.

EE Environmental Management Standard *EMS0001 Environmental Impact Assessment and Environmental Management Plans* (EMS 0001) has the stated purpose of ensuring 'that all works on EE's Network is undertaken in such a manner as to manage any actual or potential environmental impacts. Activities are to be carried out using a due diligence approach, in accordance with industry and other appropriate standards to ensure positive environmental outcomes and compliance with relevant legislation'. A copy of EMS 0001 is available on EE's Standard and EE's Accredited Service Provider (ASP) website.

### **8.2 Environmental management plan**

This REF has identified a number of mitigation and management measures to minimise adverse environmental impacts that could potentially arise from the project. These mitigation and management measures would mostly be implemented during the construction phase of the project.

EE will require the preparation of a site-specific Construction Environmental Management Plan (CEMP) for the proposed construction works, which will provide a clear framework for how these measures will be implemented and who will be responsible for their implementation. The CEMP will be prepared prior to commencement of any construction works, and will be reviewed and certified by the EE Environment Team, prior to the commencement of any on-site works.

The CEMP will be a working document, and will be subject to ongoing updates as required to respond to specific requirements. The CEMP will be developed in accordance with the specifications set out in the EMS 0001.

Furthermore, the construction of the project will be subject to audits by EE to ensure that the works are carried out in an environmentally satisfactory manner. The assessment has not identified any issues that cannot be managed by employment industry 'best practice' environmental management techniques.

### **8.3 Monitoring of impacts**

Environmental monitoring will be undertaken in accordance with environmental mitigation and management measures proposed for each of the environmental aspects assessed as part of this REF.

In addition, in accordance with EMS 0001, environmental inspections for 'Class 4 activities' will be conducted by EE's Sustainability and Environment (S&E) team at the commencement, completion (close out inspection) and periodically during works for activities being carried out in environmentally sensitive areas, or where the activity duration exceeds six months. The frequency of these periodic inspections will be determined at the commencement of the construction phase of the works by the Project Manager or the Environmental Services Manager or the technical specialists that have full knowledge of the environmental impact assessments for this REF.

Environmental monitoring and inspections will be undertaken in accordance with EMS 0001 where any potential non-conformance identified from the inspection will be discussed, recorded and addressed.

## **9 Environmental assessment and mitigation**

### **9.1 Overview**

The following environmental factors were assessed in detail to determine the environmental impacts associated with the project:

- archaeology;
- heritage; and
- biodiversity.

The assessment reports are provided in appendices B, C and D respectively, and summarised in the following sections. Lower risk environmental factors for the project that are required to be considered under Clause 171 of the EP&A Regulation and the Code are also addressed in this section and comprise water, utilities and services, roads, traffic and access, land use, landscape and visual, socio-economic impacts, noise, air quality and dust suppression, safety and hazards, bushfire, waste generation storage, and cumulative impacts.

Prior to the commencement of construction, a construction contractor will develop a CEMP with the approval of the EE Environment Team, which will capture the management and mitigation measures presented in this REF, providing further site-specific detail where appropriate and responsibilities and timing for their implementation.

### **9.2 Aboriginal heritage**

#### **9.2.1 Overview**

An Aboriginal heritage due diligence assessment (AHDDA) for the project was prepared by Artefact Heritage Services (Artefact). Potential impacts on Aboriginal heritage from the project were assessed in accordance with the Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW (due diligence guidelines) (DECCW 2010b). The objectives of the assessment were to:

- identify if registered Aboriginal objects, Aboriginal places or potential Aboriginal archaeological deposits are likely to occur in the areas of the project;
- determine if the project is likely to harm Aboriginal objects, Aboriginal places or potential Aboriginal archaeological deposits (if present); and
- determine if further archaeological investigation is required.

This section provides a summary of the AHDDA which is provided in Appendix B.

#### **9.2.2 Existing environment**

##### **i Aboriginal history of the locality**

Given that the majority of the feeder route will be installed by a combination of trenching and under boring beneath road pavement on Luddenham Road, Elizabeth Drive and Adams Road, the AHDDA is an important component of this REF. The landscape and soils of the project route are described in Section 9.5.

The area studied for the project (ie study area) is located in the traditional lands of the Darug, Dharawal and Gandangara people, whose traditional lands within the region are described in Section 1.4.5 of Appendix B.

The oldest archaeological evidence of Aboriginal activity in the Sydney region is from Cranebrook Terrace, which is located approximately 15 km north-west of the study area. Sediments from an archaeological excavation at this site have been dated to 41,700 years Before Present (BP) (ANU-4016). Interactions with Aboriginal people across Sydney and surrounds are documented from early 1800s, from which point their population declined. Descendants of the Darug, Gandangara and Dharawal groups continue to live across the Cumberland Plain along with Aboriginal people from other areas of NSW.

## ii European history of the locality

Exploration of the area within Western Sydney began soon after first settlement, given that the sandy shallow soils of coastal Sydney were unsuitable for cultivation and it was necessary to find more fertile land. Early residential settlement in Western Sydney, predominantly surrounding Penrith and Parramatta, was driven by agriculture.

The study area was first visited by Europeans in the 1800s. The earliest European land use in the study area was likely to have been associated with timber getting, grazing and pastoralism from the early 19<sup>th</sup> century onwards. Analysis of historical aerial imagery shows that the most of the study area had roads constructed prior to the earliest photographs being taken in the 1930s.

## iii Previous archaeological investigations and research

A number of archaeological assessments took place in locations of similar topography to the study area, across Western Sydney, including the suburbs of Quakers Hill, Oakdale, Horsley Park, and Erskine Park, contributing to an understanding of the locations where artefacts are most likely to be found.

Archaeological investigations across the Cumberland Plain over the past 30 years have been comprehensive, and have concluded that artefact densities are most likely to be greater on terraces and lower slopes within 100 m of freshwater resources. Investigations and predictive models identified that ridgelines and crests located between drainage lines are likely to contain archaeological evidence.

Furthermore, previous documentary and archaeological research indicates that archaeological evidence is likely to be found with certain landforms, largely as a result of the resources that were associated with these landforms. OEH (now DPE) lists five such landforms:

- within 200 m of waters;
- within a sand dune system;
- on a ridge top, ridge line or headland;
- within 200 m below or above a cliff face; and
- within 20 m of or in a cave, rock shelter, or a cave mouth.

## iv Aboriginal Heritage Information System (AHIMS) database search

The Aboriginal Heritage Information System (AHIMS) was searched on 2 and 9 May 2022 for an area of approximately 1000 m (east-west) by 1000 m (north-south) from the study area. The AHIMS search identified a total of 331 sites within approximately 1000 m of the study area.

DPE – Heritage (former OEH) lists 20 standard site features that can be used for each site, the frequency of which is summarised in Table 9.1. The results of the search are shown in Table 9.1 and in Figure 9-1.

**Table 9.1 Frequency of recorded site types**

Site features	Frequency	Percentage
Artefact	304	91.9
Artefact, potential archaeological deposit (PAD)	14	4.2
PAD	8	2.4
Modified tree (scarred or carved)	4	1.2
Grinding groove	1	0.3
<b>Total</b>	<b>331</b>	<b>100</b>

The findings are consistent with previous archaeological investigations within the Cumberland Plain, in that although Aboriginal occupation covered the whole of the landscape the availability of fresh water, and associated resources, was a significant factor in repeated and long-term occupation of specific areas within



the landscape. Certain site types, such as culturally modified trees, are particularly sensitive and can be easily destroyed throughout historical occupation, while others, such as stone artefacts, are more resilient.

