Badgerys Creek Zone Substation

Review of Environmental Factors

Prepared for Endeavour Energy

November 2024

Badgerys Creek Zone Substation

Review of Environmental Factors

Endeavour Energy

E220571 RP30

November 2024

Version	Date	Prepared by	Reviewed by	Comments
1	10 October 2023	Sheri Thomson	Philip Towler	Draft
2	1 December 2023	Sheri Thomson	Philip Towler	Final – TfNSW comments added
3	11 November 2024	Sheri Thomson	Janet Krick	Updated to include larger works area and additional works

I certify that I have prepared the contents of this REF, and, to the best of my knowledge, it is in accordance with the Code approved under clause 244K of the Environmental Planning and Assessment Regulation 2000, and the information it contains is neither false nor misleading.

Reviewed by

Janet Krick
Associate
11 November 2024

Ground floor 20 Chandos Street
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Executive Summary

Endeavour Energy (EE) proposes to establish a new indoor 132/33-kilovolt (kV) zone substation named Badgerys Creek Zone Substation (the project) in the north-western corner of 1669-1723 Elizabeth Drive, Badgerys Creek, NSW (the project site). The project site is within the Elizabeth Enterprise Precinct (EEP).

The project is part of the broader electricity transmission and distribution network supply strategy to meet increasing electricity demand in the Western Sydney Growth Areas, the Western Sydney Aerotropolis Area and surrounding supporting developments. Specifically, Badgerys Creek Zone Substation will supply major distribution clients within the Badgerys Creek precinct area including Mirvac EEP, Sydney Water Advanced Water Recycling Facility and Badgerys Creek Enterprise. The project is the subject of this Review of Environmental Factors (REF).

The key features of the project will involve enabling works, construction, and operation of Badgerys Creek Zone Substation and associated landscaping and onsite stormwater management systems.

The purpose of this REF is to examine and consider, to the fullest extent possible, all matters affecting or likely to affect the environment as a result of this proposal. This REF details the possible environmental impacts associated with the project and identifies mitigating measures to be incorporated into the design, construction, and operation of the substation to minimise environmental impacts. This REF has been advised by the following technical reports which can be found as appendices to this report: Aboriginal Test Excavation Report (Artefact 2020); Aboriginal Cultural Heritage Assessment Report (ACHAR) (Artefact 2022); a Noise Impact Assessment (EMM 2022), and a Biodiversity Assessment Report (ecologique 2024, previously known as Eco Logical).

The project site is currently surrounded by a mix of agricultural, commercial, industrial and rural residential land uses. CH Horsemanship is situated to the north, Badgerys Creek Waste Management Service to the northwest, Animal Welfare League to the southeast, agriculture to the south and the future Western Sydney Airport to the southwest. The project will sit in the northwestern corner of the EEP, surrounded to the east and south by warehouses once EEP construction finishes. Due to the project site's historical native vegetation clearance and agricultural use, environmental risks are low. The main environmental risks of the project are associated with potential archaeological deposit (PAD) Aboriginal heritage sites. A buffer area of 5 m will be established around Aboriginal Heritage Information Management System (AHIMS) sites 45-5-5624 (PAD EP AS 03) and 45-5-5625 (PAD EP AS 04) and newly discovered PAD site EEP S2 PAD03.

Mitigation measures identified in Chapter 8 and 9 of this REF will be included in the Construction Environmental Management Plan (CEMP) and implemented to manage any potential environmental risks associated with the project.

Endeavour Energy is the Determining Authority for the project. The project is subject to the provisions of The Code of Practice (The Code) for Authorised Network Operators (ANO), State Environmental Planning Policy (Transport and Infrastructure) 2021 (TISEPP) and requires assessment and approval under Part 5 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

Certification

I certify that I have reviewed and endorsed the contents of this REF document and, to the best of my knowledge, it is in accordance with the *Environmental Planning and Assessment Act 1979* (EP&A Act), the Environmental Planning and Assessment Regulation 2000 (EP&A Regulation) and the Guidelines for Division 5.1 Assessments approved under clause 170 of the EP&A Regulation, and the information it contains is neither false or misleading. This is a determination that the proposal as assessed in this REF meets the requirements under Part 5 of the EP&A Act.

Endrosed by	**Approved by**
Name Janet Krick	**Name:** Mohammad Alam
Title: Associate	**Title:** Environmental Specialist
Company: EMM Consulting Pty Limited	**Company:** Endeavour Energy
Date: 11 November 2024	**Date:**
	Mohammad.Alam@endeavourenergy.com.au Digitally signed by Mohammad.Alam@endeavourenergy.com.au DN: cn=Mohammad.Alam@endeavourenergy.com.au, email=Mohammad.Alam@endeavourenergy.com.au Date: 2024.11.20 17:37:37 +11'00'
Signature:	**Signature:**

TABLE OF CONTENTS

Appendices

Tables

Figures

List of abbreviations and glossary of terms

Term	Meaning
A	Amp: the unit of measure for current (or load) which is the amount
AHIMS	Aboriginal Heritage Information Management System
ANO	Authorised Network Operator under the *Electricity Networks Assets (Authorised Transactions) Act 2015*
ASP	Accredited Service Provider
CEMP	Construction Environmental Management Plan
DCCEEW	Department of Climate Change, Energy, the Environment and Water
Determining Authority	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.
BYDA	Before You Dig Australia
DC	Direct Current
DPE	Department of Planning and Environment
DM	Demand Management
EE	Endeavour Energy
EMP	Environmental Management Plan
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW). Provides the legislative framework for land use planning and development assessment in NSW.
EP&A Regulations	Environmental Planning and Assessment Regulation 2021
EPA	Environment Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth). Provides for the protection of the environment, especially matters of national environmental significance, and provides a national assessment and approvals process.
ES Act	*Electricity Supply Act 1995*
ESCP	Erosion and Sediment Control Plan
ESD	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.
EWP	Elevation Work Platform
Feeder	A set of electric conductors that distribute electricity
HDD	Horizontal Directional Drilling
HV	High Voltage
Hz	Hertz
Joint bay	Concrete bay constructed in various locations along a feeder route which is used for jointing lengths of cable together
km	Kilometre

Term	Meaning
kV	Kilovolts
LEP	Local Environmental Plan: a type of EPI made under Part 3 of the EP&A Act.
LGA	Local Government Area
m	metre
MNES	Matter of National Environmental Significance
NP	National Park
NPW Act	*National Parks and Wildlife Act 1974*
OEH	Office of the Environment and Heritage
OH	Overhead
PCC	Penrith City Council
POEO Act	*Protection of the Environment Operations Act 1997*
REF	Review of Environmental Factors
Road	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.
SCADA	Supervisory Control and Data Acquisition
SEPP	State Environmental Planning Policy: a type of EIP made under Part 3 of the EP&A Act
SIS	Species Impact Statement
The Code	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.
TMP	Traffic Management Plan
UGOH	Underground to overhead construction – a structure which facilitates the transition of underground cabling to aerial (overhead) construction
V	Volt: the unit of measure for voltage which is the pressure that electricity is pushed through the wire
ZS	Zone Substation

1 Introduction

1.1 Background

Endeavour Energy (EE) is a network electricity distributor operator 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 establish a new zone substation in the north-western corner of the master planned Elizabeth Enterprise Precinct (EEP) at 1669–1723, Elizabeth Drive, Badgerys Creek, NSW. The wider EEP will be assessed separately as a State Significant Development (SSD).

EEP will be a 244-hectare industrial estate 800 metres (m) from Western Sydney Airport that will accommodate warehouses, distribution centres, a road network and Badgerys Creek ZS.

The project is part of a broader transmission supply strategy to meet increasing electricity demand and address network limitations in the Luddenham, Kemps Creek, and Badgerys Creek 33 kilovolt (kV) network. The proposed substation (9,169 square metres (m^2)) will be supplied by two 132 kV feeders, one from Western Sydney Airport TS (Transmission Substation) and the other from a new tee from Feeder 93X on a land parcel inside the EEP.

EMM Consulting Pty Limited (EMM) has been engaged by EE to prepare a review of environmental factors (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 project.

This 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 sensitives at the site, a site visit conducted on 12 December 2022 (Plate 1.1) by EMM's REF author, technical assessment reports and other relevant project documentation provided by EE.

Source: S. Thomson

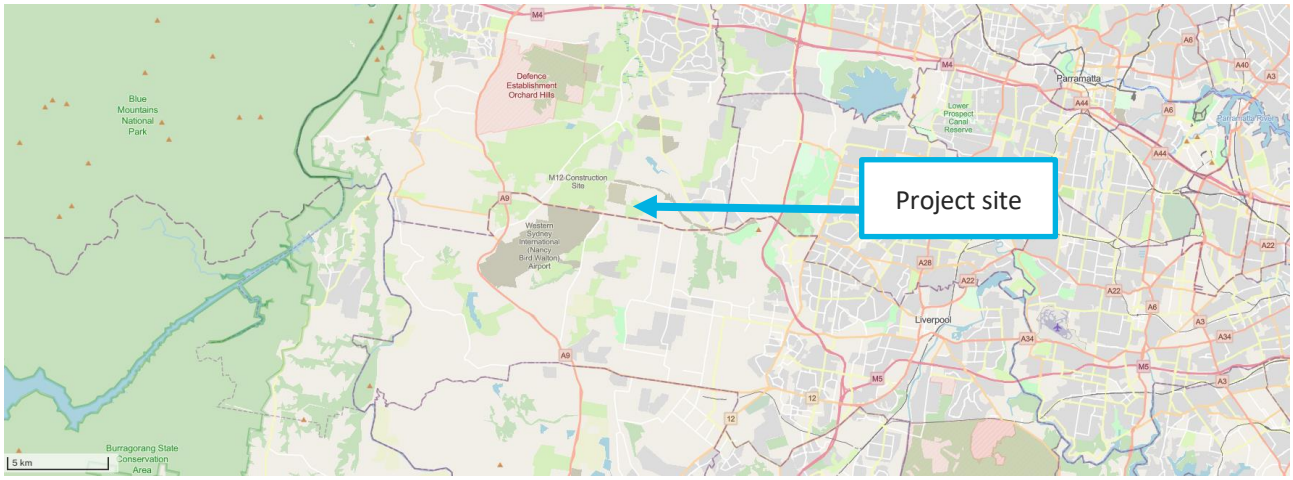
Plate 1.1 Project site looking northeast

1.2 Location of the project site

The project site includes Lot 99 DP1283398 in which the future Badgerys Creek Zone Substation (BC ZS) will be located, plus an enabling works area within 1669–1723 Elizabeth Drive. The Project site off Elizabeth Drive, Badgerys Creek, NSW. The project site is described further in Chapter 6 and shown in Figure 7.3.

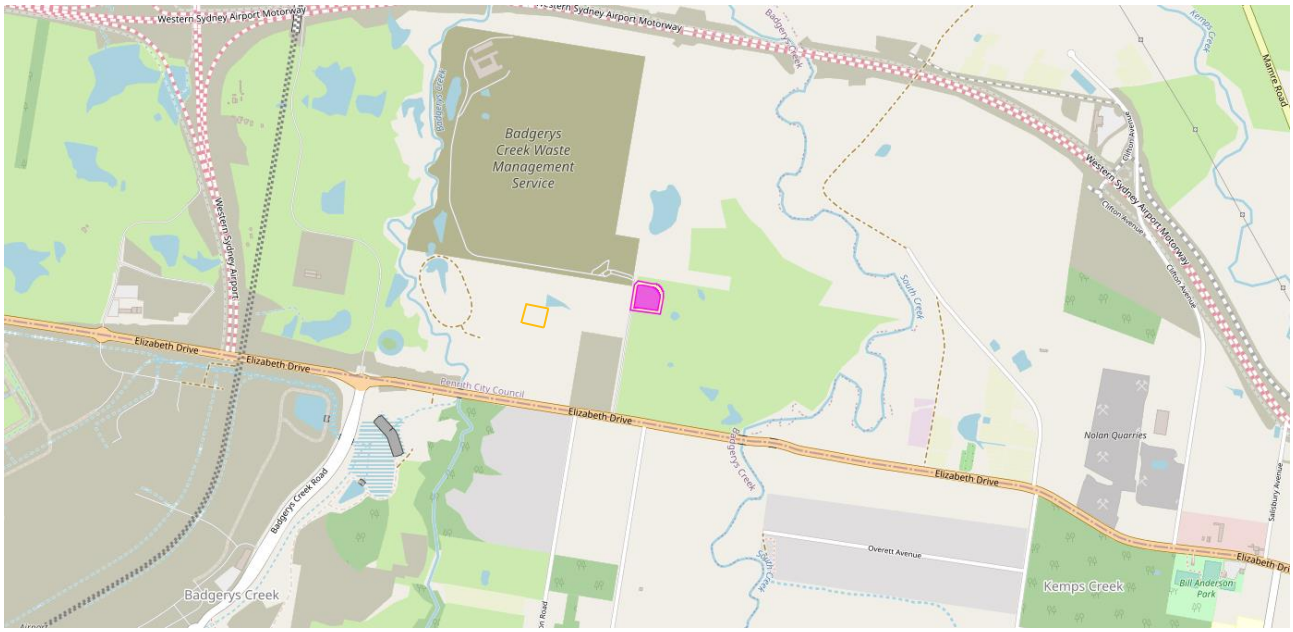
The regional and local settings of the project site are shown in Figure 1.1 and Figure 1.2, respectively. The project is located within Penrith City Council (PCC) Local Government Area (LGA) in the Sydney Basin area. The project is approximately 1 kilometre (km) north-east of Western Sydney Airport, 15 km south-east of Penrith central business district (CBD) and 40 km west of Sydney's CBD.

The project site is zoned ENT Enterprise under the State Environmental Planning Policy (Precincts - Western Parkland City) 2021 (Western Parkland City SEPP) (refer to Figure 3.1).



Source: Sharing and Enabling Environmental Data (SEED) portal

Figure 1.1 Regional setting of the project site



Source: SEED portal

Figure 1.2 Local setting of Badgerys Creek Zone Substation (shown in pink) (enabling works area not included)

1.3 Proponent

EE is the project proponent. EE operates under national electricity laws, statutory instruments, and policies which government networks in the National Electricity Market. The EE network spans over 25,000 square kilometres (km^2) and services over 2.7 million people across Sydney's Greater West, the Blue Mountains, the Southern Highlands, Illawarra and the South Coast of NSW.

Proponent details are provided in Table 1.1.

Table 1.1 Proponent details

Specification	Details
Proponent	Endeavour Energy
Address	10 Darcy Street, Parramatta NSW 2150
Website	https://www.endeavourenergy.com.au/
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 Chapter 7 of this REF.

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. 7* (EE 2019) and in accordance with requirements set out in the Code, with the exception of a small number of additional sections added for greater clarity.

2 Project justification

2.1 Overview

The project site is located off Elizabeth Drive in the Greater Western Sydney region also referred to as Western Parkland City. The project will service the Badgerys Creek precinct area including Mirvac EEP, Sydney Water Advanced Recycling Facility and Badgerys Creek Enterprise.

The project plays a key role within EE's broader distribution network to connect and provide electricity to this rapidly transforming part of Sydney including the new industrial premises of the Elizabeth Drive Precinct in which the project will reside.

This chapter describes the strategic context, need, objectives, and benefits of the project.

2.2 Strategic context

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

Based on the NSW Government predictions, Sydney's population will continue to grow to nearly eight million people over the next 40 years. 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.

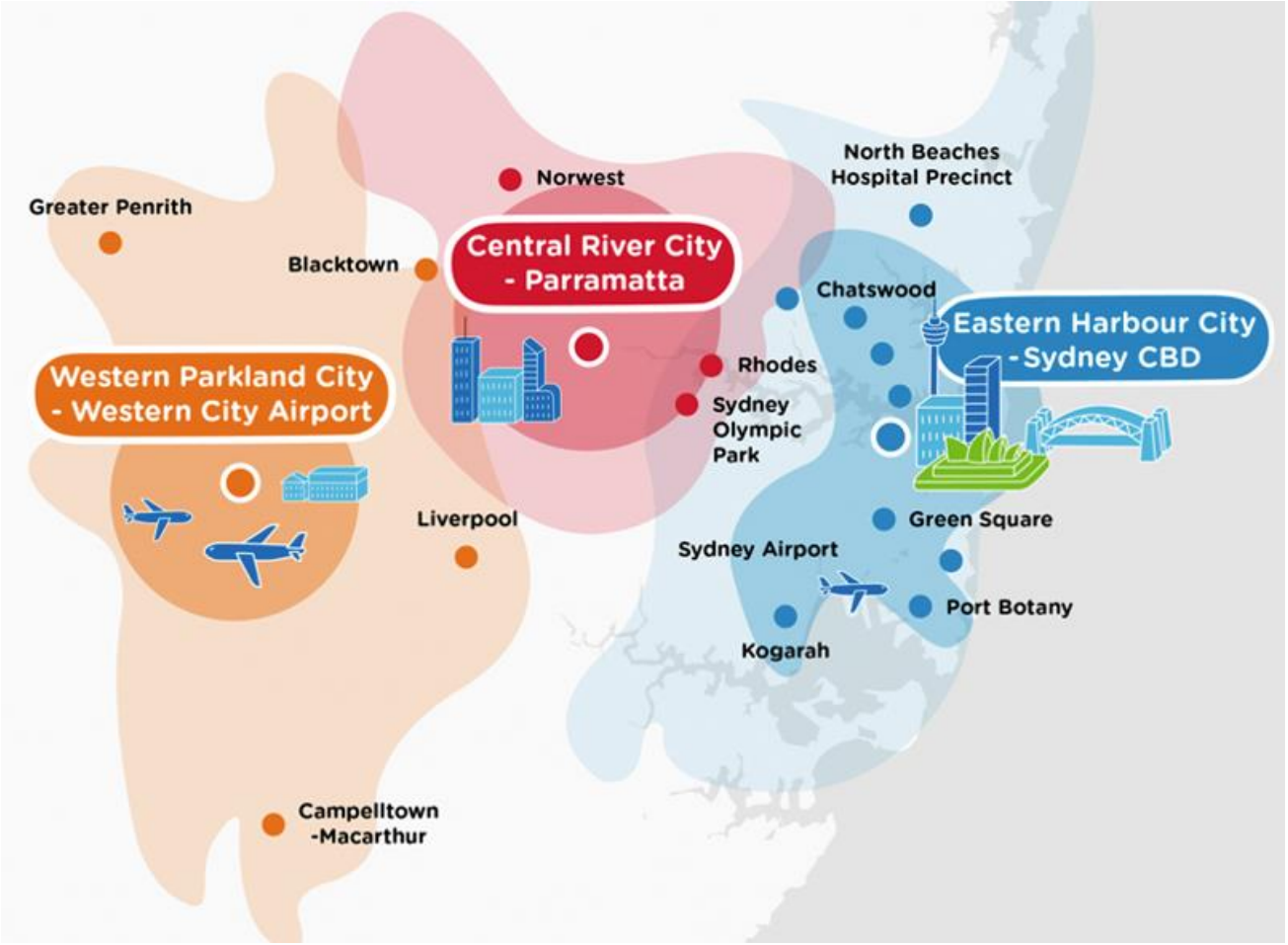
One of the key growth areas has been the Western Parkland City (see Figure 2.1). Government plans for Western Sydney have evolved in the last few decades, and especially with the release of the Greater Sydney Region Plan 'A Metropolis of Three Cities' (the Greater Sydney Region Plan) in 2018 which projects the following growth for the Western Parkland City (GSC 2018a):

- population increase from 740,000 in 2016 to 1,120,000 in 2036, which would include a 28% population increase in the 0–19-year-old bracket and 17% increase in +65-year-old bracket
- approximately 210,000 additional dwellings between 2016–2036
- approximately 237,000 additional jobs between 2016–2036.