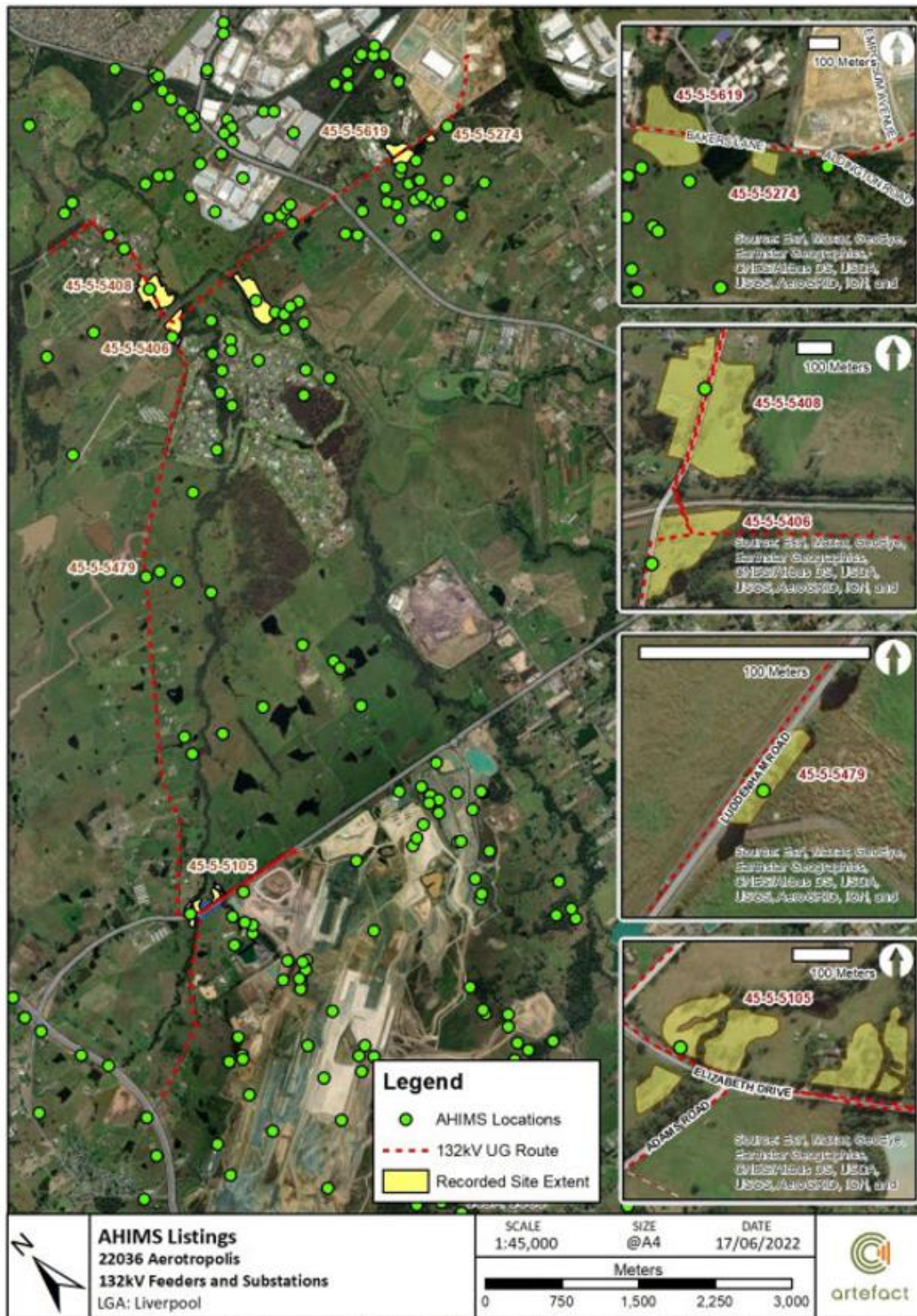


Figure 9-1 Map showing the location of recorded Aboriginal sites from AHIMS search results



**v Aboriginal sites within 100 m of the study area**

The AHIMS searches conducted on 2 and 9 May 2022 identified 10 sites in close proximity to or overlapping with the study area, including:

- AHIMS ID 45-5-5410 Luddenham Rd IF 1;
- AHIMS ID 45-5-5409 Luddenham Road AFT 3;
- AHIMS ID 45-5-5408 Luddenham Road AFT 2;
- AHIMS ID 45-5-5479 Luddenham Road Cosgrove Creek AFT 1;
- AHIMS ID 45-5-5105;
- AHIMS ID 45-5-2762;
- AHIMS ID 45-5-5187 MSP-01;
- AHIMS ID 45-5-5340 MSP-05;
- AHIMS ID 45-5-5341 MSP-06;
- AHIMS ID 45-5-5342 MSP-07;
- AHIMS ID 45-5-5169.

**vi Site inspection**

A due diligence assessment was carried out on 18 May 2022 by Artefact's Senior Heritage Consultant, Heritage Consultant and EE's representative (J. Sokalik, E. Jones and C. Jurd respectively). Another inspection was carried out on 27 May 2022 by Artefact's Technical Director, Heritage Consultant and EE's representative (J. Symons, E. Jones and C. Jurd respectively). The due diligence assessment served to inspect paved roads including Luddenham Road, Elizabeth Drive, and Adams Road.

**vii Archaeological sensitivity**

Archaeological sensitivity is closely related to levels of ground disturbance, whether artefacts are located on, or close to, the surface, and whether the area is within a sensitive landform unit according to the predictive statements. Background research and site inspection identified areas of archaeological sensitivity situated adjacent to the paved bitumen surfaces in a number of places along the project route.

Recorded Aboriginal sites within the road corridor and adjacent to the paved road surface include AHIMS ID 45-5-5410, AHIMS ID 45-5-5409, AHIMS ID 45-5-5408, AHIMS ID 45-5-5479, AHIMS ID 45-5-5105, and AHIMS ID 45-5-5619. Furthermore, a number of recorded Aboriginal sites are recorded immediately adjacent to the road corridor, including AHIMS ID 45-5-5274, and AHIMS ID 45-5-5343.

The recorded Aboriginal sites within the road verge and adjacent to the paved road surface are all situated within the Backdown residual soil landscape. Within this soil landscape, archaeological deposits are likely to be situated within A Horizon and thus 20-30 cm from the surface.

The AHDDA notes that construction and maintenance of paved roads and the installation of drains beneath them is likely to have resulted in significant disturbance. Given that the paved road surface is situated on top of a number of layers of subgrade that support the paved surface, this process is likely to have resulted in the removal of A horizon soils, as shown in Figure 9-2.

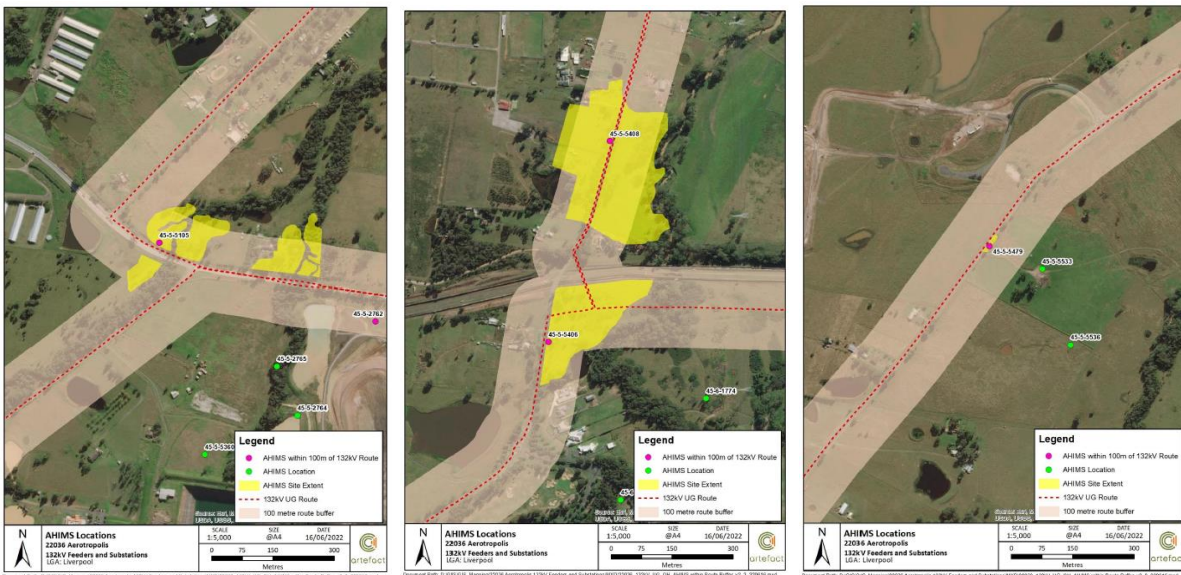


**Figure 9-2** Section of trench dug through a similar road in Prospect showing evidence of disturbance to a depth greater than 30 cm (Source: Artefact 2022a; Artefact 2019b).

**viii Predicted impacts**

There are 4 areas where the alignment runs through or near identified areas of archaeological potential. These are:

- AHIMS 45-5-5105 at the intersection of Adams Lane, Elizabeth Drive and Luddenham Road
- AHIMS 45-5-5408 north of the Warragamba pipeline
- AHIMS 45-5-5406 at the Twin Creeks Golf Club
- AHIMS 45-5-5479 along Luddenham Road.



**Figure 9-3** Location of potential impacts (shown in full in Appendix B)

AHIMS 45-5-5479 along Luddenham Road will be able to be avoided. However, AHIMS 45-5-5408 north of the Warragamba pipeline and AHIMS 45-5-5479 along Luddenham Road may not be able to be wholly avoided. At those locations, the under bore of Cosgroves and Oaky Creek, as well as the joint bay construction, *may* impact the edges of those mapped Aboriginal sites. This will be confirmed with a professionally surveyed

alignment mapped against the AHIMS site boundaries to confirm if impacts can be avoided and managed, or if they cannot be avoided.

The under bore at the Twin Creek Golf Club will impact the AHIMS site and so will require further approval as outlined below.

### 9.2.3 Management and mitigation measures

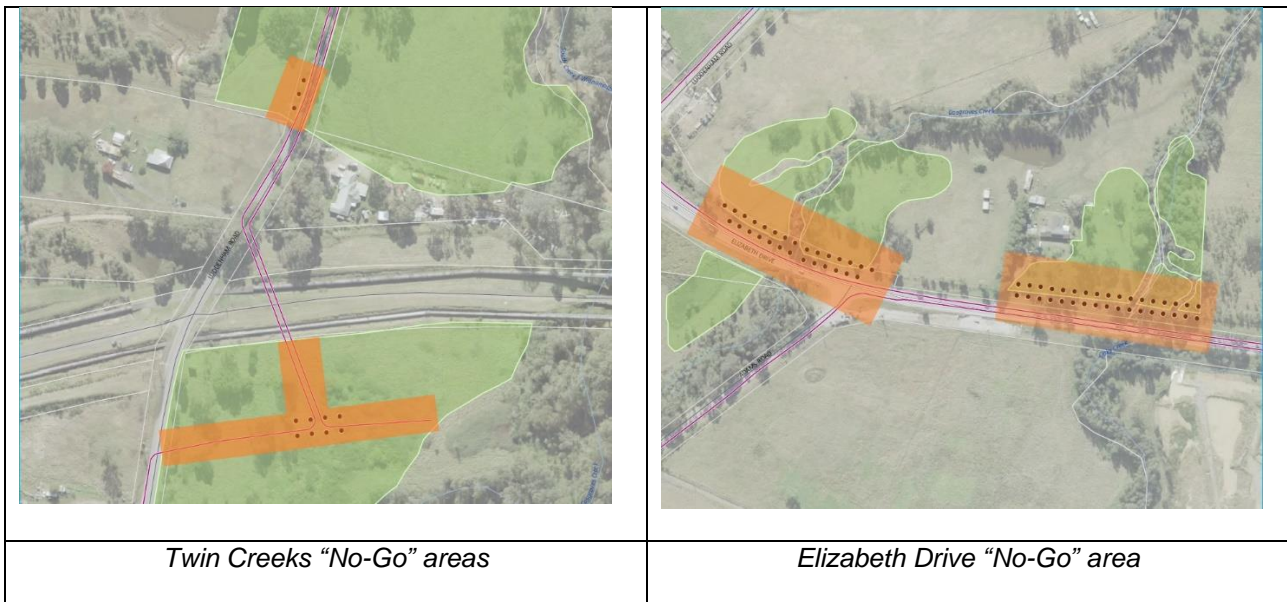
The following management and mitigation measures are recommended in the AHDDA:

- In accordance with the due diligence guidelines, the proposed works can proceed with caution beneath the paved bitumen surfaces of Luddenham Road, Elizabeth Drive and Adams Road.
- All trenching activity must be contained within the paved bitumen surfaces of the road corridor towards the centre of the road lane, and no closer than 500 mm to the white lane markings which are located towards the outer edge of the paved road surface.
- Additional Aboriginal heritage assessment must be undertaken where it is identified that trenching will occur outside the white lane markings and/or in the road verge.
- Additional Aboriginal heritage assessment must be undertaken where it is identified that the proposed works require activities within the road verge. And this is currently being undertaken.
- The recorded extent of AHIMS ID 45-5-5408, AHIMS ID 45-5-5479, and AHIMS ID 45-5-5619 includes the road verge up to the edge of the paved road surface. A surveyor should be engaged to delineate the edge of the paved road surface at AHIMS ID 45-5-5408, AHIMS ID 45-5-5479, and AHIMS ID 45-5-5619 if more accurate mapping details is required for construction design to delineate between the road verge and road pavement in those areas.
- In order to avoid inadvertent damage to AHIMS ID 45-5-5410, AHIMS ID 45-5-5409, AHIMS ID 45-5-5408, AHIMS ID 45-5-5479, AHIMS 45-5-5105, and AHIMS ID 45-5-5619, temporary fencing or barricades must be installed during works along the edge of the road pavement to ensure that no activities take place on recorded Aboriginal sites. Temporary fencing or barricades should be placed on the edge of the paved road surface and must not impact the ground surface adjacent to the paved road surface. Those exclusion zones must not be entered during works. Aboriginal objects cannot be impacted without a valid Aboriginal Heritage Impact Permit (AHIP) applicable to the proposed works.
- Unexpected Aboriginal objects remain protected by the NP&W Act. If any such objects, or potential objects, are uncovered in the course of the proposed works, work in the vicinity must cease and Heritage NSW, Deerubbin Local Aboriginal Land Council (LALC) (for areas north of Elizabeth Drive and Gandangara LALC (for areas south of Elizabeth Drive), and a qualified archaeologist must be contacted for advice. Further assessment and permits may be required before works can recommence.
- If human remains are found, work must cease, the site must be secured, and the NSW Police and Heritage NSW, DPE must be notified.
- A heritage induction should be provided to all contractors prior to works commencing. The heritage inducing would identify the relevant legislative requirements and the unexpected finds procedure.
- Aboriginal objects cannot be impacted without an AHIP.

It should be noted that EE is currently undertaking further investigations at the AHIMS sites notes above. This includes surveying in the sites and alignment as well as a formal Aboriginal Cultural Heritage Assessment.

As of the time of writing this report, the AHIMS sites have been formally surveyed in relation to the proposed alignment and joint bay locations. Where the proposed design could not avoid the AHIMS locations, these are being assessed in the ACHA. Until they have been properly assessed and subject to test excavation and (if needed) an AHIP, these areas remain “no-go” areas. That means, while this REF might be approved, a condition if its approval is no works to be undertaken in these no-go areas until they have been cleared by test excavation, or an AHIP approval has been gained.





### 9.3 Historic heritage

#### 9.3.1 Overview

A non-Aboriginal (historic) heritage impact assessment (HIA) was prepared by Artefact to identify any areas of European heritage that are within the vicinity of the project.

The HIA was prepared in accordance with the guidelines outlined by the NSW Heritage Office (now Heritage NSW) including the *NSW Heritage Manual: Assessing Heritage Significance*, *NSW Heritage Manual: Statement of Heritage Impact*, *Assessing Significance for Historical Archaeological Sites and ‘Relics’* and the Australian International Council on Monuments and Sites (ICOMOS)’s *Charter for Places of Cultural Significance*.

This section provides a summary of the HIA which is provided in Appendix C.

#### 9.3.2 Existing environment

##### ix Non-statutory heritage items

The Register of the National Estate (RNE) was searched for any non-statutory heritage items, and identified that there are no non-statutory heritage items within the study area or within 50 m of the study area that are listed on the RNE.

##### x Listed heritage items

A search of the State and local heritage registers identified two items within 50 m of the study area, as shown in Table 9.2.

**Table 9.2** Historic heritage items within the study area

Register	Listing	Significance
Water NSW Section 170 Register	Warragamba Supply Scheme (SHI# 4580161)	State
Penrith LEP 2010	Luddenham Road Alignment (LEP item no. 843)	Local
SEPP (Western Sydney Aerotropolis) 2020	Luddenham Road Alignment (item no. 18)	Local

## **xi History of the locality**

Chapter 3 of the HIA in Appendix C outlines the history of the locality of the project, including the history of Luddenham Road and Warragamba pipelines and the value of the surrounding developments. Key historical heritage features of the area are summarised below:

- The first settlers were attracted to different regions of Western Sydney due to rich alluvial soils and local waterways required for agriculture. The availability of several local waterways including Badgerys Creek added to the attraction of the area surrounding Badgerys Creek.
- The first land grants in the area were made in 1808, which allowed settlers to establish rural estates. The study area passes through several early land grants, which were made to emancipated convicts. Private soldiers, free settlers, officials and officers between 1811 and 1821.
- Notable individuals that were granted land within the study area include wealthy landowner Gregory Blaxland and government official Captain John Piper. A portion of the study area also crosses Cosgrove Creek and South Creek, where Lot 222 DP 270417 identified as part of a 60-acre area granted to William Cosgrove in 1811.
- Works on the original Warragamba Emergency Scheme began in 1936 and was completed in 1940, whereby water was conveyed via a 48-inch pipeline across Megarrity's Creek Bridge at Warragamba, 16 km to the Prospect Reservoir. The Warragamba Dam was commissioned in 1960. The original Warragamba pipeline was upgraded in 1953 to an 84-inch pipeline, and a second 84-inch pipeline from Warragamba to Prospect was constructed between 1957 and 1969. No other major works have occurred on these pipelines, other than basic maintenance.

Artefact's HIA concludes that land development has changed little in the area, although some intensification has occurred such as in dairy and poultry farming, aviary activities and market gardening. Early slab cottages, homesteads, cisterns, sheds and vineyards persist as reflections of the districts former character.

Given the area is sparsely populated and is characterised by an open landscape, the location has seen it used for projects including defence and government radio infrastructure, and most recently and more widely, the construction of the Western Sydney Airport.

## **xii Site inspection**

A site inspection of the study area was conducted on 27 May 2022 by Artefact's Technical Director and Heritage Consultant (J. Symons and E. Jones respectively). The site inspection served to investigate the project route including the landscape surrounding the road corridors.

No original road fabric was observed during the site inspection, as all existing road surfaces were observed to consist of modern bitumen with concrete culverts present at intervals. Several culverts along Luddenham Road and Elizabeth Drive portions of the study area were able to be inspected; however, access to a small number of culverts was not possible due to roadworks hampering access and due to safety concerns. The inspection revealed that the culverts were likely installed at the same time as the modern road surfaces.

The road corridors inspected were bordered by posts and rail fencing along their alignments. The Statement of Heritage Impact (SHI) for the Luddenham Road Alignment notes that this fencing is a remnant of previous pastoral uses for the surrounding land and serves as a contributory element for the item's significance. However, the fencing along Luddenham Road appears very new, suggesting that it is in fact not original, significant fabric.

### **9.3.3 Impact assessment**

#### **xiii Archaeological assessment**

Artefact conducted an assessment of archaeological potential and significance, based on analysis of available historical plans, secondary sources and an understanding of previous impacts within the study area. For the purpose of this assessment, it was assumed that no ground disturbance works would occur outside the road corridor. A summary of archaeological potential and significance is provided in Table 9.3.

**Table 9.3 Summary of archaeological potential**

Phases	Potential remains	Archaeological potential	Archaeological significance	Potential for 'relics'
Early land grants	1809 - 1978 <b>Luddenham Road corridor:</b> Evidence of land clearing (tree boles, burnt soil), undocumented evidence of agricultural uses (postholes associated with fencelines/huts/agricultural structures, water management, structural evidence of huts, artefact scatters).	Nil	n/a	No
	1811 – present day <b>Lot 22 DP 270417:</b> Evidence of former masonry buildings or structures (brick or stone footings, associated deposits), occupation deposits (underfloor accumulations), yard scatters, rubbish pits), paving associated with external yard divisions and landscaping, postholes associated with fence lines, beaten earth or paved surfaces, hearth, chimney remnants, refuse deposits associated with external kitchen, evidence of landscaping (such as stone or brick retaining walls, edging, hard surfaces indicating former pathways, stone flagging), rubbish pits.	Moderate	Local	Yes
Luddenham Road	Pre-1879 - c.1920 Compressed earth surface, table drains, stone culverts.	Nil-low	Local	No
	1920 - 1950 Gravel ballast, table drains, stone/concrete culverts.	Low	Nil	No
	1950 - current Bitumen and modern road surfaces, table drains, concrete culverts.	Extant (not archaeological)	Nil	No

**xiv Impacts to archaeological items**

Lot 222 DP 270417 has been identified as having the potential to contain archaeological resources associated with Cosgrove's Farm and a 'pre-1906' homestead. The HIA has identified that trenching works have the potential to impact on the following potential archaeological remains at this residence:



- postholes/ footings associated with the large eastern shed;
- gravel/ kerbing associated with the former drive; and
- evidence of the early 19th century farm grant ie wells of cisterns, remains of earlier structures (these are more likely to be located to the north of the trenching works, within the main house block).