These projects have impacted the land use vision of Western Sydney; in particular, with the creation of the 'three cities' concept. Since the release of the Greater Sydney Region Plan, work on infrastructure and housing provision in Sydney's greater west has accelerated with significant investment in precincts, infrastructure and development, particularly with large scale projects such as the Western Sydney Airport, the Sydney Metro, Sydney Science Park, and the Bringelly Road, Elizabeth Drive and Northern Road upgrades (GSC 2018b). The provision of utilities is a critical component of this growth.

The project aligns with Greater Sydney Commission's (GSC) *Our Greater Sydney 2056 Western City District Plan – connecting communities* (WSD Plan) (GSC 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
- optimise infrastructure use.



Source: Investment NSW (2021).

Figure 2.1 A Metropolis of Three Cities concept map

2.2.2 Western Sydney Aerotropolis Precinct Plan

The project is approximately 1 km north-east of Western Sydney Airport, on Enterprise (ENT) zoned land. The project will support growth in the regions of Luddenham, Kemps Creek, and Badgerys Creek, including the Aerotropolis Area.

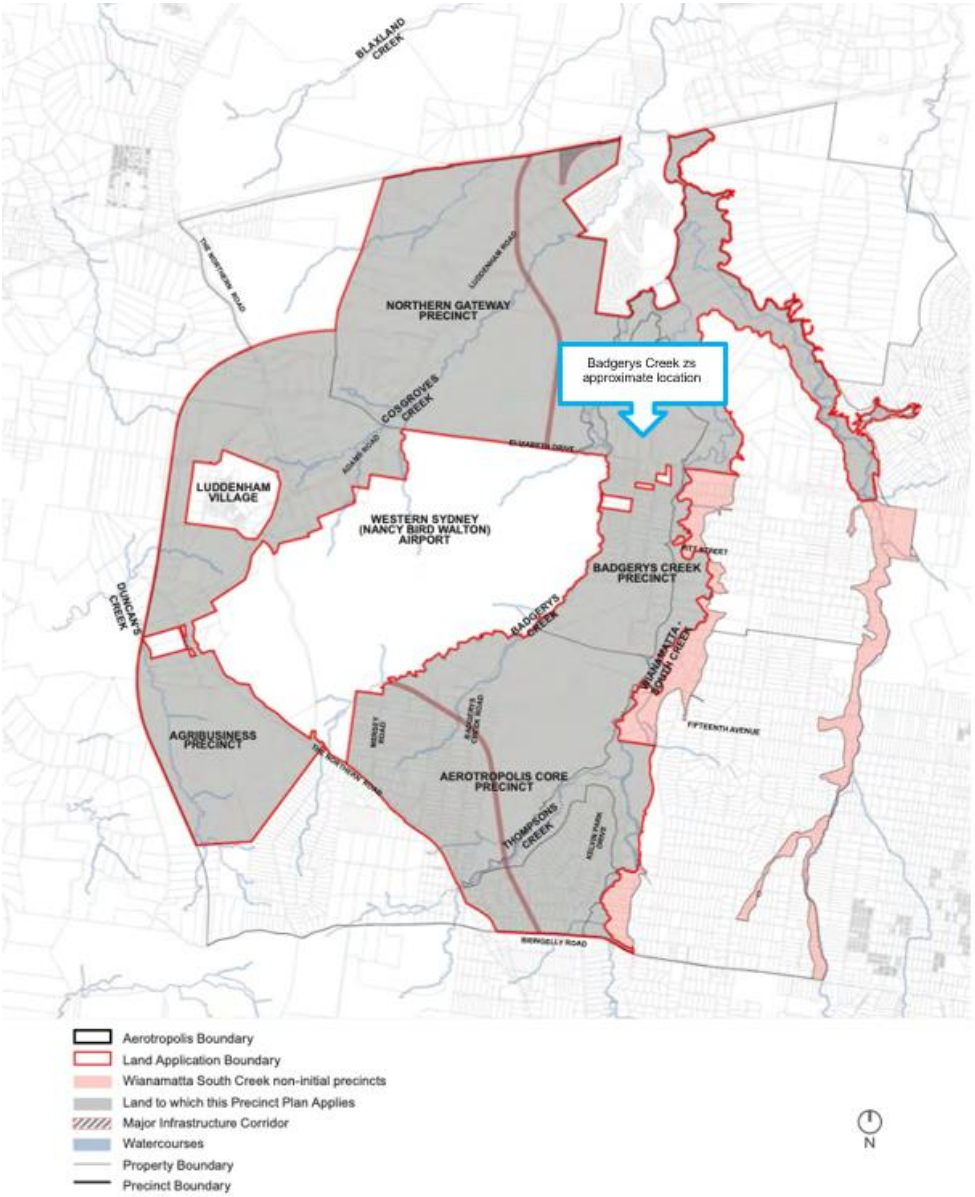
The project's proximity to Western Sydney Airport and surrounding developments makes it crucial in supporting and servicing development of the new growth area. The State Government plans to transform the Aerotropolis area into the following key precincts shown in the land use figure (Figure 2.2).

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

The project aligns with several 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).

Thus, the project is crucial in servicing new infrastructure and development in the Badgerys Creek Precinct and to support the supply security and reliability of the entire Aerotropolis area. Growth of the area is dependent on the delivery of safe, efficient, and cost-effective utilities, which EE is committed to providing as part of their broader transmission supply network in line with State Government plans, policies, and targets.



Source: Western Sydney Aerotropolis Precinct Plan (DPE 2022a)

Figure 2.2 Land application map

2.3 Project need

The project, located in the Western Sydney Priority Growth Area, is part of EE's overarching strategy to meet increasing electricity demand from SSI and SSD associated with the Western Sydney Priority Growth Area including the EEP, Sydney Water Advanced Water Recycling Facility, and Badgerys Creek Enterprise (EE 2022). The Western Sydney Growth Area in Sydney's south-west will provide greater opportunities for new homes, jobs, education, health, services, and infrastructure 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, commercial and infrastructure development growth within this region of Sydney.

The project is crucial for the safe and reliable operation of infrastructure and development.

2.4 Project objectives

The key objective of the project is to provide a reliable source of electricity to meet the residual and actual load demand of the Elizabeth Enterprise Precinct and surrounding areas.

2.5 Project benefits

Residents, commercial and industrial business operators, and their customers will all benefit from safe, efficient, cost-effective, and continuous electrical supply within the EEP and Western Sydney growth area.

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 EEP Plan, Aerotropolis Plan and the Western Parkland City SEPP, as well as numerous other strategic plans for this area.

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 Aerotropolis 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

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 provides for State environmental planning policies (SEPPs) and local environmental plans (LEP) to regulate development.

Relevant provisions from statutory instruments are examined below.

3.2.1 NSW Environmental Planning and Assessment Act 1979

i Development

The EP&A Act includes a definition of 'development' (refer Section 1.5 of the EP&A Act) being:

(1) For the purposes of this Act, ***development*** is any of the following:

a) the use of land

b) the subdivision of land

c) the erection of a building

d) the carrying out of a work

e) the demolition of a building or work

f) any other act, matter or thing that may be controlled by an environmental planning instrument.

(2) However, development does not include any act, matter or thing excluded by the regulations (either generally for the purposes of this Act or only for the purposes of specified provisions of this Act).

The proposed works are therefore considered to be development and the EP&A Act and its supporting instruments apply.

Section 3.18 of the EP&A Act states that and environmental planning instrument may provide for specified development to be carried out without development consent, or with development consent.

Further, Section 4.2 of the EP&A Act provides that an environmental planning instrument (such as a local environmental plan or State environmental planning policy) may provide for development to be carried out with consent.

The State Environmental Planning Policy (Transport and Infrastructure) 2021 (Transport and Infrastructure SEPP) (see Section 3.2.3 below) provides at Section 2.44(1) that 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 (unless the land is reserved under the *NSW National Parks and Wildlife Act 1974*).

Therefore, the proposed development is permitted without consent.

The provisions under Part 4 of the EP&A Act therefore do not apply to this proposed development but the provisions of Part 5 of the EP&A Act are triggered because Division 5.1 of Part 5 defines 'activities' to include the use of land, erection of a building and the carrying out of a work, provided that the activity is not exempt development, prohibited development or development which requires consent under Part 4.

ii Determining authority

Under Section 5.1 of the EP&A Act, the term 'determining authority' is defined as a Minister or public authority and, in relation to any activity, means the 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.

In this case, EE is the public authority by or on whose behalf the activity is to be caried out and is therefore the determining authority.

iii Environmental assessment

Section 5.5 of the EP&A Act stipulates that a determining authority, in its consideration of an activity shall, notwithstanding any other provisions of this Act or the provisions of any other Act or of any instrument made under this or any other Act, examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity.

If the activity is found to be likely to significantly affect the environment, then Section 5.7(1) requires an environmental impact statement (EIS) to be prepared.

3.2.2 Environmental Planning and Assessment Regulation 2021

Section 171(2) of the EP&A Regulation stipulates that the determining authority must take into account certain prescribed environmental factors.

Section 171(3) stipulates that a determining authority must prepare a review of the environmental factors that demonstrates how the environmental factors were taken into account. These factors are considered within an REF for a project. Table 3.2 includes an itemised list of these factors for the project.

Section 171(4) requires the REF to be published if the activity has a capital investment value of more than $5 million, it requires a permit under certain other legislation (e.g. *Heritage Act 1977*), or if considered in the public interest to do so.

3.2.3 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) [now clause 2.5 (1, 2) of Chapter 2 the State Environmental Planning Policy (Resilience and Hazards) 2021].

- All the provisions of State Environmental Planning Policy (State Significant Precincts) 2005 (State Significant Precincts SEPP). The State Significant Precincts SEPP has been consolidated into the State Environmental Planning Policy (Precincts- Regional) 2021 (Regional SEPP) (DPE 2022).

The State Significant Precincts SEPP sets out the process for the rezoning of State Significant Precincts, which is no longer relevant given the area of the project has already been rezoned under the Western Parkland City SEPP (refer to Section 3.4). Furthermore, the State Significant Precincts SEPP has been consolidated into the State Environmental Planning Policy (Precincts–Regional) 2021 (Regional SEPP).

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:

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

3.2.4 NSW Code of Practice for Authorised Network Operators (ANO)

i Determining authority

The Code is the approved Code undersection 198 of the EP&A Regulation (2021). 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 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.

ii 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.

For the most part, construction impacts of the project will be confined to the area shown in Appendix A which will be within the project site. The northern side of the project will be within 100 m of the yet-to-be constructed Eastern Ring Road and the project's all weather access track will align with Eastern Ring Road.

As described in Chapter 7, 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.

iii 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 project. The table below specifies the outlined assessment requirements and where they have been addressed in this REF are provided in Table 3.1.

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 8 Environmental assessment and mitigation
	Discuss viable alternatives and any mitigation measures to be implemented.	Chapter 5 Consideration of alternatives
Certification	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.	Above Executive Summary
The proponent, determining authorities and any required approvals	Identify the proponent and all determining authorities and required approvals for the activity.	Section 1.3 Proponent Section 3.2.4 NSW Code of Practice for Authorised Network Operators, Determining authority
The environment of the activity	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.	Section 3.3 *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* Chapter 6 Existing environment Section 8.3 Heritage Section 8.9 Visual amenity
	The REF must identify and describe Threatened Species Populations and Ecological Communities that are likely to occur in the area affected by the activity.	Section 8.4 Biodiversity
The impacts of the activity	The likely environmental impacts for all phases of the activity and describe their extent, size, scope, intensity and duration.	Chapter 8 Environmental assessment and mitigation
	As a minimum, the REF should document consideration of each of the factors listed in clause 171(2) of the EP&A Regulation and the document consideration of each of the factors listed in Section 5A of the EP&A Act in relation to Threatened Species, Populations and Ecological Communities (including fish and marine vegetation), and their Habitats.	Chapter 8 Environmental assessment and mitigation
	List the sources and data the ANO relied on when preparing the REF.	References Appendices
Mitigating measures that will apply to the activity	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.	Chapter 9 Environmental management Chapter 8 Environmental assessment and mitigation

Table 3.1 REF requirements specified in the NSW Code for Authorised Network Operators

Requirement	Summarised description	Addressed
Summary of impacts	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.	Chapter 10 Conclusion
Consultation	Record the consultation undertaken for the purposes of preparing the REF in accordance with Section 2.3.7 of the Code.	Chapter 4 Consultation
Conclusions regarding an EIS and/or a SIS	The REF should describe: Whether the activity is likely to significantly affect the environment, in which case an EIS is required; and Whether the activity is likely to significantly affect Threatened Species, Populations, Ecological Communities or their Habitats, in which case a SIS is required. Describe the reasons for these conclusions, referencing the more detailed assessments in the body of the REF for support.	Section 3.2.1i Transport and Infrastructure State Environmental Planning Policy 2021 Section 8.3 Heritage Section 8.4 Biodiversity Chapter 10 Conclusion
	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.	Chapter 10 Conclusion

3.3 Commonwealth Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) outlines the Commonwealth Government's role regarding 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)

- 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.

An assessment of the project in consideration of flora and fauna protected under the EPBC Act was completed against a search of the Protected Matters Search Tool (PMST) for the project site with area buffer of 5 km, as summarised in Table 3.2.

Table 3.2 Assessment against the EPBC Act

MNES and other matters protected by the EPBC Act	Search result	Predicted impacts
MNES		
World heritage properties	There are no world heritage properties (including buffer zones) within the search area.	No significant impact predicted.
National heritage places	There are no national heritage properties (including buffer zones) within the search area.	No significant impact predicted.
Wetlands of international importance (listed under the Ramsar Convention)	There are no wetlands of international importance located within the search area.	No significant impact predicted.
Great Barrier Reef marine park	There are no Great Barrier Reef marine parks within the search area.	No significant impact predicted.
Commonwealth marine area	There are no Commonwealth marine areas within the search area.	No significant impact predicted.
Listed threatened ecological communities (TECs)	There are six listed threatened ecological communities recorded in the search area.	A couple Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion trees stand just outside the northern boundary of the project site. However, no trees will be removed or trimmed as part of the project, therefore, no Assessment of Significance was completed.
Listed threatened species	There are 51 listed threatened species recorded in the search area.	Habitat constraints within the project site are considered degraded to the point that the threatened species are unlikely to use the project site. Therefore, no Assessment of Significance was completed.
Listed migratory species	There are 11 migratory species recorded in the search area.	Habitat constraints within the project site are considered degraded to the point that the threatened species are unlikely to use the project site. Therefore, no Assessment of Significance was completed.
Other matters protected by the EPBC Act		
Commonwealth lands	There are three parcels of Commonwealth land within the search area.	No impact predicted as the project will be contained within the site boundaries.

Table 3.2 Assessment against the EPBC Act

MNES and other matters protected by the EPBC Act	Search result	Predicted impacts
Commonwealth heritage places	There are no listed Heritage Places within the search area.	No impact predicted.
Listed marine species	There are 22 listed marine species recorded in the search area. This includes mostly migratory bird species.	Habitat constraints within the project site are considered degraded to the point that the threatened species are unlikely to use the project site. Therefore, no Assessment of Significance was completed.
Whales and other crustaceans	No whales or other crustaceans have been recorded in the search area.	No significant impact predicted.
Critical habitat	There are no critical habitats in the search area.	No significant impact predicted.
Commonwealth reserves terrestrials	There are no Commonwealth reserves terrestrials within the search area.	No significant impact predicted.
Australian marine parks	There are no Australian marine parks within the search area.	No significant impact predicted.
Habitat critical to the survival of marine turtles	There is no habitat critical to the survival of marine turtles within the search area.	No significant impact predicted.