However, the HIA has concluded that there is overall limited potential for substantially intact archaeological remains associated with the early land grant or pound to be located within the area proposed for trenching.

The proposed trenching also avoids the main structures present on 20<sup>th</sup> century aerial photographs of the site. Overall, the proposed excavation works are unlikely to result in more than minor impact to the potential archaeological site at Lot 222 DP 270417.

#### **xv Impacts to heritage items**

Section 6.3 assess the potential direct (physical), indirect (visual) and cumulative impacts of the proposed works on heritage items within the study area itself and its vicinity. An assessment of heritage impacts of the proposed works are outlined in Table 8 of the HIA in Appendix C, with the overall conclusion provided in the statement of heritage impact (SHI) below.

#### **xvi Statement of heritage impact**

The HIA has concluded that the project will involve trenching within the existing road corridor along the Luddenham Road Alignment. The existing road surface is not considered to be an element of the item's heritage significance as it is a modern addition to the Luddenham Road Alignment. Rather, the alignment of the road itself, the surviving post and rail fencing that borders it and its sparsely settled, rural setting that are the factors that contribute to its heritage value. On completion of the excavation works and feeder installation trenches would be backfilled and the road surface reinstated. The proposed works from the project would therefore not result in long-term visual change or impact to the heritage listed road, or to the surrounding area. The study area has generally low potential to contain locally significant archaeological 'works' associated with earlier phases of road construction.

Overall, the proposed works will not result in indirect or direct impacts on the Warragamba Supply Scheme pipeline listed on the Water NSW Section 170 register and the SEPP (Western Sydney Airport) 2020.

The proposed trenching works within Lot 222 DP 270417 have the potential to result in minor impact to the archaeological site that has been identified in this assessment, and by Extent Heritage. The site is likely to reach the local significant threshold. Assuming appropriate mitigation is in place during excavation works, impacts to significant archaeological remains should be minimal.

#### **9.3.4 Management and mitigation measures**

The following management and mitigation measures are recommended in the HIA:

- Section 139(e) archaeological monitoring and Archaeological Research Design and Methodology (ARDM):
  - It is recommended that excavation works within the potential site of Cosgrove's Farm / 'Ammamagong' homestead within Lot 222 DP 279417 be subject to historical archaeological monitoring. The adoption of archaeological monitoring program means that the works are exempt from the requirement to obtain an excavation permit under subsections 139(1) or (2) of the Heritage Act.
  - An Archaeological Research Design and Methodology will be prepared to guide the archaeological monitoring program, in line with the requirements outlined in Table 9 of the HIA in Appendix C.
- Unexpected finds procedure: An unexpected finds procedure should be implemented for all excavation works not subject to archaeological monitoring. All relevant construction staff, contractors and subcontractors must be made aware of their statutory obligations for heritage to ensure no archaeological remains or heritage fabric are impacted during the proposed works without appropriate mitigation measures in place.
- Report circulation and consultation: A copy of this HIA report will be provided to WaterNSW and Penrith City Council for their information on works proposed to occur within the curtilages of the Warragamba Supply Scheme and Luddenham Road Alignment. As the proposed works are not

expected to result in impacts to heritage items above the level of negligible, this would be for information purposes only.

## 9.4 Biodiversity

### 9.4.1 Overview

An ecological assessment for the project was prepared by Gingra Ecological Surveys (GES) in order to assess whether the project route may support any flora and fauna species listed under the BC Act.

The ecological assessment involved desktop searches and a field survey, which was undertaken on 1 June 2022.

This section provides a summary of the ecological assessment which is provided in Appendix D.

### 9.4.2 Existing environment

The study area is within the Hawkesbury Nepean catchment and is within the Central Coast botanical subdivision. It lies within the Cumberland Plain landscape unit.

#### xvii Desktop searches

GES conducted searches of the Atlas of NSW Wildlife and EPBC listed threatened flora for flora species present within 5 km and 10 km of the project. The results are presented in Table 9.4. For a full description of habitat preferences, presence in locality and whether it could possibly be affected, refer to Table 2 and Table 3 of the ecological assessment in Appendix D.

**Table 9.4 Threatened flora desktop search results**

Scientific name	Common Name	Atlas of NSW Wildlife *recorded within 5 km radius	EPBC listed threatened flora search *recorded within 10km radius
<i>Acacia bynoeana</i>	Bynoe's Wattle		X
<i>Acacia pubescens</i>	Downy Wattle	X	X
<i>Allocasuarina glaericola</i>			X
<i>Cryptostylis hunteriana</i>	Leafless Tongue-orchid		X
<i>Cynanchum elegans</i>			X
<i>Dillwynia tenuifolia</i>		X	
<i>Genoplesium baueri</i>	Yellow Gnat-orchid		X
<i>Grevillea juniperina</i> subsp. <i>juniperina</i>		X	
<i>Grevillea parviflora</i> subsp. <i>parviflora</i>		X	X
<i>Haloragis exalata</i> subsp. <i>exalata</i>	Wingless Raspwort		X
<i>Isotoma fluviatilis</i> subsp. <i>fluviatilis</i>		X	
<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i>		X	
<i>Melaleuca deanei</i>			X

**Table 9.4** Threatened flora desktop search results

Scientific name	Common Name	Atlas of NSW Wildlife *recorded within 5 km radius	EPBC listed threatened flora search *recorded within 10km radius
<i>Persicaria elatior</i>			X
<i>Persoonia hirsuta</i>	Hairy Geebung		X
<i>Persoonia nutans</i>	Nodding Geebung	X	X
<i>Pimelea curviflora</i> var. <i>curviflora</i>			X
<i>Pimelea spicata</i>	Spiked Riceflower	X	X
<i>Pomaderris brunnea</i>			X
<i>Pterostylis gibbosa</i>	Yallah Greenhood		X
<i>Pterostylis saxicola</i>			X
<i>Pultenaea parviflora</i>		X	X
<i>Rhizanthella slateri</i>	Eastern Australian Underground Orchid		X
<i>Thesium australe</i>	Austral Toadflax		X

Notes: sp. – species, subsp. – subspecies, var. - variety

GES conducted a search of the Atlas of NSW Wildlife and EPBC listed threatened fauna for fauna species present within 5 km and 10 km of the project. The results are presented in Table 9.4. For a full description of habitat preferences, presence in locality and whether it could possibly be affected, refer to Table 2 and Table 3 of the ecological assessment in Appendix D.

**Table 9.5** Threatened fauna desktop search results

Scientific name	Common Name	Atlas of NSW Wildlife *recorded within 5 km radius	EPBC listed threatened flora search *recorded within 10km radius
<b>Fish</b>			
<i>Macquaria australasica</i>	Macquarie Perch		X
<i>Prototroctes maraena</i>	Australian Grayling		X
<b>Frogs</b>			
<i>Heleioporus australiacus</i>	Giant Burrowing Frog		X
<i>Litoria aurea</i>	Green & Golden Bell Frog		X
<b>Reptile</b>			
<i>Delma impar</i>	Striped Legless Lizard		X
<b>Mammals</b>			

**Table 9.5**      **Threatened fauna desktop search results**

Scientific name	Common Name	Atlas of NSW Wildlife *recorded within 5 km radius	EPBC listed threatened flora search *recorded within 10km radius
<i>Dasyurus maculatus maculatus</i> (SE mainland population)	Spotted-tailed Quoll		X
<i>Falsistrelle tasmaniensis</i>	Eastern False Pipistrelle	X	
<i>Phascolarctos cinereus</i>	Koala		X
<i>Petauroides volans</i>	Greater Glider		X
<i>Petaurus australis</i>	Yellow-bellied Glider	X	X
<i>Petrogale penicillata</i>	Brush-tailed Rock Wallaby		X
<i>Pseudomys novaehollandiae</i>	New Holland Mouse		X
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	X	X
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat		X
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail Bat	X	
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat		
<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	X	
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	X	
<i>Miniopterus australis</i>	Little Bent-winged Bat	X	
<i>Myotis macropus</i>	Southern Myotis	X	
<b>Birds</b>			
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	X	
<i>Botaurus poiciloptilus</i>	Australasian Bittern		X
<i>Burhinus grallarius</i>	Bush Stone Curlew	X	
<i>Numenius madagascariensis</i>	Eastern Curlew		X
<i>Calidris ferruginea</i>	Curlew Sandpiper		X
<i>Rostratula australis</i>	Australian Painted Snipe	X	X
<i>Falco hypoleucos</i>	Grey Falcon		X
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper	X	

**Table 9.5**      **Threatened fauna desktop search results**

Scientific name	Common Name	Atlas of NSW Wildlife *recorded within 5 km radius	EPBC listed threatened flora search *recorded within 10km radius
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo		X
<i>Chthonicola sagittata</i>	Speckled Warbler	X	
<i>Daphoenositta chrysoptera</i>	Varied Sittella	X	
<i>Lathamus discolor</i>	Swift Parrot	X	X
<i>Lophoictinia isura</i>	Square-tailed Kite	X	
<i>Ninox strenua</i>	Powerful Owl		
<i>Hieraaetus morphnoides</i>	White-bellied Sea-Eagle	X	
<i>Hieraaetus morphnoides</i>	Little Eagle	X	
<i>Hirundapus caudacutus</i>	White-throated Needletail		X
<i>Ixobrychus flavicollis</i>	Black Bittern	X	
<i>Grantiella picta</i>	Painted Honeyeater		X
<i>Anthochaera phrygia</i>	Regent Honeyeater		X
<i>Petroica boodang</i>	Scarlet Robin	X	
<i>Pycnoptilus floccosus</i>	Pilotbird		X
<i>Stictonetta naevosa</i>	Freckled Duck	X	
<i>Stagonopleura guttata</i>	Diamond Firetail	X	
<b>Gastropod</b>			
<i>Pommerhelix duralensis</i>	Dural Land Snail		X
<i>Meridolum corneovirens</i>	Cumberland Plain Land Snail	X	

**xviii**      **Field surveys**

A total of 36 plant species were detected during the field surveys, including 16 locally native species and 20 exotic species. GES notes that this is considered to be a very low level of native plant diversity reflecting the disturbance which has occurred in the local area for over 200 years, given that the area has been subject to agricultural land use for approximately 200 years. A list of plant species found within the study area is included in Appendix 1 of Appendix D.