3.4 Land use and permissibility

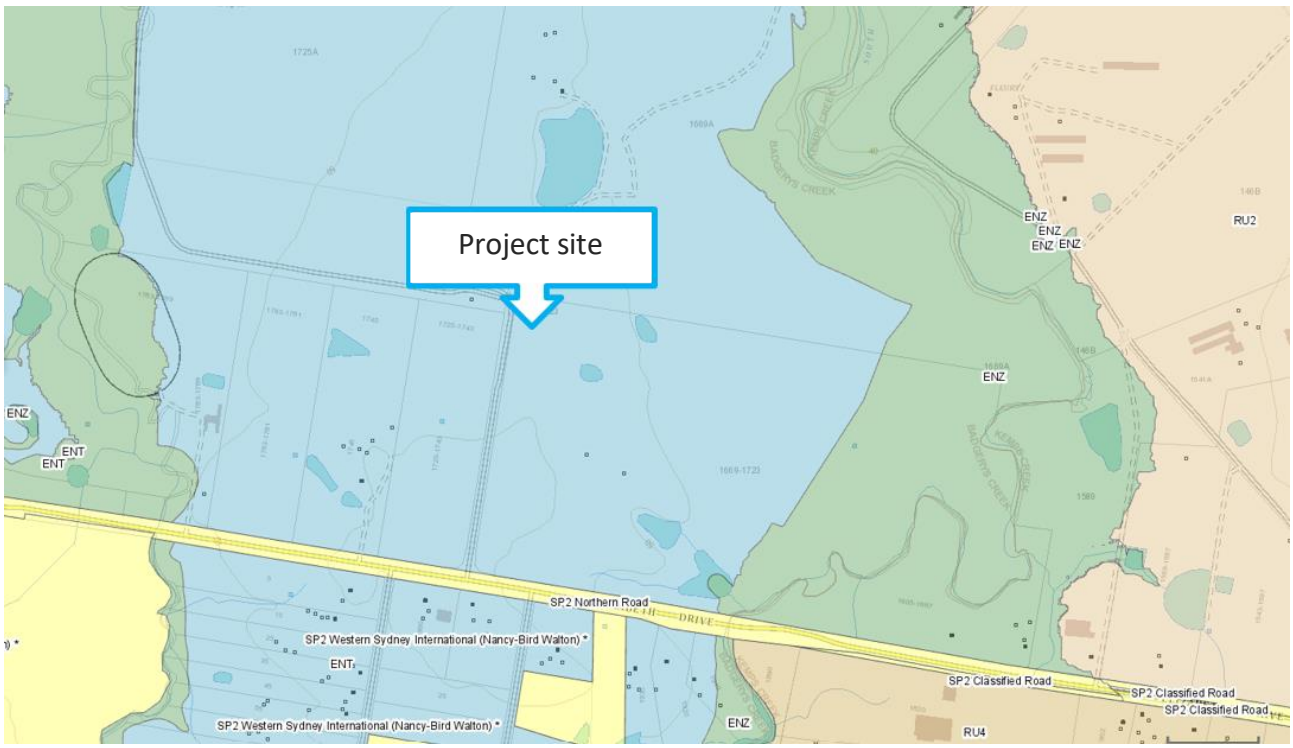
Under Section 2.44 of the Transport and Infrastructure SEPP, development for the purpose of an electricity transmission or distribution network may be carried out by or on behalf of an electricity supply authority or public authority without consent on any land. It is noted in Section 2.43, electricity and distribution networks include electricity substations in the definition. As such, this project is permissible. However, to assess the strategic land use compatibility, the zoning of the land and its objectives have also been reviewed, as set out below.

The project site is currently zoned Enterprise (ENT) (Figure 3.1) in the State Environmental Planning Policy (Western Sydney Aerotropolis) 2020 (the Western Sydney Aerotropolis SEPP).

The Western Sydney Aerotropolis SEPP stipulates the objectives of ENT zoned land as to:

- encourage employment and businesses related to professional services, high technology, aviation, logistics, food production and processing, health, education, and creative industries
- provide a range of employment uses (including aerospace and defence industries) that are compatible with future technology and work arrangements
- encourage development that promotes the efficient use of resources, through waste minimisation, recycling, and re-use
- ensure an appropriate transition from nonurban land uses and environmental conservation areas in surrounding areas to employment uses in the zone
- provide facilities and services to meet the needs of businesses and workers.

As described in Chapter 2, the project enables the achievement of these objectives.



Source: Planning Portal (DPE 2022b)

Figure 3.1 Land zoning map for the project site and surrounds

3.5 NSW Environment and Planning Assessment Regulation 2021

Section 5.10a of the Act sets out mandatory factors an REF must consider. Table 3.3 lists these factors and where their assessment can be found within this REF.

Table 3.3 Section 171(2) Review of environmental factors – the Act, s5.10(a)

Clause	Response
a) the environmental impact on the community,	The construction of the project will have temporary impacts on residents adjacent to the subject site, including potential elevated noise and visual impacts. Should there be any planned electricity outages, relevant residents, educational, commercial, and industrial premises will be notified (refer to Section 8.10). 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.
b) the transformation of the locality,	The surrounding area is undergoing significant transformation. Once construction in the Elizabeth Enterprise Precinct is completed, the ZS will not be visible from Elizabeth Drive due to the location of warehouses between the ZS and Elizabeth Drive (refer to Section 8.9). The scale of the project is minor compared to the surrounding development.
c) the environmental impact on the ecosystems of the locality,	The local ecosystems are not expected to be adversely impacted (refer to Section 8.4).
d) reduction of the aesthetic, recreational, scientific, or other environmental quality or value of the locality,	The project will be constructed in 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 EEP and Badgerys Creek Enterprise.

Table 3.3 Section 171(2) Review of environmental factors – the Act, s5.10(a)

Clause	Response
e) the effects on any locality, place or building that has— i) aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific, or social significance, or ii) other special value for present or future generations,	Impacts to Aboriginal and historic heritage are not expected. An Aboriginal Cultural Heritage Assessment Report for the EEP, including test excavation determined the extent of Aboriginal materials is outside the boundary of the project site. No known heritage items are located within the project site. (refer to sections 8.2 and 8.3, respectively).
f) the impact on the habitat of protected animals, within the meaning of the *Biodiversity Conservation Act 2016*,	Impacts to habitat of protected animals are not expected (refer to Section 8.4).
g) the endangering of a species of animal, plant or other form of life, whether living on land, in water or in the air,	The project is not expected to endanger any species of animal, plant, or other form of life (refer to Section 8.4).
h) long-term effects on the environment,	No long-term negative effects on the environment are expected as a result of the project. The project is necessary to service EEP and Badgerys Creek Enterprise.
i) degradation of the quality of the environment,	No long-term degradation of the quality of the environment is expected as a result of the project.
j) risk to the safety of the environment,	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. 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.
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.
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 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 8.16, the entire project precinct and surrounding precincts are currently in the process of being transformed, 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.

Table 3.3 Section 171(2) Review of environmental factors – the Act, s5.10(a)

Clause	Response
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 8 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.

The consultation undertaken in accordance with these requirements is summarised in Section 4.2.

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 Environment Protection Authority (EPA). 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 is classified, handled, transported, and disposed appropriately
- environmental incidents involving actual or potential harm to human health, or the environment are reported to EPA (refer Chapters 8 and 9 for management measures).

3.6.3 Environment Operations (Waste) Regulation 2014

The Environment Operations (Waste) Regulation 2014 (Waste Regulation) is a key piece of legislation for the regulatory framework in NSW and includes strict thresholds for Environmental Protection Licences (EPLs). Under the Waste Regulation, a Resource Recovery Exemption and a Resource Recovery Order allow for the reuse of virgin excavated natural materials (VENM) or excavated natural materials (ENM) for the purpose of application to land as engineering fill or for use in earthworks. Resource recovery orders and exemptions have been developed by the EPA to ensure that "the use of waste must be genuine, fit-for-purpose and cause no harm to the environment or human health".

According to the EPA, all soil stockpiles for the purpose of re-use as fill must be classified as either VENM or ENM in order to be transported and used as fill. Excavated natural material is defined as:

> …natural material that:
>
> - has been excavated or quarried from areas not contaminated with manufactured chemicals or process residues, as a result of industrial, commercial, mining or agricultural activities
> - does not contain sulphidic ores or soils and includes natural material that meets such criteria for virgin excavated natural material.

In addition to a range of criteria for chemical and other attributes, generators of VENM must assess the past and present activities on the site and surrounding land. Any material requiring excavation will be assessed for relevant contaminants of concern.

3.6.4 NSW Biodiversity Conservation Act 2016

In accordance with the NSW *Biodiversity Conservation Act 2016* (BC Act), several factors need to be considered 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.

Biodiversity is considered in Section 8.4.

3.6.5 Summary of legislative requirements

A summary of relevant legislative requirements not addressed above is provided in Table 3.4.

Table 3.4 Other legislative requirements

Legislation	Authority	Responsibility	Requirement	Comment
NSW *Contaminated Land Management Act 1997* (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 *Electricity Supply Act 1995* (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.

Table 3.4 Other legislative requirements

Legislation	Authority	Responsibility	Requirement	Comment
NSW *Heritage Act 1977* (Heritage Act)	DPE/ Heritage Council	EE/Project manager	Consideration – under s139 as to whether a permit to excavate or disturb land is required.	AHIMS 45-5-5624 and 45-5-5625 are to be cordoned off including a 5 m buffer zone to prevent works from impacting the sites.. Works are not to be done outsidde the area assesed within this REF. Works vehicles and personell are to stay within the works boundaries as shown on Figure 7.3.
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.	Council will be notified as part of the REF process.
Transport and Infrastructure SEPP	Local Council	EE	Notification – under s42 of 21 days' notice for works involving new or existing feeders.	Council will be notified as part of REF notification process.
National Greenhouse and Energy Reporting Act 2007	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.
NSW *National Parks and Wildlife Act 1979* (NPW Act)	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 artefact scatters have been identified in two locations outside of the project site, which will not be impacted by the project. Refer to Section 8.2.
NSW Protection of the Environment Operations Act 1997 (POEO Act)	DPE	Project manager/ Project supervisor	General – under s120 no "dirty water" discharge into stormwater drains.	Refer to Section 8.5
POEO Waste Regulation	DPE	Project manager/ Project supervisor	General – under Section 24 transportation of certain waste must be tracked.	Refer to Section 8.6
NSW *Roads Act 1993*	TfNSW	Project manager/ Project supervisor	Approval – under s138 for work on a classified road.	Proposed works will not affect any roads.
Rail Safety National Law (NSW) 2012		Project manager/ Project supervisor		Proposed works will not affect any railways.

Table 3.4 Other legislative requirements

Legislation	Authority	Responsibility	Requirement	Comment
NSW *Rural Fires Act 1997*	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 Section 8.14.
NSW *Biodiversity Conservation Act 2016* (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 to Section 8.4. The project site is not within an area of biodiversity values.
NSW *Water Act 1912*	Water NSW	Project manager/ Project supervisor	Consideration/ permit – under s113 to extract groundwater via any type of bore, well or excavation	The extraction of groundwater 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 Figure 4.1.

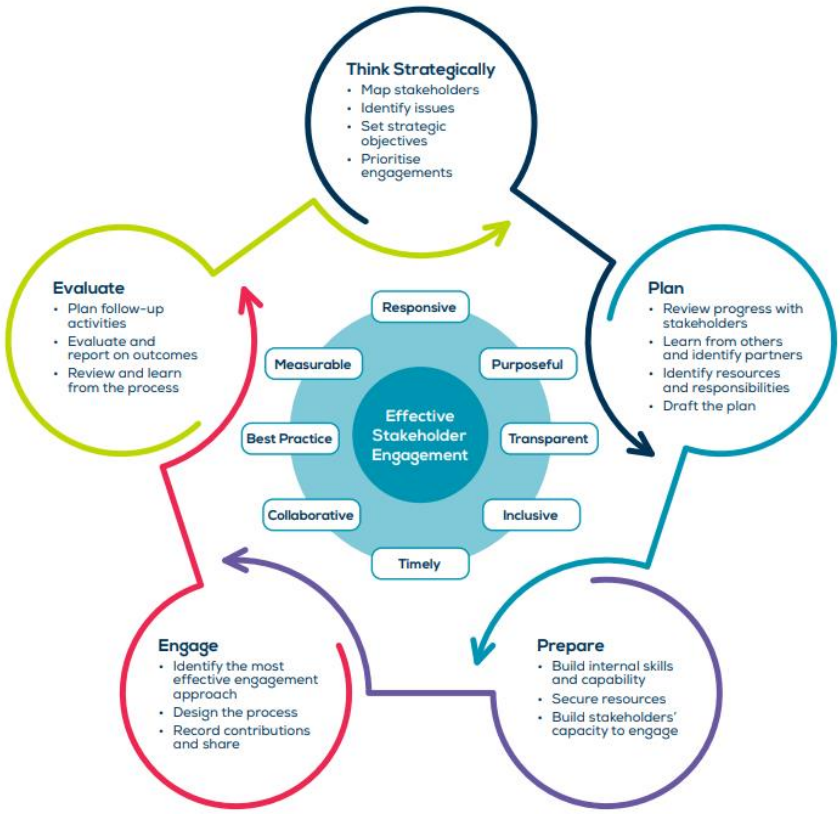


Figure 4.1 Endeavour Energy Stakeholder Engagement Framework

4.2 Project specific consultation

4.2.1 Council notification and requirements

In accordance with the NSW *Electricity Supply Act 1995*, EE is required to consult with the relevant councils no less than 40 days prior to the commencement of construction. A letter providing notification of the project was sent to Penrith City Council (PCC) on 23 August 2023. As the scope of works has expanded since Council was notified, PCC was re-notified on 1 November 2024.

A public notice in relation to the draft REF was published in The Western Weekender on 28 October 2023. The draft REF will also be published on the EE website.

Notifications were also sent to local MP Mrs Tanya Davies on 23 August 2023 and again on 1 November 2024.

Section 171(4) of the EP&A Regulation requires 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 the threshold so will be displayed. If any member of the public has questions or concerns, EE have a connection point via EE "Your Say" at https://yoursay.endeavourenergy.com.au/.

4.2.2 Notification of nearby landowners

The project is occurring approximately 560 m away from the nearest dwelling. Adjacent landowners and directly impacted landowners will be notified via letter box drop. Should construction planning result in direct impacts to a landowner's property, EE will also immediately and directly engage with them.

4.2.3 Notification of stakeholders

Notifications were sent to the following stakeholders via email on 19 October 2023:

- Telstra
- Sydney Water
- Transport for New South Wales (TfNSW)

As the scope of works has expanded since these stakeholders were notified, they were re-notified via email on 1 November 2024.

4.2.4 Future consultation

The project's Construction Environmental Management Plan (CEMP) 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. All potentially affected properties will be notified prior to the commencement of construction works. In the event any electricity supply outages are required to facilitate the safe construction of the proposal, impacted landowners will be notified in advance.

5 Consideration of alternatives

The project lies within the Western Sydney Aerotropolis Area and will include key electricity supply connections for the EEP, Sydney Water Advanced Water Recycling Centre and Badgerys Creek Enterprise Area, which collectively require around 20MVA of supply capacity by 2031 and 60MVA by 2050. A do-nothing scenario would result in these planned developments unable to be powered as it is expected customer connections will exceed the supply capacity of the existing network in 2025/2026. The address future supply issues, several options were considered:

5.1 Option 1 – establish Badgerys Creek ZS with supply from WSA TS

Option 1 involves establishing Badgerys Creek ZS in a single stage, with the provision for a third future transformer expected to be required between 2035 and 2045:

- 132/22 kV ZS with two 45MVA transformers
- building(s) to house 132 kV switchboards
- building(s) to house 22 kV switchboards
- building(s) to house protection control equipment and amenities
- spatial provision for future:
    - third 45 MVA transformer
    - third incoming 132 kV feeder bay
    - additional 22 kV switchboard
    - grid battery energy storage system (BESS).

5.2 Option 2A – establish Badgerys Creek ZS with supply from WSA TS and 93X

Option 2 involves the establishment of Badgerys Creek ZS in a single stage with transmission supply provided by two 132 kV feeders – one from the Western Sydney Airport transmission station (TS) and the other from a connection to the existing feeder 93X. The ZS would include a provision for a third future transformer expected to be required between 2035 and 2045:

- 132/22 kV ZS with two 45MVA transformers
- building(s) to house 132 kV switchboards
- building(s) to house 22 kV switchboards
- building(s) to house protection control equipment and amenities
- spatial provision for future:
    - third 45 MVA transformer
    - third incoming 132 kV feeder bay

- additional 22 kV switchboard
- grid BESS.

5.3 Option 2B – stage Badgerys Creek ZS with supply from WSA TS and 93X

Option 2B involves the establishment of Badgerys Creek ZS in two stages. The ZS would include a provision for a third future transformer expected to be required between 2035 and 2045:

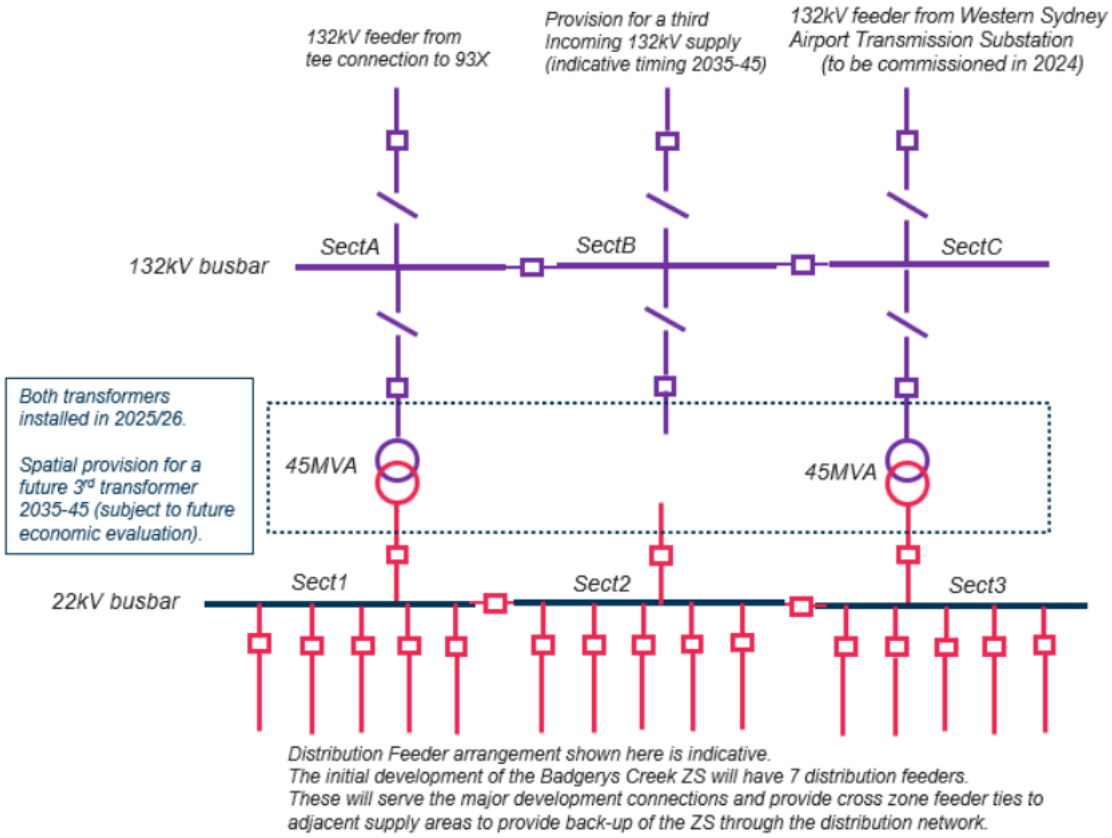
- 132/22 kV ZS with two 45MVA transformers (staged for commissioning in financial year (FY) 2026 and FY2028 including demobilisation and remobilisation on the work site for the second transformer installation)
- building(s) to house 22 kV switchboards
- building(s) to house 132 kV switchboards
- building(s) to house protection control equipment and amenities
- spatial provision for future:
  - third 45 MVA transformer
  - third incoming 132 kV feeder bay
  - additional 22 kV switchboard
  - grid BESS.