Field survey results showed the following in relation to the flora and fauna identified in database searches (refer Table 9.4 and Table 9.5):

- None of the flora species were detected and the disturbed nature of the habitat across the area of impact means it is highly unlikely that any would occur.
- The proposed works are to take place within areas of disturbed grassland, with no hollow bearing trees or structures likely to support any of the threatened species listed in Table 9.5 to be impacted.



### 9.4.3 Impact assessment

The ecological assessment assessed the project, and in particular the works that cross the Cosgrove and Oaky Creeks, which will involve drilling an underground trench beneath each creek with the drill pads being located in cleared land outside of the riparian zone. The works are designed to take place in land which has been cleared and disturbed by past land uses. Five *Grevillea juniperina* subsp. *juniperina* plants may be affected by the proposed trenching works near Luddenham Road.

The field surveys identified that there is no need to undertake detailed assessment in relation to any of the threatened fauna species identified through desktop searches and listed in Table 9.5. However, consideration was given to the likely impact of the project on threatened species recorded from within a 10 km radius of the study area. It was considered that a formal Assessment of Significance needs to be completed in relation to *Grevillea juniperina* subsp. *juniperina*.

The Assessment of Significance is included in Chapter 7 of the ecological assessment in Appendix D. The assessment concluded that even though the project involves “clearing of native vegetation” which is a key threatening process (KTP) relevant to the species, the extent of vegetation clearing is extremely minor and well below thresholds prescribed in the BC Act. Thus, it was concluded that:

- It is highly unlikely that the development will significantly affect the regional or local population status of *Grevillea juniperina* subsp. *juniperina*, and
- There is no need to provide a Species Impact Statement or a BDAR.

### 9.4.4 Management and mitigation measures

The following management and mitigation measures are recommended in relation to biodiversity:

- Consideration should be given to minimising the impact upon vegetation during construction wherever possible.
- The minimal feasible amount of vegetation clearing should be undertaken for construction purposes.
- Where feasible, dead wood, fallen branches and logs should be retained as habitat. Where removal of dead logs or wood is required, these should be relocated (not removed from the site) into adjacent areas that will not be disturbed by construction workers.
- Weed control measures (eg herbicide spraying) should be undertaken prior to construction commencing in areas where high densities or infestations of weeds occur. This will help to reduce the risk of weeds being spread as a result of the proposed project.
- To reduce the likelihood of spreading weeds, tyres and undercarriages of vehicles are to be washed and cleaned out/ or sprayed after working with weed infested areas, and prior to entering

## 9.5 Water

### 9.5.1 Overview

This section assesses the potential hydrology, flooding, water quality, soil erosion and sedimentation aspects and impacts of the project.

### 9.5.2 Existing environment

#### xix Hydrology and water quality

The project is within the Hawkesbury-Nepean catchment, and more specifically within the Wianamatta South Creek catchment (South Creek catchment). South Creek rises in Sydney’s south-western suburbs, approximately 4 km north-east of Narellan and 7 km west of Minto, and generally flows north. It is joined by numerous tributaries including Badgerys Creek, Kemps Creek, Ropes Creek and Eastern Creek until it reaches its confluence with the Hawkesbury River close to Windsor. South Creek flows through many Western Sydney suburbs including Bringelly, Badgerys Creek, Kemps Creek, Orchard Hills. South Creek is joined by Badgerys Creek and Kemps Creek at the suburb of Badgerys Creek, by Blaxland Creek at Orchard Hills, and by Cosgrove Creek at Luddenham.

The floodplains and watercourses set within the catchment area are largely interrupted by storages for grazing and cropping with drainage infrastructure provided in some more urbanised areas (Sydney Metro 2020). However, it is important to note that the existing flow paths and runoff of the surrounding waterways, in

particular levels and velocity, will be altered by the construction of the Western Sydney Airport and surrounding development, due to the introduction of hard stand areas, levelling of existing topography and introduction of water management infrastructure such as detention basins or culverts (Sydney Metro 2020). The Aerotropolis and surrounding precincts have been designed to incorporate specific landscape and waterway features of the surrounding landscape.

Numerous surface water and groundwater studies have been undertaken for the infrastructure and development currently being built or planned in the Western Sydney Growth Area; and thus the impacts of large scale urban growth and cumulative development would have been considered in greater detail in the assessment documentation for the various projects. Studies undertaken over the last few years have shown that the existing water quality of some of the local creeks, including the South Creek, Badgerys Creek, and Cosgrove Creek, is generally poor and does not meet the Australian Water Quality Guidelines for Fresh and Marine Waters (NSW Government 2020). Previous studies have identified that the South Creek is one of the most degraded catchments in the wider Hawkesbury-Nepean catchment (Sydney Metro 2020). The high nutrient concentrations and subsequent algal and aquatic weed growth are a result of the following pollution sources (Sydney Metro 2020):

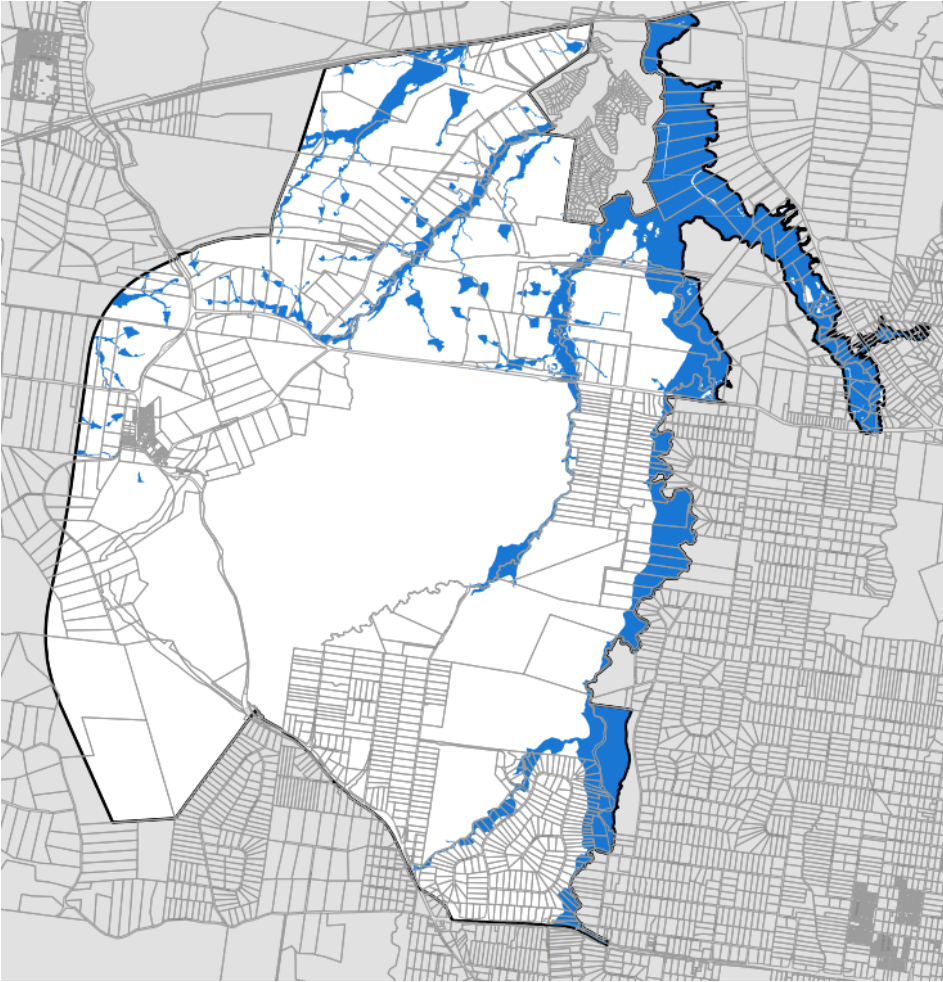
- effluent released from five sewage treatment plants in the lower parts of the catchment: and
- urban and agricultural runoff from market gardens, cattle and sheep grazing and intensive agriculture such as poultry farming.

Further potential impacts to water quality within the catchment can be managed through adequate management and mitigation measures and erosion and sediment controls.

## **xx Flooding**

Western Sydney Parkland SEPP shows the extent of the 1 in 100 annual exceedance probability (AEP) flood extent over the Aerotropolis (refer Figure 9-4). It shows that in the event of a 1 in 100 AEP flood, only the area surrounding the Elizabeth Drive/ Luddenham Road would be impacted, as well as some small portions of Luddenham Road. Flood modelling undertaken for the Sydney Metro project shows that regular rainfall events indicate that regular flood events are generally confined to the main channels and flow away relatively quickly to the lower portions of the South Creek catchment (Sydney Metro 2020).

The urbanised areas of the Aerotropolis have more formalised drainage systems that discharge into the main watercourse (Sydney Metro 2020). Further development, and the introduction of further hard surfaces and water management infrastructure in the area, will most likely further mitigate any flooding risk.