5.4 Option 2C – establish Badgerys Creek ZS and stage 132kV supply

Option 2C involves the establishment of Badgerys Creek ZS in a single stage but staging its 132 kV supply. The ZS would include a provision for a third future transformer expected to be required between 2035 and 2045:

- 132/22 kV ZS with two 45MVA transformers (staged for commissioning in financial year (FY) 2026 and FY2028 including demobilisation and remobilisation on the work site for the second transformer installation)
- building(s) to house 132 kV switchboards
- building(s) to house 22 kV switchboards
- building(s) to house protection control equipment and amenities
- spatial provision for future:
  - third 45 MVA transformer
  - third incoming 132 kV feeder bay
  - additional 22 kV switchboard
  - grid BESS.

Option 2A is the preferred option as it has the highest net market benefits and several practical advantages including diversifying the supply security and reliability of the Aerotropolis area by providing a supply additional to the Aerotropolis backbone feeder. A simplified drawing of option 2A is provided in Figure 5.1.



Source: RIT-D draft project assessment report (EE 2022).

Figure 5.1 Simplified line drawing of Option 2

6 Existing environment

6.1 General context

The project site is in the suburb of Badgerys Creek, within the Penrith City Council (PCC) local government area (LGA), in the Cumberland subregion of the Sydney Basin area. The project site is approximately 1 km from the future Western Sydney Airport, 15 km south-east of Penrith, and approximately 40 km west of Sydney's CBD. The future M12 motorway will be approximately 1 km north of the project site. The project site is situated within the Gandangara Local Aboriginal Land Council (LALC). The area is characterised by rural landscape with gentle sloping landforms and mountain views.

The future ZS site is 1.249 hectares in the north-western corner of 1669–1723 Elizabeth Drive, legally defined as Lot 99, DP 1283398. However, stage 1 of project construction will include an extra xx hectares (total of xx hectares) to accommodate enabling works including earthworks, a designated stockpile area, an alternate sediment basin location, parking, laydown areas, and construction compounds. For the purposes of environmental assessment within this REF, the project site includes both the future ZS site (Lot 99 DP1283398) and the enabling works area. The extent of the project site is shown in Figure 7.3.

The project site is relatively flat (Plate 6.1), with elevations between 50 and 62 m Australian height datum (AHD) (and consists of grassy open paddock, with no watercourses. The closest watercourses are South Creek approximately 520 m north-east, and Badgerys Creek approximately 725 m southwest of the project site.

Most of the surrounding rural residential and commercial lots are sparsely populated. The project site is bound to the west by an unnamed access road (Plate 6.2). Cleanaway Kemps Creek Resource Recovery Park and Bulk Resource Management site is west of the site, across the unnamed access road. Kingsfield Stud, an equestrian facility, is adjacent to the project site's northern boundary. An access road will be constructed adjacent to the site's northern and eastern borders at a later date as part of the EEP (not included in this REF). Stage 1 of the EEP will be constructed to the east and south of the project site, with nine warehouses and distribution centres, as depicted in Figure 6.2, however BC ZS is likely to be constructed prior to construction of the wider EEP (wider EEP area and stages are shown in Figure 6.1).

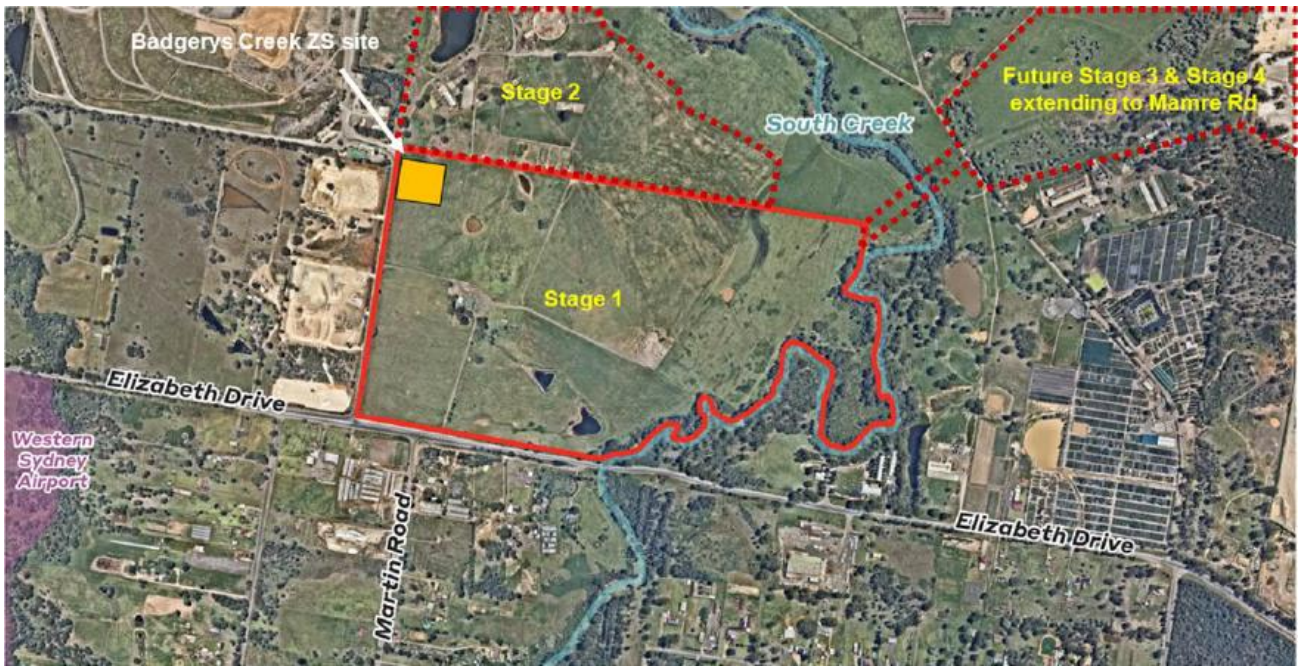
As previously noted, the entire area is transforming with the construction of the Western Sydney Airport, the Sydney Metro, and other surrounding developments, infrastructure, and precincts. Aerotropolis construction is currently underway, including bulk earthworks and road infrastructure upgrades. The Western Sydney Airport is quickly becoming the dominant land use in the area. Other surrounding land uses include a mix of agricultural, rural industrial and commercial, and rural residential development.

Stage 1 of the EEP lies within 1669-1723 Elizabeth Drive, Badgerys Creek, which will be transformed into nine industrial buildings with an internal road network and car parking. As previously discussed, BC ZS will be located within the Stage 1 development area of the EEP. Stage 2 of the EEP industrial development will be located adjacent to the north of Stage 1, and Stage 3 will be located north-east of Stage 1, but will not be adjacent (Figure 6.1). Stage 2 will connect to Mamre Road.

Source: S. Thomson

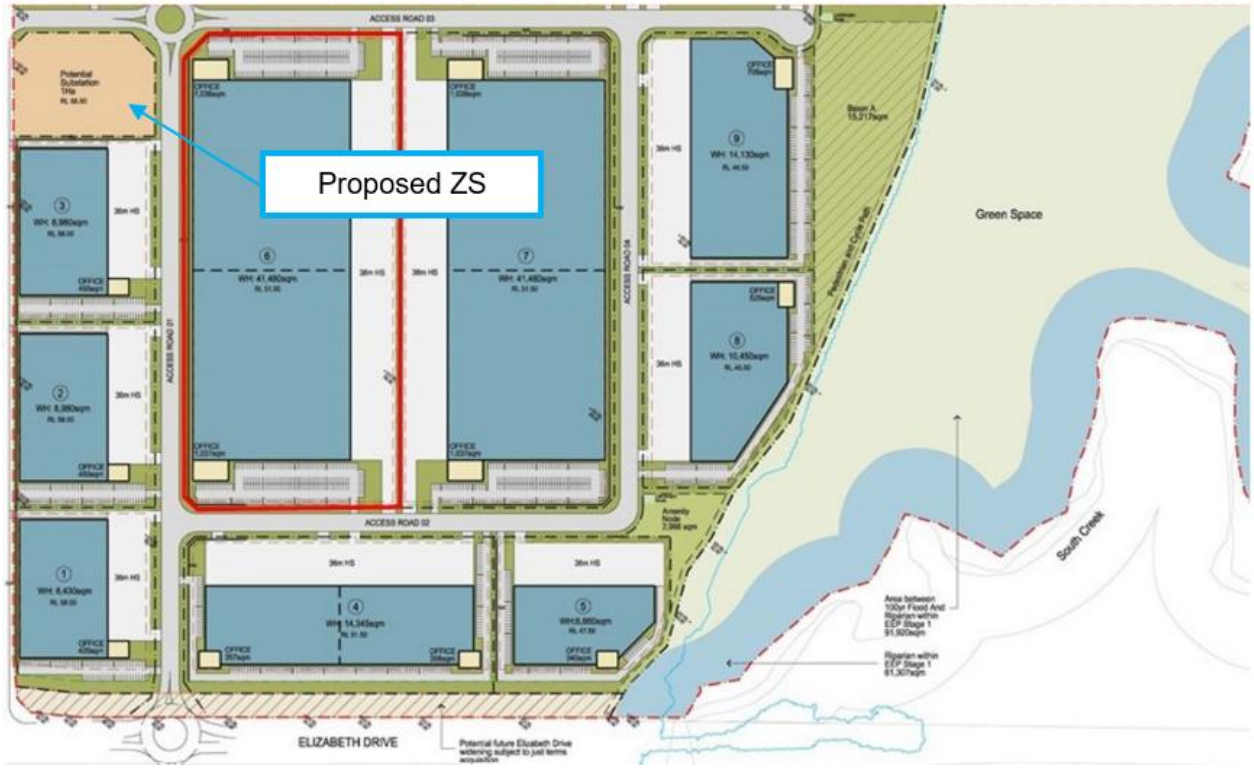
Plate 6.1 The project site, facing east

Plate 6.2 Unnamed access road adjacent to the western side of the project site, facing west



Source: EE 2022

Figure 6.1 **1669-1723 Elizabeth Drive (red outline) showing the BC ZS site (not including enabling works area) in yellow in the north-western corner**



Source: DPE (2021).

Figure 6.2 **Proposed concept masterplan for the EEP Stage 1 site**

6.2 Physical context

The project site is within Cumberland subregion of the Sydney Basin. Native trees remaining in the wider surrounding area are characteristic of the open woodland with dry sclerophyll forest that once used to dominate the area and includes species such as: Grey box (*E. moluccana*), Forest red gum (*E. tereticornis*) Broad-leaved ironbark, Narrow-leaved ironbark, Woollybutt and less commonly, forest oak. Many various grass and shrub species would have grown in the understorey prior to historic clearing.

The Cumberland landscape unit is underlain by Triassic Wianamatta Group of sediments, predominantly shales with some areas of sandstone and interbedded claystones and ironstones. The project site contains Blacktown (residual) Soil which generally contains shallow to moderately deep friable greyish brown loam and hard setting brown clay loam overlying strongly pedal mottled brown light clay as the dominant soil types (NSWEH n.d.).

6.3 Cultural setting

The Badgerys Creek area has been subject to agricultural land use for about 200 years, until more recent times when subdivisions changed the dominant land use in the area.

The area surrounding the project is sparsely populated with a few dwellings in the vicinity of the project site. According to the 2016 census, Badgerys Creek had a population of only 225 persons, with 74 private dwellings (ABS 2016). 61.8% of the population is of working age (aged 15–64 years), with outdoor vegetable growing the most common industry of employment at 33%, followed by Road Freight Transport at 18.5%.

Aboriginal and European history is further discussed in Section 8.2 and Section 8.3, respectively.

7 Proposed works

7.1 Overview

Endeavor Energy is proposing to construct and operate Badgerys Creek Zone Substation to provide electricity to meet the residual and actual load demand of the Elizabeth Enterprise Precinct and surrounding developments. A general arrangement design is provided in Figure 7.2 and a photomontage in Figure 7.2.

The project is expected to commence in December 2024 and is expected to be commissioned in September 2028.

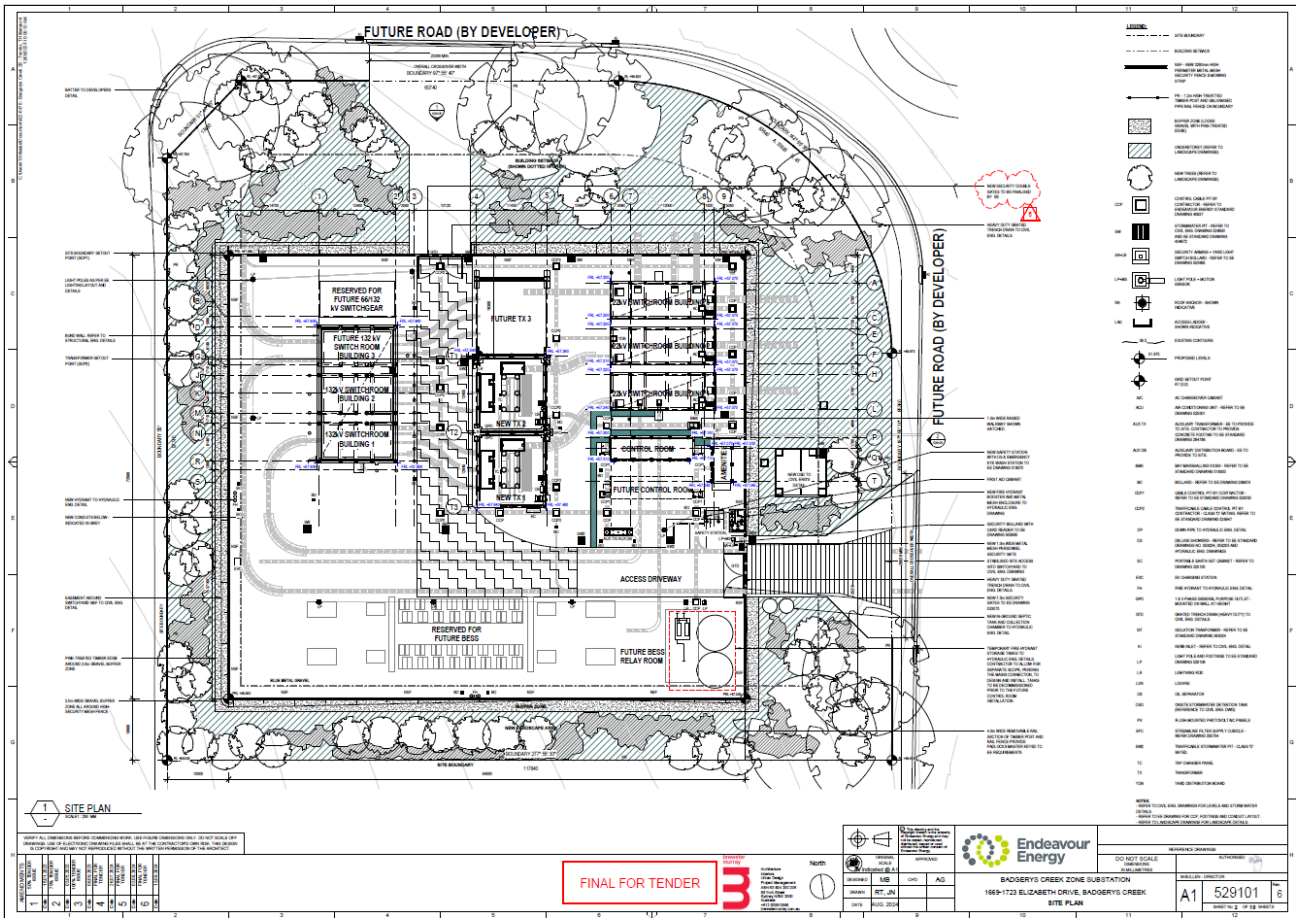


Figure 7.1 General arrangement design of Badgerys Creek Zone Substation

Source: EE (2022)

Figure 7.2 Photomontage of Badgerys Creek zone substation

7.2 Description of work

7.2.1 Earthworks

To enable construction of BC ZS, earthworks including excavation and benching, will be undertaken across Lot 99 DP1283398. Cut and fill plans indicate a cut volume of -3,461 m^3 and a fill volume of 8,817 m^3, with a balance of 5,356 m^3 which will be imported to the project site.

A stockpile area, alternate sediment basin area, catch drain and batters will be located adjacent to Lot 99, within the boundary shown in "\\emm.local\xdrive\2022\E220571 - Endeavour Energy Environment Support\GIS\04_Outgoing\BadgerysCreek_TWP\G010_EarlyWorksSiteLayout_20241105_02.pdf"

Figure 7.3, which is within the northwestern corner of 1669–1723 Elizabeth Drive. The extended boundary will be referred to as the enabling works boundary, which will be assessed as part of this REF. Detailed earthworks plans can be found in Appendix A. Earthworks are to be in accordance with Appendix G, *Geotechnical Investigation, Proposed Badgerys Creek Substation, part lot 5 DP 860456 no 1669-1723 Elizabeth Drive, Badgerys Creek* (GeoEnviro 2022).

KEY

- Project location
- Lot 99 boundary (DP1283398)

Site element

- Sediment basin
- Double truck route
- Stockpile area

Existing environment

- Minor road
- Vehicular track
- Named watercourse
- Cadastral boundary

INSET KEY

- Major road
- NPWS reserve
- State forest

Source: EMM (2024); ABS (2021); DCSSS (2023); GA (2009); MetroMap (2024)

0 100 200 m

GDA2020 MGA Zone 56

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Suggested early works site layout

Badgerys Creek Zone Substation REF
Tender Works Package
Figure 7.3

EMM
creating opportunities

7.2.2 Zone substation

Zone substations form part of an electricity distribution and transmission network and connect and convert higher voltage sub-transmission networks to the lower voltage distribution network. Endeavor Energy have many zone substations within their broader transmission and distribution network. These substations typically generate a low frequency 'hum' at 100 hertz (Hz).

The project will include construction and operation of a 133/22 kV, which will have an initial firm capacity of 45 MVA. A detailed scope of works can be found in section 5 of Project Brief T-2214 (NPR-000080 – Establishment of Badgerys Creek ZS), attached as Appendix F.

Key project components to be constructed or installed are:

- establishment of indoor 132/22 kV Badgerys Creek ZS:
    - two 132 kV modular buildings to accommodate 132 kV gas insulated switchgear (GIS)
    - two 45 MVA transformers providing a firm (n-1) transformer capacity of 45 MVA
    - three 22 kV modular buildings to accommodate 22 kV switchgear
    - one modular control building to accommodate protection and control panels and auxiliary equipment
    - one amenities room modular building to accommodate the meal room and toilets
    - space provided in the switchyard for the future No. 3 transformer and 132 kV switchroom Building 3 (refer to Figure 7.1 and Figure 7.2)
- establishment of associated equipment including switchgear, protection and control panels, SCADA and communications
- a fire management system and fire hydrant system including fire extinguishers and fire hydrant enclosure boosters within the building
- onsite water and storm water management systems:
    - a mains water supply booster pump-house structure
    - temporary water storage tanks
    - above ground detention tank and water quality basin
    - underground stormwater pipes
    - sub soil drainage and flushing point
    - grated trench drain
- parking spaces for two light vehicles
- two electric vehicle charging stations, with the ability to accept heavy vehicles
- double security perimeter fencing, with an outer 1.2m tall post and rail fence and another inner security fence

- landscaping.

The indicative project design and footprint is presented in Appendix A. It may be subject to revision in the detailed design phase. Any changes will be reviewed for consistency with the approved REF and if changes are inconsistent with the approved REF, an addendum will be prepared. .

7.2.3 Rehabilitation

Upon completion of earthworks, the enabling works area (the portion of the project site that is not Lot 99 DP1283398) will be rehabilitated to the condition, landscape and contours present prior to the commencement of works, including filling in of any sediment basin areas and swales.

7.2.4 Stages of construction

BC ZS construction will include three stages:

- Earthworks (December 2024 – February 2025)
- Civil Works of the ZS (February 2025 – February 2026)
- Electrical fit out
    - stage 1 (October 2025 – September 2027)
    - stage 2 (October 2027 – September 2028)

7.3 Construction details

7.3.1 Timing, duration, hours of work

Project works are scheduled to start in December 2024 and finish in September 2028.

Works will be undertaken during standard working hours:

- 7:00 am to 6:00 pm Monday to Friday
- 8:00 am to 1:00 pm on Saturdays
- no works on Sundays or public holidays.

Should unexpected out-of-hours works be required, the process for undertaking out of hours works as described in EE's EMS 0016 – Industrial and Construction Noise Standard and Environmental Guidelines Handbook will be followed. Appropriate internal and external approvals shall be obtained where required, prior to the out-of-hours works being carried out.

7.4 Equipment and materials required

The general plant and equipment required for the works includes (but is not limited to):

- excavators
- bulldozers
- scrapers

- crane
- elevated work platform (EWP)
- winch
- cable trailers
- drum stand
- crew/tool truck.

7.5 Workforce and construction laydown areas

The construction workforce numbers would include:

- 10-15 workers during earthworks
- 8-10 workers during construction
- no permanent staff on site during operation.

The laydown areas will be located within the project site. Laydown areas would include, where needed: parking for construction works, office areas and ablutions as well as storage areas for raw materials, plus plant and equipment.

8 Environmental assessment and mitigation

8.1 Overview

The following environmental factors were assessed in detail as initial site review determined they were higher risk environmental factors:

- Aboriginal cultural heritage
    - Aboriginal test excavation report (ATER)
    - Aboriginal cultural heritage assessment report (ACHA)
- Noise
- Geotechnical investigation
- Biodiversity.

Assessment reports are provided in Appendix B and Appendix C (Aboriginal cultural heritage), Appendix D (Noise impact assessment), Appendix G (Geotechnical investigation) and Appendix I (biodiversity) and are 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 addressed in this section are: historical heritage, water, utilities and services, roads, traffic and access, land use, landscape and visual, socio-economic impacts, air quality and dust , safety and hazards, bushfire, waste, contamination, and cumulative impacts.

Prior to the commencement of construction, the construction contractor will develop a CEMP and a detailed erosion and sediment control plan (ESCP) with the approval of EE, which will capture the management and mitigation measures presented in this REF, providing further -site-specific detail where appropriate, plus responsibilities and timing for their implementation.

8.2 Aboriginal heritage

8.2.1 Overview

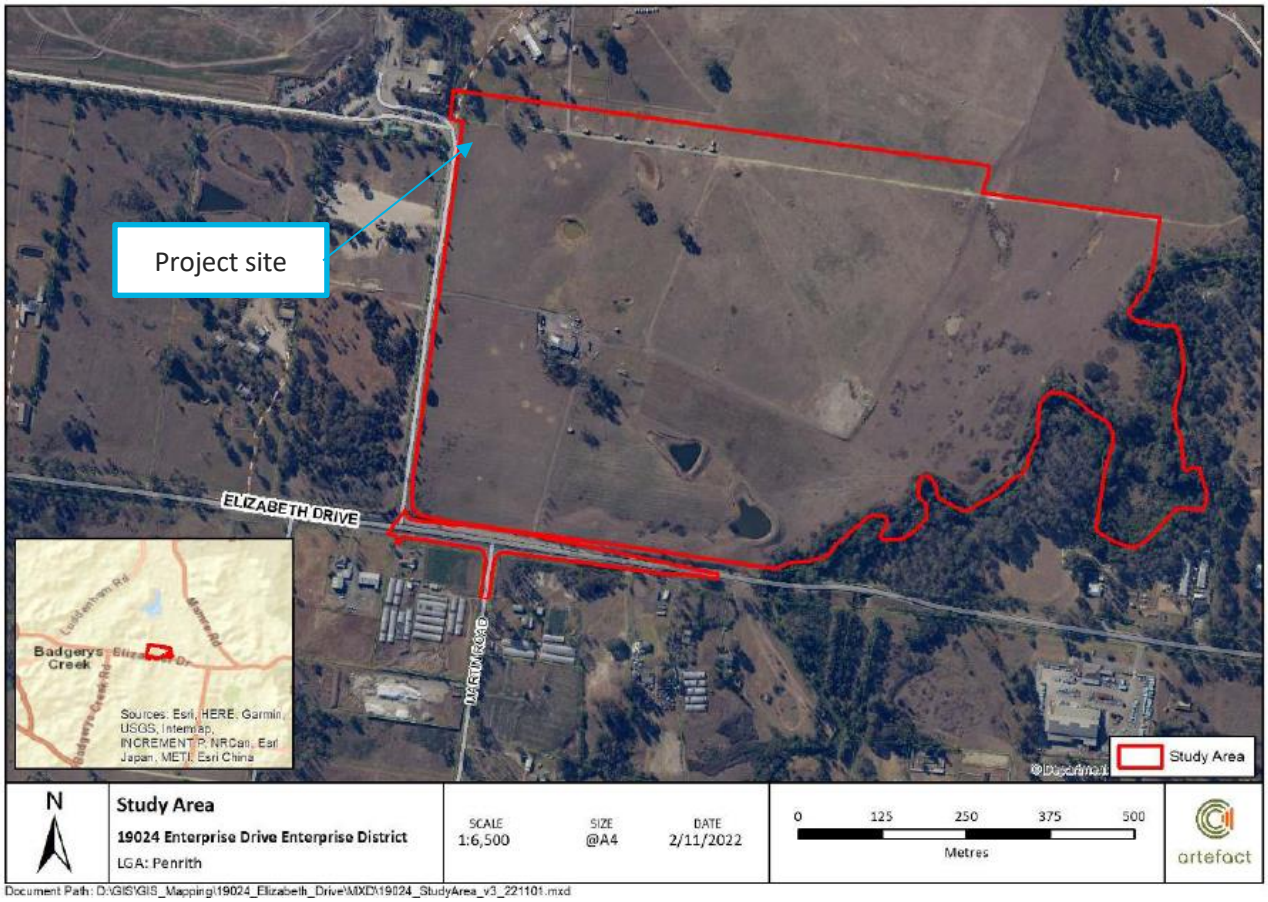
An *Aboriginal Test Excavation Report* (Artefact 2020) (Appendix B) and *Aboriginal Cultural Heritage Assessment Report* (ACHAR) (Artefact 2022) (Appendix C) were prepared by Artefact for the broader Elizabeth Enterprise Precinct site. These were commissioned by Mirvac to meet the Secretary's Environmental Assessment Requirements for Elizabeth Enterprise Precinct's State Significant Development Application SSD-19618251.

Potential impacts on Aboriginal heritage from the project were assessed in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (The Code of Practice) (DECCW 2010). The objectives of the assessment were to:

- asses the Aboriginal cultural heritage values of the study area, including archaeological and community cultural values and the significance of identified values
- identify Aboriginal cultural heritage values that may be impacted by the works including consideration of cumulative impacts, and measures to avoid significant impacts
- ensure appropriate Aboriginal community consultation in the assessment process

- identify and describe any recommended further investigations, mitigation and management measures required.

The ACHAR study area is shown in Figure 8.1.



Source: Artefact (2022)

Figure 8.1 Location of the ACHAR study area

8.2.2 Existing environment

i Aboriginal history of the locality

Traditional Aboriginal tribal boundaries within Australia have been reconstructed, primarily based on surviving linguistic evidence and therefore are approximations. Social interaction, tribal boundaries and linguistic evidence may not always correlate, and it is likely boundaries and interaction levels varied and fluctuated over time. Multiple language groups were present within Badgerys Creek including the Darug, Dharawal, and Gundungurra as the area is within a transitional space between tribal boundaries. The study area is located near the boundaries of Dharawal and Gundungurra Aboriginal language groups, though it is uncertain which group(s) occupied the study Area (Artefact 2022).

Evidence of human occupation in the vicinity of the study area has been dated to 41,700 years Before Present (yBP). Interactions with Aboriginal people across Sydney and surrounds are documented from the early 1800s, which at that time were generally amicable. Tensions mounted between Aboriginals southwest of Sydney and farmers Aboriginals were accused of stealing crops and spearing cattle. In addition to conflict with settlers, Aboriginal numbers declined rapidly with the 1789 smallpox epidemic, which is thought to have killed over half of

the Sydney Region's Aboriginal population. Descendants of the Dharawal and Gundungurra groups continue to live across the region (Artefact 2022).

ii Previous archaeological investigations and research

Archaeological investigations across the Cumberland Plain over the past 30 years have been comprehensive due to the increasing population growth in the western Sydney area. Studies 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 because of the resources that were associated with these landforms. The Heritage NSW due diligence guidelines list 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
- within 20 m of or in a cave, rock shelter, or a cave mouth.

iii Aboriginal Heritage Information System (AHIMS) database search

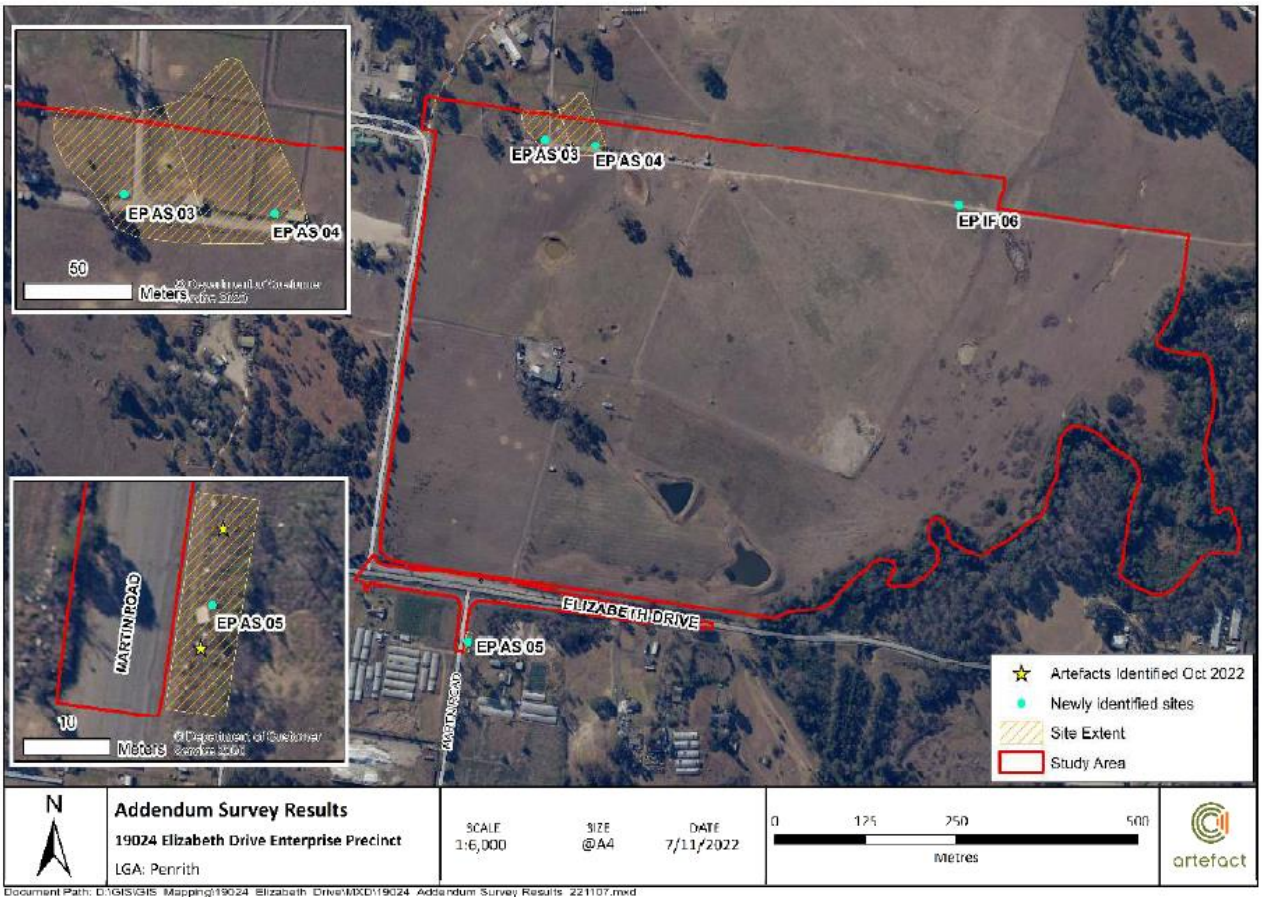
The AHIMS was searched on 22 October 2024 by S. Thomson of EMM, incorporating the entirety of 1669–1723 Elizabeth Drive, Badgerys Creek plus a buffer of approximately 50 m.

Fifteen Aboriginal sites are recorded within the search area.

iv Site inspection

Four archaeological surveys were conducted by Artefact between 2019 and 2022, as part of the ACHAR. Each survey was conducted by an archaeologist with a member of Deerubbin LALC in attendance.

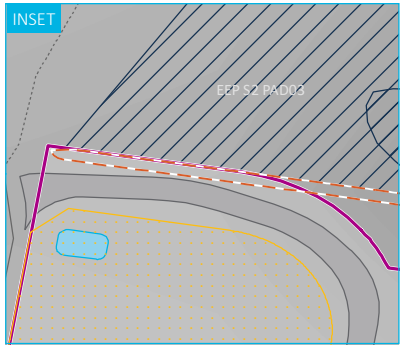
Archaeological survey found AHIMS 45-5-5624/Elizabeth Precinct (EP) AS 03 to be a scatter 10 m by 10 m, and AHIMS 45-5-5625/EP AS 04 to be a scatter 15 m by 10 m, with the sites likely related. The extent of AHIMS 45-5-5624 (EP AS 03) and AHIMS 45-5-5625 (EP AS 04) as surveyed by Artefact (2022) are shown in Figure 8.2.



Source: Artefact (2022)

Figure 8.2 Location of EP AS 03 and EP AS 04

As part of EEP stage 2 investigations, further sites were located north of the project site. One PAD site, EEP S2 PAD03, extends into the northern boundary of the project site. A buffer area of 5 m will be applied to the southwestern extent of EEP S2 PAD03 and the area, including the 5 m buffer will be fenced off to protect the site from project works. The extent of EEP S2 PAD03 and buffer area are shown in Figure 8.3.



KEY

- Project location
- Lot 99 boundary (DP1283398)
- PAD site
- PAD location 5m buffer

AHIMS (by site type)

- Artefact
- Potential Archaeological Deposit (PAD), Artefact

Proposed early works site element

- Sediment basin
- Double truck route
- Stockpile area

Existing environment

- Major road
- Minor road
- Vehicular track
- Watercourse/drainage line

Source: EMM (2024); OEH (2024); DCSSS (2023); GA (2009); MetroMap (2024)

0 100 200 m

GDA2020 MGA Zone 56

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Aboriginal Heritage locations and buffer areas

Badgerys Creek Zone Substation REF
Tender Works Package
Figure 8.3

EMM creating opportunities

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8.2.3 Management and mitigation measures

AHIMS 45-5-5624 (EP AS 03) and AHIMS 45-5-5625 (EP AS 04), located adjacent to the northern-eastern boundary of the project site, have been assessed as low-density artefact scatters with high significance. These Aboriginal site extents are more than 5 m from the project site.

EEP S2 PAD03 is located within 5 m of the project site. To protect the PAD area, the following measures will be implemented:

- A buffer area of 5 m around the southern extent of the site must be fenced off to ensure the site is not impacted by project works including site earthworks and project truck access. No works, worker parking, laydown areas, stockpiles, etc are to occur within the buffer area.
- Works will be confined to the project site. No works, worker parking, laydown areas, stockpiles, etc. will be located outside the project site boundaries.

Additionally, general measures to be implemented at the project site are as follows:

- All on-site personnel are to be made aware of their obligations under the *National Parks and Wildlife Act 1974*. This includes protection of Aboriginal sites and the reporting of any new or suspected Aboriginal sites. This may be done through an on-site induction or other suitable format.
- In the event that additional Aboriginal, or suspected Aboriginal objects are uncovered during the works, then works in that area are to stop and the area is to be cordoned off. The project manager is to contact an archaeologist to assess whether the material is considered an Aboriginal object under the meaning of the *National Parks and Wildlife Act 1974 and* advise on the required management and mitigation measures. Works are not to recommence in the cordoned off area until heritage clearance has been given and/or the required management and mitigation measures have been implemented.
- In the event that human remains, or suspected human remains are uncovered during the construction, works in that area are to stop and the area is to be cordoned off. The project manager is to contact the NSW Police to establish whether the area is a crime scene. If it is not a crime scene, Heritage NSW is to be notified via the Environment Line on 131 555 and management measure are to be devised in consultation with the local Aboriginal community. Works are not to recommence in the area until the management measures have been implemented.