**Figure 9-4** 1 in 100 AEP flood extent (Source: SEPP Western Sydney Parkland maps).

## xxi Geology and soils

The project is located within the Sydney Basin and traverses a number of geographic formations. In some areas, the project overlies areas of Ashfield Shale and Bringelly Shale formations (Artefact 2022a). Ashfield Shale composes of laminate and dark grey shale, and is separated from Bringelly Shale by Minchinbury Sandstone, a medium to fine grained lithic quartz sandstone. Bringelly sandstone consists of shale, calcareous claystone and laminate. In places closer to streams and waterlines, the underlying geology within the study area consists of Quaternary alluvium which is derived from Wianamatta Group shales and Hawkesbury Sandstone. One small area of the project along Elizabeth Drive is situated within the Londonderry clay formation.

The project also covers a number of soil landscapes, predominantly the Luddenham Erosional landscape and the Blacktown Residual landscape. (Artefact 2022a). Luddenham soils are generally shallow (<100 centimetres (cm)), dark Podzolic Soils of massive Earthy Clays on crests. On upper slopes, soils consist of moderately deep (70 – 150 cm) Red Podzolic Soils. On lower slopes and drainage lines, soils are generally moderately deep (<150 cm) Yellow Podzolic Soils and Prairie Soils. Blacktown soils are shallow to moderately deep (>100cm) hard-setting and mottled Red and Brown Podzolic Soils on crests. On lower slopes and drainage lines, Yellow Podzolic soils occur. In portions of the study area that are located closer to streams and waterlines, soils of the South Creek alluvial landscape can be found. These soils are very deep layered soils that overlie bedrock or relict soils.

## xxii Future land use vision

NSW Government's Western Sydney Aerotropolis 'What we heard: Community consultation report' (NSW Government 2019) (WSA Community Report) notes that the Aerotropolis has been planned around the network of waterways to create environmental, social and amenity benefits. The Government has sought innovative approaches to incorporate specific landscape and waterway features into the design of new communities.

EE will undertake its work in line with Government objectives and will ensure that any works undertaken consider the natural landscape and waterway features into its project design, as well as the assessments undertaken for the project and outlined in this REF.

### **9.5.3 Impact assessment**

The project will be contained within the road reserves, apart from three key locations where under boring will occur (refer to Chapter 7). The under boring will occur under the aboveground Warragamba pipeline in Stage 6 of construction works, as well as under two waterways including Cosgrove Creek in Stage 5 and Oaky Creek in Stage 7. The depth of the under boring activities will vary depending on the underlying geology and specific conditions in each of the boring locations. The typical cross section and further information about boring is provided in Section 7.3.2 of this REF.

Under bore activities will be planned in detail supported by geotechnical investigations, to ensure that the depth of boring is appropriate and all necessary construction techniques are observed for the specific context of the under bore area.

Activities such as trenching and under boring, that have the potential to impact on the water quality of the surrounding area need to be managed. Disturbance to the soil and risk of erosion and sediment run-off will be greatest during the construction of the project, which can occur as a result of:

- rain occurring whilst trenches are open;
- groundwater entering the holes and trenches; and
- inadequate erosion and sediment control measures.

Given the presence of the Luddenham Erosional landscape, and the erosion risk associated with the presence of dispersive soils priority should be given to the prevention, or at least minimisation, of soil erosion rather than allowing erosion to occur and relying on sediment control measures to trap and contain sediment and turbid runoff. The risks of erosional soils reduce closer to waterways. Given that road surfaces are covered by sealed surfaces, the risk of sedimentation will be greatly reduced. It will be easy to regularly sweep and clean these areas. The greatest erosion risks during the construction works when potentially dispersive soils are exposed such as with open trenches.

Another risk is the storage and/or stockpiling of fill material that will need to be removed from site. Stockpile management will be a key element for inclusion in the CEMP, particularly in relation to location, drainage and appropriate handling and removal from site.

Given that the works will be contained within road reserves, and temporary in nature, the risk of flooding should not affect the project. The surrounding landscape is currently undergoing a transformation that will mitigate any future risks associated with flooding events.

There is the potential for frac-outs to occur when water and/or other lubricants used in the boring process escape from the confines of the borehole. Frac-outs will be known immediately by the operator from a drop in pressure. Once a pressure drop occurs, the machine will be switched off and visual inspection for frac outs will commence. Frac outs can be managed using the mitigation measures outlined in the section below.

A combination of management and mitigation measures should be implemented to control offsite impacts of this risk, in particular when working close to any waterways.

### **9.5.4 Management and mitigation measures**

The key objective of any water management and mitigation measures should be prevention of pollution, erosion prevention and sediment control. The practices that will be implemented during construction, and in particular any under boring activities, are described below.

#### **Pollution control measures, erosion and sediment control**

The objective of erosion and sediment control practices will be to take all reasonable and practicable measures to minimise short- and long-term soil erosion, while minimising sediment transport. This will be achieved by applying the principles of erosion and sediment control detailed in Landcom (2004) to the identified site constraints and erosion hazards.

The following management and mitigation measures will be applied during construction:

- spill kits will be available at all work sites, and all persons undertaking construction works will be made aware of EE's incident response procedures.
- soil and water management will be conducted in accordance with EE's standards and Environmental Guidelines Handbook;
- the Project Manager/ Supervisor responsible for construction works will be required to develop a site specific Erosion and Sediment Control Plan as part of the CEMP;
- disturbance will be restricted to those areas of the project route required for the active stage of works;
- detailed geotechnical investigations will be undertaken if necessary prior to establishing the underbores along the underground section of the project route;
- any soil tracked on the roadways will be swept up on a regular basis;
- no fuels, oils or other chemicals are to be stored at worksites unless small amounts are required for that specific days' work;
- refuelling and maintenance of vehicles, plant and equipment will not be carried out on site. All vehicles, plant and equipment are to be refuelled prior to arriving on site;
- the sequencing of construction and drainage, erosion and sediment control works will allow for the installation of the temporary drainage system, and preferably the permanent stormwater drainage system as soon as practicable;
- where necessary, additional erosion and sediment controls will be installed during periods of highest rainfall risk (April to October);
- all drainage, erosion and sediment control measures will be maintained in proper working order until their function is no longer required;
- flagging tape or bunting will be used during construction to minimise the potential or any disturbance outside of the designated work areas;
- upon decommissioning any stage of works, erosion and sediment control measures, all materials used to form the control measures will be removed and/or disposed of appropriately;

#### **Excavated material measures**

- Excavated materials are to be taken off site each day. Where it is necessary to store spoil or other loose materials on site, sediment fences are to be constructed on the down slope side of the stockpile;
- permission of the landowner is to be sought prior to establishing site compounds or stock piling on their land;
- spoil management and dewatering of worksites will all be managed in accordance with the following EE Standards and the Environmental Guidelines Handbook which are all available on the EE Standards and ASP Website:
  - EMS 0007 – Waste Management;
  - EMS 0008 – Environmental Incidence Response and Management;
  - EMS 0013 – Spoil management;
  - EMS 0014 – Dewatering worksites;

#### **Contamination of soil measures**

- an unexpected finds protocol will be prepared and implemented, as part of the CEMP, to manage any contamination which may be encountered during construction works;
- should contamination be identified, an assessment of deeper soils, leachability and/or groundwater may be necessary to assess potential impacts to Oaky Creek and Cosgroves Creek;
- in the event that acid sulphate soils (ASS) are exposed during excavation works, these soils will be managed in accordance with EE's Generic Acid Sulphate Soil Management Plan – Annexure C of EMS0013 Spoil Management;

#### **Inspection and maintenance**

- the construction, inspection and maintenance requirements for all drainage, erosion and sediment control measures will be specified in the CEMP;
- inspections will be undertaken 24 hours prior to predicted rainfall events and immediately following rainfall events that cause run-off, and weekly during periods of no rain; and
- all clean and dirty water, debris and sediment removed from drainage, erosion and sediment control measures will be disposed of in a manner that will not create erosion, sedimentation or a pollution hazard.



## **Under bore management**

Drilling Management Plan to minimise effects of impacts, including:

- Contain and monitor drilling fluids at entry/exit points
- Identify and manage frac outs
- Re-use and/or disposal of drilling fluids
- The drilling reception and launch site will be restored back to original or better conditions on completion of the works.
- Double sediment and erosion controls and a standby vac truck are required during under bore works. This will act as a second line of defence to stop any run-off/ frac-out exiting the work area.
- In the event of a frac-out, works would immediately cease, and spill kits/vacuum trucks would be used to clean up the sediment. The drilling contractor would be responsible for ensuring that spilled fluids are suitably disposed of or recycled where appropriate.
- The Site Supervisor would notify the Environmental Advisor and Project Manager who will co-ordinate any clean up actions.
- Drilling fluid/waste will be collected and stored in sealed holding tanks and recycled as appropriate. Excess fluid/waste will be removed from site via a licensed vacuum truck and disposed of at a licensed waste facility. No water will be released on to the ground.
- Drilling water and lubricating fluids will be reused wherever possible prior to their disposal at a licensed waste management facility.
- A functioning 'spill kit' will be kept near the drill rig at all times for immediate clean-up of accidental chemical/fuel spills. Any contaminated spill rags are to be disposed of at an approved waste facility

### **9.6 Utilities and services**

A detailed Dial Before You Dig (DBYD) search will be conducted for all services in the vicinity of the project route as part of the final project design and prior to construction commencing. Where necessary, relevant authorities and customers will be contacted regarding potential impacts on their services.

#### **9.6.1 Management and mitigation measures**

- The Project Manager will conduct DBYD searches prior to works commencing on site.
- The Project Manager will notify impacted residents and businesses regarding any potential interruptions to electricity supply prior to these outages occurring in accordance with National Energy Customer Framework (NECF) requirements.

### **9.7 Roads, traffic and access**

#### **9.7.1 Overview**

As previously noted, the project will involve the installation of the feeder along an approximately 10 km stretch of local and State roads within the suburbs of Luddenham, Badgerys Creek and Orchard Hills. The construction works will predominantly occur within the road reserves, and any trenching activity will be contained within the bitumen surfaces of the road corridor towards the centre of the road lane and no closer than 500 mm to the white lane markings which are located towards the outer edge of the paved road surface.