8.3 Historical heritage

8.3.1 Overview

A search of the State Heritage Register, National Heritage List Australia, Commonwealth Heritage List Australia and World Heritage Areas Australia was completed on 16 October 2024 by S. Thomson of EMM via the Central Resource for Sharing and Enabling Environmental Data in NSW (SEED) (NSW Government 2024) and the NSW State Heritage Inventory (NSW Government 2024a). This considered the entire area of 1669–1723 Elizabeth Drive, Badgerys Creek. There are no historical items within the area. The closest item is McGarvie Smith Farm, which is listed in the Western Sydney Aerotropolis SEPP (2020) and is located approximately 1.5 km west of the site. In the scoping report for the wider EEP, Ethos Urban (2021) found no state significant evidence of the early settlement phase, including no evidence of the Badgery family's first house.

As there are no historical heritage items or sites within the ZS site, there are no expected impacts to heritage items and/or 'relics'.

8.3.2 European history of the locality

Exploration of the area within Western Sydney began soon after first European settlement, as 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.

Land grants around the Badgerys Creek area began in 1809, bringing European settlement to the area for the purpose of cropping and raising livestock to help support the rising colony population. The suburb's namesake, James Badgery, was granted 804 acres at South Creek in 1809. The land grants were extremely successful, producing horses, sheep, wheat, and cattle, until a severe drought from 1838–1840 caused crop failure.

After a rust outbreak in wheat crops shortly after the drought, the area wheat industry collapsed and farmers left to find better land, resulting in subdivision of the initial large land grants into smaller allotments. The 1859–1864 subdivision on one such land grant, the 6,710-acre Luddenham Estate, given to John Blaxland has been identified as "the beginning of the next phase of the area" (DIRDC 2018).

In the 1890s, the depression displaced city families who came to the Badgerys Creek and Bringelly area to take advantage of the smaller, 3–10-acre land lots that were sold with inexpensive deposits and repayments. Many turned their smaller land parcels into orchards, but Badgerys Creek remained sparsely populated (DIRDC 2018).

Subdivision of James Badgery's allotment began in 1920. Part of the land was used as a CSIRO animal health research station from 1936. In the same year, The University of Sydney Veterinary Department purchased 160 hectares in Badgerys Creek to train veterinary students in animal husbandry (DIRDC 2018).

A handful of research facilities, including the Australian Air Force Radio Receiving Station and the Overseas Telecommunication Commission's Bringelly Radio Receiving Station Complex, were constructed in the Badgerys Creek area in the 1950s.

In the 1960s, poultry farming, dairy, market gardens, beekeeping and timber operations were established in and around Badgerys Creek.

Analysis of historical aerial imagery (NSW Government 2022) shows the following historical changes that took place within the project site:

- the project site had been mostly cleared by the mid-twentieth century with a few scattered trees remaining
- by 1965, more trees had been cleared with a few scattered trees remaining across the project site and approximately 3 single trees or possibly small groups of trees within Lot 99
- little change between 1965 and 1975 – the project site remained open grassy paddock with a few scattered trees
- little change between 1975 and 1991
- by 1998, the western side of the project site was cropped in straight rows
- by 2004, the project site was once again open grassy paddock with no signs of crops
- by 2013, the Lot 99 portion of the project site had been cleared of all remaining trees and only 2 single or possibly small groups of trees remained in enabling works portion of the project site.

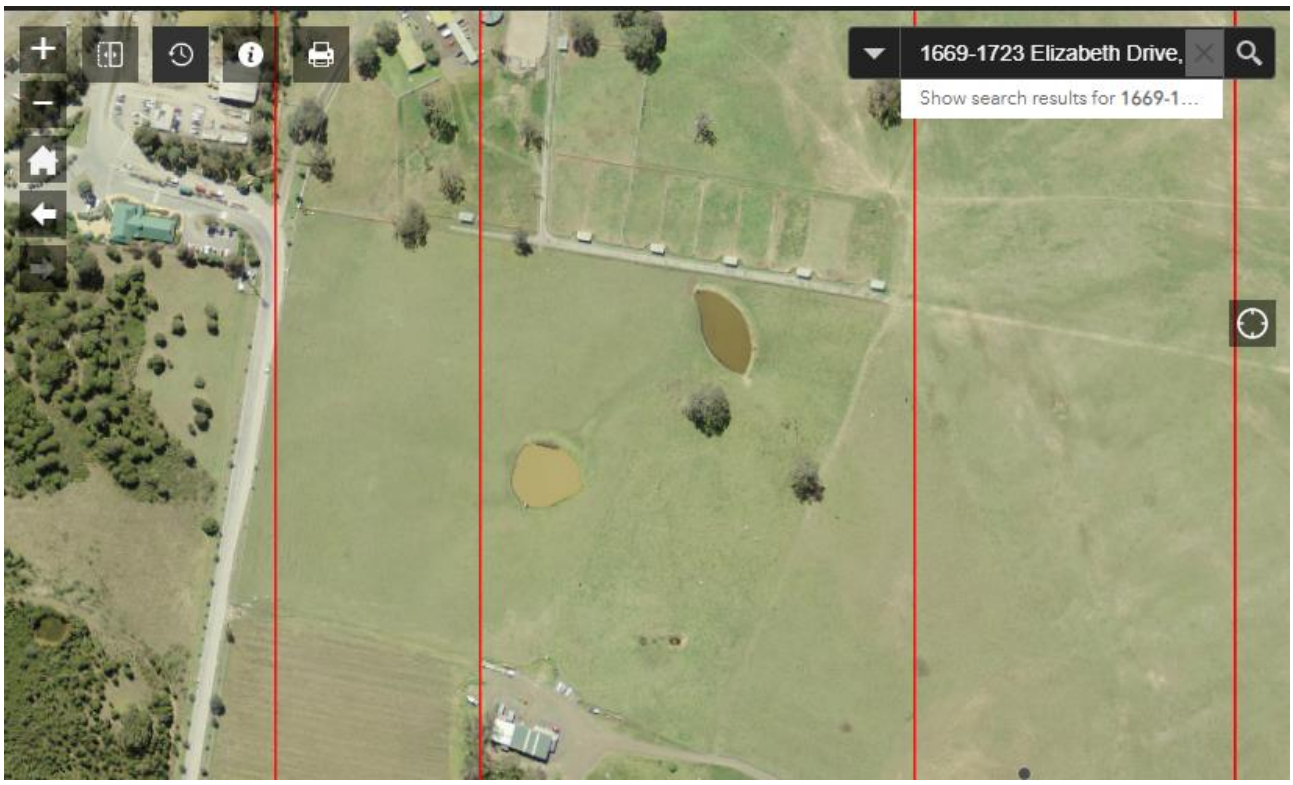


Plate 8.1 The project area in 2013

(NSW Government 2024b)

8.3.3 Management and mitigation measures

The following management and mitigation measure is proposed:

- An unexpected finds procedure will be implemented for all earthworks and excavation works. All relevant construction staff, contractors and subcontractors will 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.

8.4 Biodiversity

8.4.1 Overview

A Biodiversity Assessment Report (BAR) was for the project was prepared by ecologique (2024) and is provided in Appendix I. Preparation of the BAR included a site visit by a qualified ecologist in May 2024.

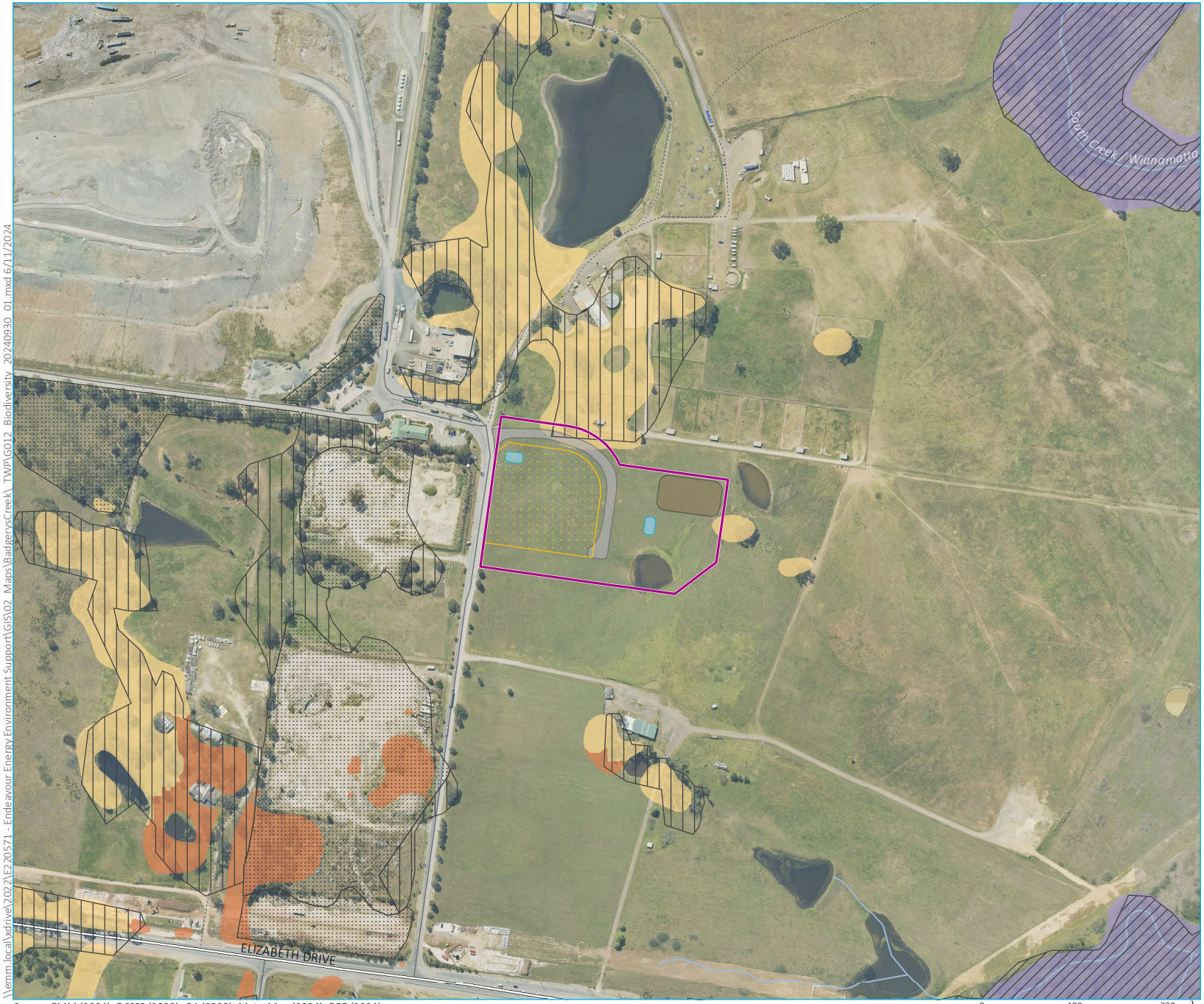
8.4.2 Existing environment

The project site is within the Hawkesbury Nepean catchment and the Cumberland Plain landscape unit of the Sydney Basin bioregion of NSW. The Cumberland Plain Landscape Unit is characterised by the Wianamatta Group, Ashfield Shale, Bringelly Shale, Hawkesbury sandstone and Tertiary alluvial/colluvial formations. According to the 1:100,000 Geological Map of Penrith, the project site is underlain by Bringelly Shale, typically consisting of shale, carbonaceous claystone, laminate, fine to medium grained lithic sandstone rare coal and tuff (GeoEnviro 2022). The vegetation of this landscape consists of extensively cleared land used primarily for intensive residential, agricultural, and industrial and recreational purposes.

There is an area mapped as plant community type (PCT) 3448 Castlereagh Ironbark Forest which primarily relates to the critically endangered Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion that extends into northern enabling works area (ecologique 2024). Ecologique (2024) found the extension of PCT 3448 into the enabling works area was the result of shadows cast by trees located on the adjacent lot north of the project site. These trees are not being cleared by the project. No PCT 3448 vegetation was found on the project site (ecologique 2024).

In their unpublished biodiversity assessment for the wider EEP, Eco Logicial Australia (now ecologique) determined through ground-truthing that two areas of PCT 3320 Cumberland shale plains woodland (formerly CPT 849) existed withing the project site as regenerating vegetation. However, the 2024 site inspection found little evidence of regenerating (ecologique 2024).

Biodiversity in and around the project site is shown in Figure 8.4.



KEY

- Project location
- Lot 99 boundary (DP1283398)

Proposed early works site elements

- Sediment basin
- Double truck route
- Stockpile area

Threatened ecological community

- 11 - Alluvial Woodland
- 13 - Shale/Gravel Transition Forest
- 3 - Cooks River Castlereagh Ironbark Forest

Plant community type

- Castlereagh Ironbark Forest
- Castlereagh Scribbly Gum Woodland
- Cumberland Red Gum Riverflat Forest

Existing environment

- Major road
- Minor road
- Vehicular track
- Watercourse/drainage line

Source: EMM (2024); DCSSS (2023); GA (2009); MetroMap (2024); DPE (2024)

0 100 200 m

GDA2020 MGA Zone 56

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Biodiversity

Badgerys Creek Zone Substation REF
Tender Works Package
Figure 8.4

EMM
creating opportunities

i Threatened species

Ecologique conducted a threatened species search which found 3,292 records of 36 threatened species within 10 km of the project site between 1 January 1990 and 21 June 2024. Results can be found in Table 3 of Appendix I.

Most threatened species records proximal to the project site are associated with land along Clifton Road approximately 1.7 km northeast and a densely vegetated land parcel located on the southern side of Elizabeth Drive approximately 2 km to the southeast.

The likelihood of any of the threatened flora species listed in Table 3 of Appendix I occurring within direct disturbance area of the project site, or being indirectly impacted by the project is considered unlikely due to the following factors:

- historical clearing of the land
- land use (grazing) over the past century
- lack of habitat in which the listed species are found in
- longevity of most species i.e. seeds/propagules within the project site are unlikely to have subsisted over the past century of agricultural land use

The project site lacks specific habitat requirements or microhabitats that would support most of the threatened fauna species listed in Table 3 of Appendix I.

The likelihood of any of the threatened fauna species to occur in or use the project site and in in turn, the potential for the project to adversely affect any of these species, is summarised in attachment A of Appendix I.

8.4.3 Impact assessment

i Direct impacts

The project will not impact PCT 3448 as the community does not extend past adjacent lot. A fence separates the adjacent lot from the project site.

The project will directly impact a very small amount of habitat for Cumberland Plain Woodland, which comprises two areas in a cleared paddock that has shown little evidence of regeneration. These small areas do not meet the definition of the threatened ecological community (TEC). Regardless, a test of significance (ToS) is provided in Appendix I which found clearing of these areas will not result in a significant impact.

Habitat constraints within the project site are considered degraded to the point that the threatened species listed in Table 3 of Appendix I are unlikely to use the project site.

The BIA determined that the project will not result in a significant impact on any biodiversity values listed under the BC Act or any matters of national environmental significance under the EPBC Act.

The NSW Biodiversity Offset Scheme does not apply to Part 5 activities. As the project will not result in a significant impact on biodiversity values, a Statement of Significance (SIS) is not required, nor is consideration of opting in to the NSW Biodiversity Offset Scheme.

ii Indirect impacts

a Earthworks and construction

As relevant to biodiversity, indirect impacts that would be likely to occur during construction if unmitigated include:

- erosion and sedimentation
- dust generation
- contamination via spills, leaks and accidents
- noise pollution
- introduction and/or spread of weeds/pathogens

b Operation

Operation of the project is likely to result in some light and noise pollution. Zone substations typically generate a low frequency hum at 100 hertz (Hz). While animals detect sound inaudible to humans and lower than 100 Hz, noise impacts on threatened species from the project are considered to be a low risk and of low consequence.

8.4.4 Management and mitigation measures

The following general management and mitigation measures will be listed in the CEMP and implemented in relation to biodiversity:

- Development and implementation of detailed ESCP.
- Weed control measures (e.g. herbicide spraying) will be undertaken prior to construction commencing in areas where high densities or infestations of weeds occur. This will reduce the risk of weeds being spread as a result of the project.
- Tyres and undercarriages of vehicles will be washed, cleaned out, and/or sprayed prior to entering weed infested areas of the site and after working in weed infested areas.
- In the unlikely event that unexpected threatened species are identified during the project, works will cease and an ecologist contacted.
- Appropriate erosion and sediment control measures should be installed at all sites to avoid sedimentation of receiving water bodies or other indirect impacts to surrounding biodiversity.
- Noise management and mitigation measures listed in Section 8.11.6 should be implemented. It is expected that resident fauna would be relatively tolerant of noise from truck movements and operations associated with the neighbouring waste management centre and other construction works within the locality.

8.5 Water

8.5.1 Overview

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

8.5.2 Existing environment

i Hydrology and water quality

The project site is approximately 490 m southwest of South Creek, and 755 m east of Badgerys Creek (Figure 8.5). It is within the Hawkesbury-Nepean catchment, and more specifically, the Wianamatta South Creek catchment (South Creek catchment). Groundwater at the project site is expected to flow north and northeast into South Creek (GeoEnviro 2023). One man-made farm dam is located within the enabling works area of the project site but will remain undisturbed. During stage 1 of project construction (earthworks), a sediment basin will be constructed either in the northwest corner of Lot 99 or in the eastern area of the enabling works boundary, as shown in Figure 7.3 and Appendix A.

South Creek commences in Narellan and has 17 tributaries including Badgerys Creek. It joins the Hawkesbury-Nepean River system at Windsor. The project site does not contain any dams, creeks, or other bodies of water.

Numerous surface water and groundwater studies have been completed for the infrastructure and development currently being built or planned in the Western Sydney Growth Area. Thus, the impacts of large-scale urban growth and cumulative development have been considered in detail in the assessment documentation for the various projects. Studies over the last few years have shown the existing water quality of some local creeks, including the South Creek and Cosgrove Creek, is generally poor and does not meet the *Australian Water Quality Guidelines for Fresh and Marine Waters* (ANZG 2018). Previous studies have identified that South Creek is one of the most degraded catchments in the wider Hawkesbury-Nepean catchment (Rae 2007). The high nutrient concentrations and subsequent algal and aquatic weed growth are a result of the following pollution sources (Rae 2007):

- effluent released from five sewage treatment plants in the lower parts of the catchment
- 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.