The following section describes the road, traffic and access impacts resulting from the construction and operation of the project.

#### **9.7.2 Existing environment**

##### **xxiii Local road network**

The local road network carries high volumes of passenger vehicle and truck movements, and some parts may even carry plant and machinery for farming given the proximity to agricultural premises.

The project traverses Adams Road, Elizabeth Drive, Luddenham Road and Patons Lane.

The project will impact the following intersections within the local road network:

- Elizabeth Drive/ Adams Road intersection;
- Elizabeth Drive/ Luddenham Road intersection;
- Luddenham Road/ Twin Creeks Road intersection (roundabout);
- Luddenham Road/ Paton's Lane intersection.

#### **xxiv Traffic movements**

Traffic movements anticipated during the construction of the project are outlined in Chapter 7.

#### **xxv Crash and casualty statistics – NSW general view**

A search of TfNSW's Centre for Road Safety 'Crash and casualty statistics – NSW general view' has identified the following statistics for the Liverpool and Penrith LGAs:

- the statistics results show that the number of crashes and casualties has gradually decreased within the Liverpool LGA between 2016 – 2020 (from 240 crashes and 350 casualties in 2016 to 117 crashes and 153 casualties in 2020);
- the statistics results show that the number of crashes and casualties has gradually decreased within the Penrith LGA between 2016 – 2020 (from 109 crashes and 149 casualties in 2016 to 65 crashes and 103 casualties in 2020);
- there was one accident on Adams Road between 2016 – 2020, including one moderate injury;
- there were approximately 15 accidents on Elizabeth Drive between 2016-2020 within approximately 2 km of the project including four minor injuries, eight moderate injuries and two serious injuries;
- there were nine accidents on Luddenham Road between 2016 – 2020, most of which occurred close to the residential development off Creek Twins Drive and involves four two minor injuries, five moderate injuries, and two serious injuries; and
- there were no accidents recorded at Patons Lane between 2016 – 2020.

The two main hotspots for accidents appear to be Elizabeth Drive, and the stretch of Luddenham Road on either side of Luddenham Road/ Twin Creeks Road intersection (roundabout).

#### **9.7.3 Impact assessment** **xxvi Construction**

Traffic accessing adjoining residential, commercial and industrial premises could be affected during road works. For this reason, EE will need to manage road closures, partial road closures, traffic and pedestrian access around worksites and property access during the construction of the project.

The linear nature of the project route will ensure that the works will be progressively moving along the project route and that access to driveways and properties will not be completely restricted or restricted for extended periods of time. Impacts will be short term only, at any given location.

In instances where access will be restricted for longer periods, such as in the vicinity of cable joining works and under boring works, notification to and consultation with the affected residents will be undertaken in advance of their access being blocked.

Project works may require sections of impacted roads to be closed for specific period of time over the construction period. Road occupancy permits will be obtained from TfNSW and Councils as required.

Use of electronic signage in advance of construction commencing may be appropriate in strategic locations along the project route to advise residents and road users of the upcoming works.

Delivery, construction and workers vehicles will be parked safely on the road verges and within private properties in a safe and appropriate manner at all times.

#### **xxvii Operation**

Following completion of construction works, vehicle movements will return to current operational levels. This will also involve the intermittent access by EE and its contractors to the feeder line easement for maintenance purposes.

#### **9.7.4 Management and mitigation measures**

The following management and mitigation measures will be implemented to minimise traffic and access impacts:

- Transportation and equipment deliveries will be in accordance with TfNSW and Council requirements.
- All other appropriate permits will be obtained from the relevant road authorities prior to construction commencing, and works will be conducted with these permits.
- A Traffic Management Plan (TMP) will be prepared as required, and included as part of the overarching CEMP.
- Designated worksite areas along the route are to be of sufficient size to accommodate skip bins if required and include room for the loading, unloading and manoeuvring of trucks.
- Electronic signage may be used if considered appropriate in advance of construction commencing to advise residents and road users of the upcoming works.
- Traffic control and safe pedestrian pathways will be established and maintained around worksites, as required for the duration of the construction works.
- Every effort will be made to restore access to properties at the end of each day's work.
- Sufficient notice will be given to residents along the project route before construction commences.
- Open points and trenches will be covered and/or fenced when workers are not in attendance at these sites.
- Vehicles will not block access to residents' properties at any time.
- Worksites and any other assets, including lawns and grass verges along the project route will be restored to the condition that they were in prior to construction commencing.

### **9.8 Visual assessment**

The project will result in temporary changes to the appearance of the project route, along the impacted road network. However, as previously noted, all construction works will be temporary in nature and works will be rehabilitated as soon as they are completed. The feeders will all be underground with none of the alignment utilising overhead poles. Thus, in the long-term the project is not expected to have any impacts to the visual nature of the area.

### **9.9 Socio-economic impacts**

The project may temporarily affect the local community as a result of minor increases in dust and air quality emissions, noise, traffic and access and visual amenity. These impacts have been considered in the REF and mitigation measures proposed in order to manage and/or mitigate these impacts, which will be temporary in nature.

The project will, however, result in long-term social benefits for the Western Sydney Growth Area, the Western Sydney Airport and the many new precincts and infrastructure projects in this area. The project will provide safe, reliable and cost-effective electricity supply for local residents, commercial and industrial users/operators.

Furthermore, economic benefits associated with the project include an increase in employment during the construction phase of the project.

Project needs and benefits are addressed in Section 2.3.

### **9.10 Noise**

#### **9.10.1 Construction noise**

Construction works associated with the project will result in some noise generation. Typical noise generation for the construction of the project will include concrete cutting and excavation machinery, large back hoe and trench digging equipment, directional digging and under bore equipment. It will also include other small items of plant, and light and heavy vehicles used by the construction contractors and traffic controllers.

Construction will generally be restricted to standard construction hours:

- Mondays to Fridays: 7:00 am to 6:00pm;
- Saturdays: 8:00 am to 1:00 pm;
- Sundays and Public Holidays: No work.

Should construction works need to be conducted outside the times specified above, specific management measures will be implemented in accordance with EE's standard out of hours procedures.

Given that the feeder is being constructed mostly through rural areas, it is anticipated that construction noise should not greatly disturb many residential, commercial and industrial premises. However, as noted in Section 6.1, there are some receivers that are located immediately adjacent to, or approximately 100 – 200 m from the roads. These receivers may be affected by the noise from construction works. However, it is important to note that construction works will only be for a duration of 15 months across multiple locations within the 10 km alignment. The lineal nature of the works is such that noise generation will transit or move along the feeder route and not occur at a particular location for an extended period, and will thus be short-lived.

Feasible and reasonable noise mitigation and management measures will be implemented for the duration of construction works.

#### **9.10.2 Operational noise**

Once commissioned, the project (ie the feeder) will operate continuously, 24 hours a day, 7 days a week. It will generate no noise when in operation.

#### **9.10.3 Management and mitigation measures**

The following management and mitigation measures are recommended for the duration of construction works:

- Appropriate approvals are to be obtained from the affected Councils and the TfNSW as required prior to commencing construction.
- All potentially affected residents should be notified prior to the commencement of construction works. Details are to include the likely duration of the works and 24-hour contract details for the Project Manager and Construction Contractor.
- Construction works must be carried out within normal working hours unless otherwise approved. Any out-of-hours-works will be carried out in accordance with the requirements of EE's Environmental Guidelines Handbook.
- Should power generators be required to supply private properties during any stage of the construction works, the Project Manager must liaise with the S&E team. If generators are required to operate at night, acoustic consultants may be required to undertake noise assessment prior to their use.

### **9.11 Air quality and dust suppression**

#### **9.11.1 Construction**

The project has the potential to generate dust and other air emissions as a result of the construction works including trenching, excavation, under boring, vehicle emissions and vehicle driving over any loose construction material or unsealed surfaces.

As previously mentioned, areas disturbed by construction works will be progressively rehabilitated as works are completed.

Dust and exhaust emissions, such as exhaust emissions generated from construction plant and vehicles, would be temporary.

Thus, the impact of the project on the air quality in the surrounding environment will be temporary and minor.

#### **9.11.2 Operation**

During operation, the project is expected not to have any impact on air quality of the surrounding environment. Minor emissions are expected to be generated by maintenance vehicles, which will be comparable to that of other vehicles on the roads of the local road network.

#### **9.11.3 Management and mitigation measures**

The management and mitigation measures listed below will be implemented to ensure the amount of dust and emissions generated by the construction works are minimal.

- Visually monitor dust levels during construction works. If excessive dust generation is occurring on site, causing a safety issue or complaints are received, immediately follow appropriate mitigation options.
- Any disturbed areas will be revegetated or resurfaced as soon as possible after works have been completed in that area.

- Traffic movement and speed will be restricted over disturbed areas of ground and unsealed access tracks.
- Ensure any soil/spoil tracked onto roadways is swept up on a regular basis.
- Excavated materials are to be either spread out on site or removed off site immediately; no loose or stockpiled materials are to be stored without appropriate sediment controls or left uncovered for a long time.
- Vehicles and machinery are not to be left idling when not in use so as to reduce exhaust emissions.
- Dust suppression techniques, including wetting down surfaces will be used as necessary.
- Reference is to made to EE's Environmental Guideline Handbook for dust mitigation and management techniques.

## **9.12 Safety and hazards**

### **9.12.1 Construction**

All components of the project will be designed and constructed in such a manner so as to meet all statutory safety requirements in accordance with the EE's design and construction standards, and the relevant Australian Standards.

Safety precautions will be implemented throughout the construction works for the protection of the surrounding community, the workforce, road users, pedestrians and local residents. Hazards which may arise during the construction works, such as open pits, open trenching, under boring entrance and exit pits, machinery and vehicle movements and changes to road and traffic conditions will be managed appropriately.