Source: EMM GIS portal

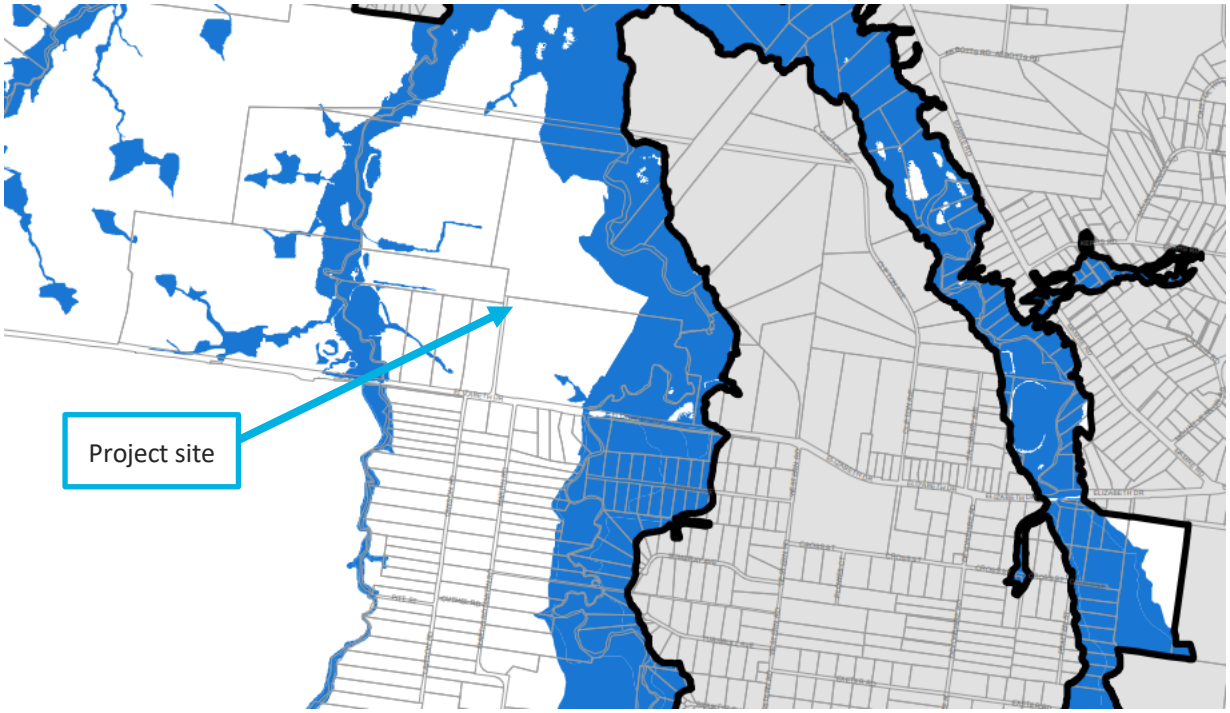
Figure 8.5 Watercourses in the vicinity of the project (approximate project site outlined in blue)

ii Flooding

Western Sydney Parkland SEPP shows the extent of the 1% annual exceedance probability (AEP) flood extent over the Aerotropolis (refer to Figure 8.6).

The map shows that in the event of a 1 in 100 AEP flood, the Badgerys Creek and South Creek corridors would be impacted. Flood modelling for the Sydney Metro project found 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). Consequently, the project site is not within the 1 in 100-year flood area.

Furthermore, construction of the project includes installation of drainage. Wider EEP Stage 1 construction will consider stormwater and flooding in design and construction plans (Ethos Urban 2021) (not part of this REF).



Source: Western Sydney Parkland SEPP

Figure 8.6 1% AEP flood extent

iii Geology and soils

The project is located within the Sydney Basin which traverses several geographic formations. The Sydney Basin is a major sedimentary basin, some 60,000 km² in size. Initially formed on Palaeozoic (541–250 ma) metamorphosed rocks, the basin is primarily a series of Permian (300–250 ma) and Triassic (250–200 ma) sandstones and siltstones that were formed by a massive delta, then subject to a range of uplift and subsidence (Australian Museum 2018). This resulted in a series of smaller plateaus and basins surrounded by elevated dissected sandstone uplands on its periphery (e.g. the Great Dividing Range to the west). Over-laying these basal sandstone and siltstones are Wianamatta shales (also of Triassic age), and then more recent Quaternary alluvium and other pedogenetic units.

The project area contains Blacktown Residual soil landscape (9030Bt) typically comprising moderately reactive, highly plastic subsoil with seasonal localised waterlogging, water erosion hazard and surface moment potential (GeoEnviro 2022). Bt is characterised by Wianamatta Group Shales (Ashfield Shale, consisting of laminite and dark grey siltstone; Bringelly Shale consisting of shale with occasional calcareous claystone, laminite and infrequent coal; and Minchinbury Sandstone consisting of fine to medium-grained quartz lithic sandstone) with local relief of 10–30 m and slopes generally no more than 5% gradient, occasionally reaching 10% (DPE n.d.).

A desktop search of the Acid Sulfate Soils (ASS) and ASS Risk maps (NSW Government 2024) indicate that ASS are unlikely to occur at the project site. Additionally, soil samples were collected from boreholes and tested as part of geotechnical investigations by GeoEnviro (2022), which found low concentrations of sulfate.

A review of the Western Sydney salinity potential map (NSW Government 2024) indicates that the project site has moderate salinity potential.

iv Water table

GeoEnviro (GeoEnviro 2022) conducted fieldwork across Lot 99 DP1283398 on 11 April 2022. Fieldwork included drilling of seven boreholes to depths varying from 1.5 m to 6 m below the existing ground surface. Groundwater and groundwater seepage was encountered at depths ranging from 3.9 m to 4.5 m below the existing ground surface. According to proposed earthworks design depths provided in Appendix A, the majority of excavation will to a maximum depth of 2 m below the existing surface, therefore, groundwater is not expected to be encountered. However, the eastern sediment basin location, which would be excavated to a maximum of 4 m below the existing surface level should not exceed 3.8 m to reduce the likelihood of intercepting groundwater.

In the event groundwater is encountered, a dewatering plan should be followed in accordance with EE's Environmental Guidelines Handbook. Under the *Water Act 1912/Water Management Act 2000*, if dewatering more than 3 megalitres (ML), a water access licence for is required.

Excavation and construction should be carried out in accordance with the geotechnical report (GeoEnviro 2022).

v Future land use vision

Stage 1 of the EEP lies within the Badgerys Creek Precinct of the Western Sydney Aerotropolis. The NSW Government's Western Sydney Aerotropolis Precinct Plan (DPE 2023) aims to transform Badgerys Creek Precinct from lower density, less intensive land use to advanced manufacturing, industry and warehousing that will employ 9,000-11,000 people. The Precinct was designed to benefit from major infrastructure including the M12 Motorway and Elizabeth Drive. The EEP is located under Western Sydney Airport's approach and take-off area for runways 05L/23R and 05R/23L and has therefore been deemed noise sensitive land unsuitable for uses such as housing.

EE will undertake project works in line with Government objectives ensuring consideration of the natural landscape and waterway features into project design, as well as the assessments undertaken for the project and outlined in this REF.

8.5.3 Impact assessment

Project design has considered the existing topography, geology, soil, groundwater and surface water features.

Earthworks 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 earthworks, which can occur as a result of:

- rain occurring while soils are exposed
- groundwater entering holes and trenches.

The greatest erosion risks during construction works are expected when potentially dispersive soils are exposed during earthworks. Sediment control measures will be implemented as outlined in the following section.

Another risk is the storage and/or stockpiling of any fill material brought to the site for earthworks, and excess spoil that may need to be disposed of following earthworks. A stockpile area will be located in the eastern portion of the enabling works area, as shown in Figure 7.3 and Appendix A. Stockpile management will be described in the CEMP, particularly in relation to location, drainage and appropriate handling and removal of any excess fill and/or spoil from the project site.

A combination of management and mitigation measures will be implemented to prevent sediment being carried off site.

i Operation

On-site drainage and a below ground septic tank and collection chamber will be designed and installed to manage and control water and soil-related impacts during the operation of the project as per design plans in Appendix A.

8.5.4 Management and mitigation measures

The key objectives of water management and mitigation measures are to prevent pollution, to prevent erosion and to control any sediment generated. The practices that will be implemented during construction are described below.

i Pollution control measures, erosion and sediment control

A detailed ESCP will be prepared for the project by a chartered professional erosion and sediment control specialist (CPESC) in accordance with *Managing Urban Stormwater Soils and Construction – Volume 1* (Bluebook) (Landcom 2004).

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

- A detailed, project specific ESCP is to be developed by a CPESC and provided to EE for approval.
- All construction phase erosion and sediment controls on the site are to be designed, supervised and certified by a CPESC in accordance with the recommendations provided by GeoEnviro (2022).
- Spill kits will be available at the construction site, 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.
- Track out prevention is to be included in the CEMP and adjacent public roadways kept free of mud and dust.
- 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 the project 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.
- All drainage, erosion and sediment control measures will be maintained in proper working order until their function is no longer required.

- Should groundwater be encountered during earthworks, the Site Supervisor would notify the Environmental Advisor and Project Manager who will co-ordinate any further actions including implementation of an appropriate dewatering plan.
- 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.

ii Fill and excess material measures

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

- 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.
- Spoil and fill material management and dewatering of worksites will be managed in accordance with the following EE Standards and the Environmental Guidelines Handbook which are all violable on the EE standards and Accredited Service Provider (ASP) website:
  - EMS 0007 – Waste Management
  - EMS 0008 – Environmental Incidence Response and Management
  - EMS 0013 – Spoil management
  - EMS 0014 – Dewatering worksites.
- Off-site disposal of surplus fill material or VENM should be undertaken in accordance with controls and measures summarised in this section.

iii Contamination of soil measures

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

- An unexpected contamination finds protocol will be prepared and implemented to manage any contamination which may be encountered during construction works and included in the CEMP.
- Should contamination be identified, an assessment of deeper soils, leachability and/or groundwater may be necessary to assess potential impacts.

iv Acid sulfate soils

ASS are unlikely to be encountered as testing found low concentrations of sulfate, however, in the event that ASS are identified during construction, the soil will be managed as follows:

- The disturbance of ASS should be avoided as much as possible by minimising excavation works where possible.
- Avoid stockpiling ASS. If stockpiling is necessary, cover stockpiles separately on plastics or in a skip bin to minimise air exposure and keep damp.

- Re-bury ASS at the same depth they originated from or engage a licenced contractor to dispose at a waste facility licenced to accept ASS. If ASS has been exposed to air, it should be neutralised with lime.

v Inspection and maintenance

The following inspection and maintenance measures will be implemented:

- 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 immediate clean-up of accidental chemical/fuel spills. Any contaminated spill rags are to be disposed of at an approved waste facility, and the incidents will be reported.
- All clean and dirty water, debris and sediment removal from drainage, erosion and sediment control measures will be disposed of in a manner that will not create erosion, sedimentation or a pollution hazard.

8.6 Waste

8.6.1 Construction

i General Construction Waste

Construction of the project will generate waste, including:

- surplus construction materials
- excess fill material and construction worker generated general waste
- wastewater
- vegetation

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.

ii Fill material

Fill material brought to site will be stockpiled in dedicated areas and managed in accordance with EE Standards and the Environmental Guidelines Handbook and EMS 0013 – Spoil management.

8.6.2 Operation

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

8.6.3 Waste 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.

- Stockpiles and excess fill material will be managed in accordance with managed in accordance with the EE Standards and the Environmental Guidelines Handbook and EMS 0013 – Spoil management.
- Waste material generated on site will not be left on site once the construction works have been completed.
- Any excess waste or spoil including, fill material and VENM, 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.

8.7 Utilities and services

A detailed Before You Dig Australia (BYDA) search will be conducted for all services in the vicinity of the project site 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.

8.7.1 Management and mitigation measures

- The Project Manager will conduct BYDA 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.

8.8 Roads, traffic and access

8.8.1 Overview

As previously noted, the construction works will occur wholly within the project site.

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

8.8.2 Existing environment

i Local road network

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

The project is accessible via an unnamed two-lane access road off the northern side of Elizabeth Drive. The access road also serves as access to BRM – Bulk Resource Management, Cleanaway Kemps Creek Resource Recovery Park, Elizabeth Drive landfill (located diagonally adjacent to the site's north-western corner), Kingsfield Stud (located adjacent to the northern side of the project site), and C.H. Horsemanship (located adjacent to Kingsfield Stud). Project vehicles would likely be utilising other area roads including the M7 (state owned), Mamre Road (state owned), The Northern Road (state owned) and/or the M4 (state owned).

The unnamed access road is a local road, operated by Penrith City Council and Elizabeth Drive is a state-owned road, operated by Transport for NSW (TfNSW 2024).

The M12 motorway (state owned), scheduled to open in 2026, is located approximately 1 km north of the project site.

Project access is shown in Figure 8.7.

Source: OpenStreetMap.

Figure 8.7 Map of project area with nearby premises and access road

ii Traffic movements

The local road network carries high volumes of passenger vehicle and truck movements, especially with the development of the Aerotropolis.

During earthworks, approximately 360 dump truck movements (where a movement is one way, i.e. arrival of a truck is one movement and departure from the project site is a second movement) will be required to import fill material. These movements will take place over a duration of four weeks, resulting in an average of 15 dump truck movements per day during earthworks.

It is anticipated that there will an average of 20 other vehicle movements each day along Elizabeth Drive and the unnamed access road as a result of project construction.

No local intersections will be impacted by the construction works and operation of the ZS.

8.8.3 Impact assessment

i Construction

The project will have minimal impact on local roads as it is located off the unnamed access road, and construction will be wholly within the project site. Elizabeth Drive will be minimally impacted as construction vehicles turning right from Elizabeth Drive (from the east) have a turning lane into the unnamed access road. Vehicles turning left from the west do not have a dedicated turning lane, however Elizabeth Drive has two lanes in both directions at the intersection with the unnamed access road.

The project is not expected to result in any road or lane closures.

Delivery, construction, and workers' vehicles will be parked safely inside the project site.

ii Operation

Following completion of construction works, the project site will only be accessed periodically for inspection and maintenance purposes. This will also involve the intermittent access by EE and its contractors for maintenance and operations purposes.

8.8.4 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 PCC requirements.
- A Traffic Management Plan (TMP) will be prepared and included as part of the overarching CEMP. The TMP will clearly show the following site features: pedestrian paths, material storage, waste material storage, vehicle parking, the location of short-stay vehicle parking, and drop off area for delivery of materials.
- Appropriate track out controls including cattle grates with washing facilities will be used to minimise sediment being tracked out of the project site.
- Sufficient notice will be given to residents that may be impacted by the project before construction commences.
- Should there be any open points and trenches, they will be covered and/or fenced when workers are not in attendance at these sites.

Vehicles will not block access to residential or commercial properties at any time.

8.9 Visual assessment

As previously discussed, the entire area is undergoing transformation which will heavily impact the appearance and land usage of the Western Sydney Aerotropolis Area. While the project will impact the visual amenity of the area, it is a minor component of the commercial and industrial development within the EEP. Once construction within the EEP is complete, BC ZS will not be visible from Elizabeth Drive and will be dwarfed by the surrounding warehouses.

8.10 Socio-economic impacts

The project may temporarily affect the local community due to 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 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 Aerotropolis area, especially within the EEP and associated infrastructure projects in the area. The project will provide safe, reliable, and cost-effective electricity supply for 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, plus the many employment opportunities that come from new businesses in the area that will have the electricity they need to operate as a result of this project.

Project needs and benefits are addressed in Section 2.3.

8.11 Noise

8.11.1 Construction

Construction works associated with the project will result in some noise generation. Typical noise generating equipment will include excavation machinery, small items of plant, and light and heavy vehicles used by construction contractors.

Earthworks will be conducted from December 2024 and last for up to three months, with completion by the end of February 2025. Erection of the facility will follow.

Noise impacts from the construction of the facility will be managed in accordance with the NSW Department of Environment & Climate Change (DECC) Interim Construction Noise Guideline (ICNG) (2009). All construction will be completed during standard construction hours. As such, limited construction noise impacts are anticipated at surrounding noise sensitive locations.

8.11.2 Operation

A Noise Impact Assessment (NIA) for project operation was prepared by EMM in late 2022 and is provided in Appendix C. The NIA found that operational noise levels emitted by the proposed ZS will meet the NSW EPA's Noise Policy for Industry (NPfI) (EPA 2017) noise criteria for residential and non-residential land.

i Existing environment

a Sensitive receivers

The nearest potentially affected residential premises is located approximately 430 m south-west of the project site, at 1745 Elizabeth Drive, Badgerys Creek. The nearest potentially affected future commercial premises will be warehouses located adjacent to the ZS to the east, and south (Figure 8.8).

Source: Noise Impact Assessment (EMM 2022)

Figure 8.8 Assessment location – nearest sensitive receivers

ii Background noise level

Ambient noise level can be defined as the background sound pressure level at any given location, normally used as a reference level to study a new intrusive sound source. The ambient L_{90} background noise level is a statistical measure of the sound pressure level that is exceeded for 90% of the measuring period, normally for a duration of 15 minutes. The Rating Background Level (RBL) is defined by the EPA as the median value of the (lower) tenth percentile of L_{90} ambient background noise levels for the day, evening or nighttime periods, measured over a number of days during the proposed days and times of operation.

Noise monitoring was conducted at one location considered to be representative of the range of noise levels likely to be experienced by the nearest residential assessment locations in the vicinity of the site. The logger location was selected based on an inspection of the site and its surrounds, the proximity of assessment locations to the site, security issues for the noise monitoring device and gaining permission for access from the residents or landowners. Considering this, the noise logger was placed on 1745 Elizabeth Drive, facing the site, from 10–26 October 2022 (NM1) and again from 121 November 2022 (NM2). A summary of existing background and ambient noise is provided in Table 8.1.