### **9.12.2 Operation**

Once in operation, project components will be inspected and maintained in accordance with EE's maintenance standards and electricity industry requirements.

### **9.12.3 Management and mitigation measures**

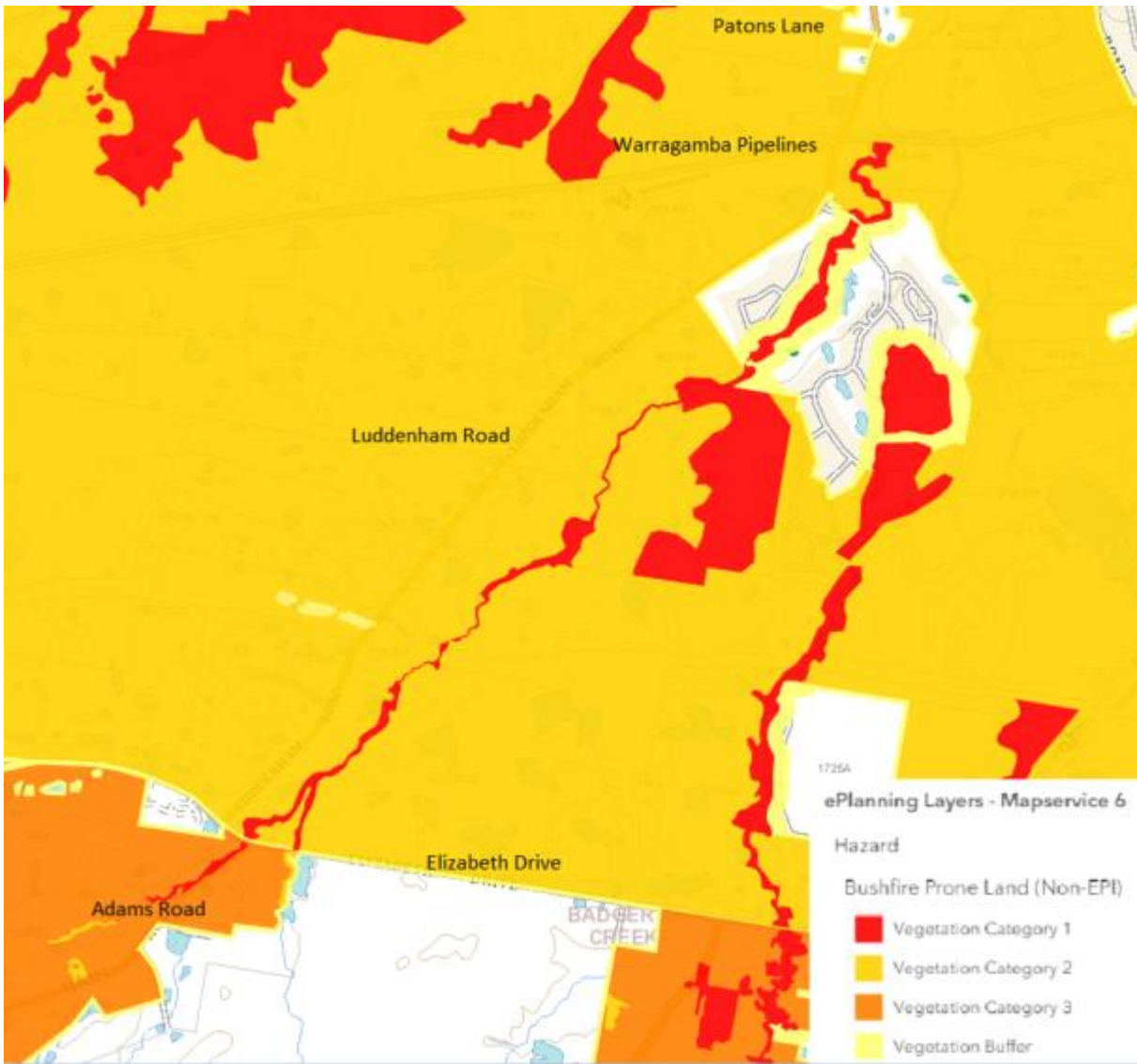
The following mitigation measures will be implemented to ensure management of safety and hazards

- Any worksite areas will be cordoned off with security fencing to direct pedestrians away from any excavations or open manholes.
- Safety signage, barriers, fencing, etc will be placed around construction areas, as required. These will be checked on a regular basis to ensure they are in adequate working condition.
- The works will not occur on days that have extreme or catastrophic fire rating.
- Any recommendations in the TMP will be implemented during the construction works.
- Any open holes that are left unattended at any time will be covered and fenced as necessary to prevent access.
- All works will be undertaken in accordance with Safework NSW requirements, EE standards and procedures and any other applicable requirements.

## **9.13 Bushfire**

Bushfire prone land is mapped within a local Government area, which becomes the trigger for planning for bushfire protection. The results of the NSW Rural Fire Service search for 'bush fire prone land' conducted on 23 May 2022 shows that most of the project route falls within bush prone land of some category.





**Figure 9-5** NSW Rural Fire Service search results for 'bush fire prone land' along the project route

### 9.13.1 Management and mitigation measures

The CEMP prepared for the project will make provision for the following bushfire protection measures:

- a site induction for contractors working on the project will include general bushfire protection measures and requirements;
- electrical equipment, plant and equipment to be used for construction works will be maintained in operational order to prevent any potential sparks;
- all legislative requirements regarding safe work procedures will be adhered to, including chemical handling and storage;
- an emergency management plan will be developed as part of the CEMP, which is to include protocols in how to respond to bushfire incidents, including evacuation during construction;
- any works that have the potential to generate heat and sparks will be restricted on days of declared catastrophic fire danger;
- vegetation clearances will be established to construct the feeder and maintained thereafter;
- construction waste will be removed from the site in a timely manner so as not to cause a fire risk or obstruct emergency vehicle access; and
- the project will be constructed and maintained in accordance with EE Company Procedure GAM 0011.

## **9.14 Waste**

### **9.14.1 Construction**

Activities associated with the construction of the project have the potential to generate waste, including surplus construction materials, old conductors and cables, general waste and excess spoil. As previously noted in Chapter 7, approximately 26,000 m<sup>3</sup> of fill material is expected to be removed from site.

Other wastes might include:

- Drilling fluids
- Construction worker generated general waste
- Unused raw materials
- Wastewater.

All waste generated during construction will be reused if appropriate, or removed, transported and disposed from site in accordance with the NSW Environment Protection Authority's *Waste Classification Guidelines* (EPA 2014) and the POEO Act.

### **9.14.2 Operation**

Once constructed, the project will generate minimal waste, with the exception of any maintenance works that may be required throughout its operational life.

### **9.14.3 Management and mitigation measures**

Measures to prevent adverse impacts in relation to generated waste will include:

- Waste mitigation and management strategies will be documented in the CEMP and in accordance with EE's Environmental Management Standard EMS 0007 Waste Management.
- Waste material generated on site will not be left on site once the works have been completed.
- Any excess waste or spoil will be disposed of at a licensed waste or recycling facility as appropriate.
- All excavated spoil will be classified prior to disposal and/or re-use. Waste disposal dockets will be obtained from the licensed waste disposal facility and copies retained for audit purposes.
- Where excavated spoil is suspected to be contaminated, works will immediately cease and the Project manager and the relevant Environmental Specialist notified. Spoil suspected of being contaminated will be tested to provide a waste classification for disposal.
- All other waste materials will be removed from the work site at the end of each working day. Where items are able to be recycled, the materials will be sorted and stored at an appropriate site (eg the nearest Field Service Centre) for collection and recycling.

## **9.15 Cumulative impacts**

The NSW Government is working closely with Councils and industry stakeholders to coordinate and refine development associated with the Aerotropolis and the surrounding precincts. Together, the different levels of government are coordinating the delivery of multiple projects that have been planned out for the Western Sydney Growth Area. Some of these projects include:

- Bringelly Road upgrade;
- Elizabeth Drive;
- The Northern Road Upgrade;
- M12 Motorway linking the M7 Motorway to the Western Sydney Airport;
- Sydney Metro – Western Sydney Airport;
- the development of multiple precincts within the growth region that will contribute to agriculture (food security), education and technology, health, services, jobs and infrastructure.

The cumulative impacts of all these developments have been considered in each of their respective environmental assessment documents. This project is small in comparison to the development and infrastructure works currently transforming the Western Sydney Growth Area, and will only be minor in terms of impacts that will arise from these larger projects. Nevertheless, any immediate cumulative impacts such as traffic congestion, noise or air quality and dust impacts will be addressed on a case-to-case basis using the management and mitigation measures provided in this REF, and standard best practice approach that EE employs during the construction of their projects.

## 10 Conclusion

The investigations undertaken as part of this REF have shown that the construction of the new 132 kv feeder will have minimal environmental impacts and should proceed subject to the mitigation measures outlined herein and in accordance with any other additional management and mitigation measures (or conditions) required by the determining authority.

There are some aspects that require further investigation:

- Potential impacts to AHIMS sites that require an ACHA, test excavation and potentially an AHIP approval; and
- Monitoring of construction at the Cosgroves Farm historic heritage site.

No work to be carried out in potential heritage sites mentioned in this REF unless further investigation is completed and approval is given by EE. Notwithstanding, the environmental assessment has concluded that the project will not have a significant effect on the environment.

It is therefore concluded that:

- an EIS is not required for the project;
- EE makes a formal determination in relation to the project;
- a separate REF will be prepared for other construction stages of the project; and
- it is required that all works be undertaken in accordance with this REF, any Notice of Determination issued in relation to this REF, the associated CEMP and any other specific mitigation measures that have been developed for this project.

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- 11 Appendix A Design Plans**
- 12 Appendix B Aboriginal Heritage Due Diligence**
- 13 Appendix C Historic Heritage Assessment**
- 14 Appendix D Flora and Fauna Assessment**