Table 8.1 Summary of existing background and ambient noise, 1745 Elizabeth Drive

Location	Time period[1]	Rating background level (RBL, based on L_{A90}) dB	Measured L_{Aeq}, period noise level[2], dB
NM1	Day	44	68
	Evening	31	55
	Night	35	58
NM2	Day	41	55
	Evening	33	48
	Night	30	45

Notes:

1. Day: 7 am to 6 pm Monday to Saturday; 8 am to 6 pm Sundays and public holidays; Evening: 6 pm to 10 pm; Night: remaining periods.
2. The energy averaged noise level over the measurement period and representative of general ambient noise.

iii Assessment criteria

Noise from development in NSW is regulated by the local council, Department of Planning and Environment (DPE) and/or the EPA. Sites generally have a licence and/or development consent conditions stipulating noise limits. Within PCC, limits are based on the EPA's Noise Policy for Industry (EPA 2017).

The NPfI intrusiveness noise triggers require that $L_{Aeq,15min}$ noise levels (energy average noise level over a 15-minute period) from the site do not exceed the RBL by more than 5 dB during the relevant operational periods. The intrusiveness noise levels are only applicable at residential assessment locations. For the purpose of this assessment, it has been conservatively assumed the RBLs measured at NM2 are applicable to all residential assessment locations (particularly for locations adjacent to Elizabeth Drive). Project intrusiveness levels are as follows:

- 46 dB during the day
- 38 dB in the evening
- 35 dB at night.

To ensure that industrial noise levels (existing plus new) remain within the recommended amenity noise levels for an area, the project amenity noise level for a new industrial development is the recommended amenity noise level minus 5 dB. It is noted that this approach is based on a receiver being impacted by multiple industrial sites (or noise sources).

For the purpose of this assessment, the residential amenity category of Rural has been applied and is considered conservative for locations adjacent to Elizabeth Drive. The NPfI defines a rural area as one with an acoustical environment that is dominated by natural sounds, having little or no road traffic noise and generally characterised by low background noise levels.

Project amenity noise levels are as follows:

- Residential locations:
  - 50 dB during the day

- 45 dB during the evening
- 40 dB during the night.

- Industrial locations:
  - 70 dB when in operation.

The project noise trigger level (PNTL) is the lower of the calculated intrusiveness or amenity noise levels. A summary of PNTLs can be found in Table 8.2.

Table 8.2 Project noise trigger levels

Assessment location	Assessment period[1]	Intrusiveness noise level, $L_{Aeq,15min}$, dB	Amenity noise level[2], $L_{Aeq,15min}$, dB	PNTL[3], $L_{Aeq,15min}$, dB
All residential assessment locations	Day	46	48	46
	Evening	38	43	38
	Night	35	38	35
All industrial assessment locations	When in use		68	68

Notes:

1. Day: 7 am to 6 pm Monday to Saturday; 8 am to 6 pm Sundays and public holidays; Evening: 6 pm to 10 pm; Night: remaining periods.
2. Project amenity LAeq,15min noise level is the recommended amenity noise level minus 5dB and $L_{Aeq,period}$ +3 dB as per the NPfI.
3. PNTL is the lower of the calculated intrusiveness or amenity noise levels.

8.11.3 Impact assessment

i Construction

Construction works associated with the project will result in some noise generation. Typical noise generating equipment will include excavation machinery, small items of plant, and light and heavy vehicles used by construction contractors.

Construction will generally be restricted to standard construction hours:

- Mondays to Fridays: 7:00 am to 6:00 pm
- 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, notification of the nearby residents and other receivers of the works to be undertaken. Approval will be required from the Environmental Team for more than two consecutive nights of out of hours works.

There are no sensitive receivers within 400 m the project, therefore construction noise impact is precited to be minimal.

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

ii Operation

Once commissioned, the ZS will operate continuously, 24 hours a day, 7 days a week. Substations typically emit a low frequency buzz/humming noise from transformers. As the project is in an industrial area, no special provision has been made for noise mitigation.

Operational noise modelling was completed at 13 nearby locations, including residential locations and three industrial locations as shown in Figure 8.8.

Operational noise levels were predicted using DGMR proprietary modelling software, iNoise. The model allows prediction under the ISO9613-2 *"Acoustics – Attenuation of Sound during Propagation Outdoors – general method"* algorithm. This algorithm is widely adopted in the industry and accepted by the EPA. Project noise trigger levels (PNTLs) are targets for a particular industrial noise source or industry. The PTNLs are the lower of either the project intrusive noise level or project amenity noise level. Acceptable noise levels for a project are noise levels that that fall below PNTL levels.

Predicted $L_{Aeq,\ 15min}$ site noise contributions were found to be below PNTLs at all residential and non-residential assessment locations (refer Table 8.3) based on the adopted plant and the plan provided. No NPfI PNTL noise exceedances are predicted from operations during the proposed operating hours (day, evening, and night) at any residential or non-residential assessment location.

Table 8.3 Predicted operational noise levels

Assessment location	Classification	Period	PNTL	Predicted substation noise level, dB L_{aeq}, 15min	
				Existing environment	SSD stage 1 completed
R1	Residential	Night	35	<30	<30
R2	Residential	Night	35	<30	<30
R3	Residential	Night	35	<30	<30
R4	Residential	Night	35	<30	<30
R5	Residential	Night	35	<30	<30
R6	Residential	Night	35	<30	<30
R7	Residential	Night	35	<30	<30
R8	Residential	Night	35	<30	<30
R9	Residential	Night	35	<30	<30
R10	Residential	Night	35	<30	<30
I1	Industrial	When in use	68	44	45
I2	Industrial	When in use	68	43	45
I3	Industrial	When in use	68	46	48

Measurements and modelling predict noise levels emitted by the transformers will meet the NPfI noise level requirements.

8.11.4 Management and mitigation measures

Best practice mitigation measures and work practices will be implemented where feasible. A summary of best practice measures is provided in the subsequent sections.

a Work practices

Work practice methods include:

- regular reinforcement (such as at toolbox talks) of the need to minimise noise and vibration
- regular identification of noisy activities and adoption of improvement techniques
- avoiding the use of portable radios, public address systems or other methods of site communication that may unnecessarily impact upon nearby residents
- develop routes for the delivery of materials and parking of vehicles to minimise noise
- where possible, avoid the use of equipment that generates impulsive noise
- minimise the movement of materials and plant and unnecessary metal-on-metal contact
- the use of local noise barriers and/or noise blankets (e.g. Echo Barrier)
- minimise truck movements
- any out -of-hours-works will be carried out in accordance with the requirements of EE's EMS 0016 – Industrial and Construction Noise Standard.
- schedule respite periods for intensive works as determined through consultation with potentially affected neighbours (e.g. a daily respite period for a minimum of one hour at midday)
- All potentially affected residents will 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.

b Plant and equipment

Additional measures for plant and equipment include:

- where possible, choose quieter plant and equipment based on the optimal power and size to most efficiently perform the required tasks
- movement alarms and beepers to be replaced with non-tonal level varying quackers or equivalent
- operate plant and equipment in the quietest and most efficient manner
- regularly inspect and maintain plant and equipment to minimise noise and vibration level increases, to ensure that all noise and vibration reduction devices are operating effectively
- Should power generators be required to supply private properties during any stage of the construction works, the Project Manager must liaise with the Environmental Services Team. If generators are required to operate at night, acoustic consultants may be required to undertake noise assessment prior to their use.

c Quantifying noise reductions

Approximate noise reductions provided by some of these measures are provided in Table 8.4.

Table 8.4 Relative effectiveness of various forms of noise control

Noise control	Nominal noise reduction possible, in total A-weighted sound pressure level, dB
Increase source to receiver distance[1]	Approximately 6 dB for each doubling of distance
Reduce equipment operating times or turn off idling machinery[2]	Approximately 3 dB per halving of operating time
Operator training on quiet operation[2]	Up to 3 to 5 dB
Screening (e.g. noise barrier)[1]	Normally 5 dB to 10 dB, maximum 15 dB
Silencing (e.g. exhaust mufflers) [1]	Normally 5 dB to 10 dB, maximum 20 dB

Notes: 1. Sourced from AS2436-2010.

2. Based on EMM's measurement experience at construction and mining sites

8.12 Air quality and dust suppression

8.12.1 Construction

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

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.

8.12.2 Operation

The project is predicted to have no air quality impacts during operation. Minor emissions may be generated by maintenance vehicles. However, these will be comparable to that of other vehicles on the roads of the local road network.

8.12.3 Management and mitigation measures

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

- Prior to commencement of construction activities, develop appropriate communications to notify the potentially impacted residences of the Project (duration, types of works, etc.) and relevant contact details for environmental complaints reporting.
- Maintain complaints logbook throughout the construction phase which will include any complaints related to dust. If a dust complaint is received, the response actioned will be detailed in the logbook.
- Record any exceptional incidents that cause dust and/or air emissions, either on or off site, and the action taken to resolve the situation in the logbook.
- Erect shade cloth barriers to site fences around potentially dusty activities such as excavation and material stockpiles where practicable.
- Keep site fencing and barriers clean using wet methods (such as through application of sprays), as required

- Deploy a water cart to ensure that exposed areas and topsoils/subsoil are kept moist, where necessary
- Modify working practices by limiting activity during periods of adverse weather (hot, dry, and windy conditions) and when dust is seen leaving the site.
- 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 measures.
- Traffic movement and speed will be restricted over disturbed areas of ground and unsealed access tracks.
- Ensure vehicle loads entering and leaving sites are covered to prevent escape of materials during transport.
- Soil/spoil tracked onto roadways will be cleaned up on a regular basis.
- Excavated materials will be managed as per sections 8.5.4 and 8.6.3.
- Vehicles and machinery will not be left idling when not in use to reduce exhaust emissions.
- Dust suppression techniques, including wetting down surfaces will be used as necessary.

8.13 Safety and hazards

8.13.1 Construction

All components of the project will be designed and constructed 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 residents. Hazards which may arise during the construction works, such as machinery and vehicle movements will be managed appropriately.

8.13.2 Operation

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

8.13.3 Management and mitigation measures

The following mitigation measures will be implemented to manage hazards:

- 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.
- The TMP and CEMP 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.

8.14 Bushfire

Results from the NSW ePlanning Spatial Viewer for 'Bushfire Prone Land' on 17 October 2024 show the project site falls within Bushfire Vegetation Category 2 (Figure 8.9). Category 2 vegetation is considered to be a lower bush fire risk than both Category 1 and Category 3, but with a higher risk than areas that have no rating ('excluded areas').

Source: ePlanning Spatial Viewer.

Figure 8.9 Bushfire prone land layer for project area

8.14.1 Management and mitigation measures

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

- 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.
- 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.
- The project will be constructed and maintained in accordance with EE Company Procedure GAM 0011.

8.15 Contamination

8.15.1 Overview

Urban Ethos (2021)[1] prepared a Request for Environmental Secretary's Requirements report regarding the entire area of 1669–1723 Elizabeth Drive for Mirvac which included the project site. The report included contamination information.

8.15.2 Existing environment

The project site was previously used for light agricultural purposes including market gardens and grazing lands.

A desktop search of the NSW EPA database was conducted on 17 October 2024 which identified the following:

- One clean up notice was issued 02 September 2015, and one penalty notice for "fail to comply with clean-up notice" was issued on 14 September 2016 under the POEO Act for the project site.
- Licences are currently in place for Cleanaway Resource Recovery facility which is adjacent to the project site.
- No notices have been issued under the CLM Act for the project site and immediate surrounding land.
- The project site is not on the list of NSW contaminated sites notified to the EPA.
- The site is not listed by EPA on the NSW Government PFAS [perfluoroalkyl and polyfluoroalkyl substances] Investigation program. The closest PFAS investigation area identified by the EPA is the Kemps Creek NSW Rural Fire Service (245 Devonshire Road, Kemps Creek). Given the RAAF Base is approximately 5.2 km southeast of the project site, and both Elizabeth Drive and South Creek separate the project site and Kemps Creek NSW Rural Fire Service, it is unlikely any PFAS related impacts at the Fire Service pose a risk to the project site.
- Cleanaway Kemps Creek Resource Recovery Park, adjacent to the project site, accepts bagged asbestos dust.

The Urban Ethos (2021) report states fragments of materials containing asbestos were found in existing stockpiles and fill materials, though it is not clear where on the property these materials were located. The likely location is around previous buildings, which were not located on the project site. However, the report states "further detailed analysis of contamination aspects across the site is not considered necessary beyond those investigations previously undertaken as Phase 1 Preliminary Site Investigation."

8.15.3 Management and mitigation measures

If asbestos contaminated soils are encountered, EE will follow protocol as outlined in the EE Environmental Guidelines Handbook (2017), which will also be included in the CEMP:

- If asbestos contaminated fill is encountered unexpectedly, stop works and contact your Environmental Representative. Apply asbestos PPE, then cover any suspected asbestos contaminated soil with plastic and barricade with asbestos signage.
- Where a buried asbestos conduit is in good condition, it can be carefully removed to avoid damaging the conduit. Update the HAZMAT register where required. Where a buried asbestos conduit appears damaged or broken, the surrounding soil may need removal.

[1] Available online: 2210168 Elizabeth Enterprise Precinct - Stage 1 Mirvac Projects Pty Ltd - Request for Secretary's Environmental Assessment Requirements (nsw.gov.au)

- Asbestos requires disposal at appropriately licenced waste facilities. Contact your Environmental Representative for advice on disposal of asbestos contaminated soil and transport requirements.
- Do not re-use contaminated soil.

8.16 Cumulative impacts

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

- Outer Sydney Orbital Corridor
- M12 Motorway linking the M7 Motorway to the Western Sydney Airport
- Sydney Metro – Western Sydney Airport
- Bradfield City
- 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. The ZS project is small in comparison to the development and infrastructure works currently transforming the Western Sydney Aerotropolis 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.

9 Environmental management

9.1 Environmental management standards

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

EE Environmental Management Standard EMS0001 *Environmental Impact Assessment and Environmental Management Plans* (EMS 0001) and EE Environmental Guidelines Handbook (EGH) 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.

9.2 Environmental management plan

This REF has identified several mitigation and management measures to minimise adverse environmental impacts that could potentially arise from the project (refer Table 9.1). 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 EE's 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 and EGH.

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.

9.3 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.

Table 9.1 Summary of environmental safeguards and management measures

Impact	Environmental safeguards	Responsibility
Biodiversity	• Development and implementation of detailed ESCP. • Weed control measures (e.g. herbicide spraying) will be undertaken prior to construction commencing in areas where high densities or infestations of weeds occur. This will reduce the risk of weeds being spread as a result of the project. • Tyres and undercarriages of vehicles will be washed, cleaned out, and/or sprayed prior to entering weed infested areas of the site and after working in weed infested areas. • In the unlikely event that unexpected threatened species are identified during the project, works will cease and an ecologist contacted. • Appropriate erosion and sediment control measures should be installed at all sites to avoid sedimentation of receiving water bodies or other indirect impacts to surrounding biodiversity. • Noise management and mitigation measures listed in Section 8.11.6 should be implemented. It is expected that resident fauna would be relatively tolerant of noise from truck movements and operations associated with the neighbouring waste management centre and other construction works within the locality.	Contractor
Earthworks management	A detailed ESCP will be prepared for the project by a chartered professional erosion and sediment control specialist (CPESC) in accordance with *Managing Urban Stormwater Soils and Construction – Volume 1* (Bluebook) (Landcom 2004). The following management and mitigation measures will be applied during earthworks: • A detailed, project specific ESCP is to be developed by a CPESC and provided to EE for approval. • All construction phase erosion and sediment controls on the site are to be designed, supervised and certified by a CPESC in accordance with the recommendations provided by GeoEnviro (2022). • Double sediment and erosion controls will be implemented during earthworks.\ • Soil and water management will be conducted in accordance with EE's standards and Environmental Guidelines Handbook. • Should groundwater be encountered during earthworks, the Site Supervisor would notify the Environmental Advisor and Project Manager who will co-ordinate any further actions including implementation of a dewatering plan. • If dewatering more than 3 ML, a Water Access Licence is required.	Developer (bulk earthworks) Contractor (during site specific works such as septic tank installation)
Invasive and noxious weed management	• Weed control measures will be undertaken prior to construction in areas where high densities or weed infestation occurs. • Tyres and undercarriages of vehicles will be washed, cleaned out, and/or sprayed prior to departing weed infested areas.	Contractor
Risk of pathogen and pest species	• 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.	Contractor

Table 9.1 Summary of environmental safeguards and management measures

Impact	Environmental safeguards	Responsibility
Contaminated land	• If asbestos contaminated fill is encountered unexpectedly, stop works and contact your Environmental Representative. Apply asbestos PPE, then cover any suspected asbestos contaminated soil with plastic and barricade with asbestos signage. • Where a buried asbestos conduit is in good condition, it can be carefully removed to avoid damaging the conduit. Update the HAZMAT register where required. Where a buried asbestos conduit appears damaged or broken, the surrounding soil may need removal. • Asbestos requires disposal at appropriately licenced waste facilities. Contact your Environmental Representative for advice on disposal of asbestos contaminated soil and transport requirements. • Do not re-use contaminated soil. • If contaminated areas are encountered during construction, appropriate control measures will be implemented to manage the immediate risks of contamination. All other works that may impact on the contaminated area will cease until the nature and extent of the contamination has been confirmed and any necessary site-specific controls or further actions identified in consultation with the Transport for NSW's Environment Manager and/or EPA.	
Accidental spills	• 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.	Contractor

Table 9.1 Summary of environmental safeguards and management measures

Impact	Environmental safeguards	Responsibility
Pollution control measures, erosion, and sediment control	• A detailed, project specific ESCP is to be developed by a CPESC. • All construction phase erosion and sediment controls on the site are to be designed, supervised and certified by a CPESC. • Spill kits will be available at the construction site, 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. • Track out prevention is to be included in the CEMP and adjacent public roadways kept free of mud and dust. • 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 the project 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. • All drainage, erosion and sediment control measures will be maintained in proper working order until their function is no longer required. • Should groundwater be encountered during earthworks, the Site Supervisor would notify the Environmental Advisor and Project Manager who will co-ordinate any further actions. • 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.	Contractor
Excavated and fill material measures	• Stockpiles will be placed in dedicated areas only. Topsoil and VENM will be clearly marked and stockpiled separately. Sediment fences are to be constructed on the down slope side of the stockpile. • 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.	Contractor

Table 9.1 Summary of environmental safeguards and management measures

Impact	Environmental safeguards	Responsibility
Excavated material measures – 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. • 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.	Contractor
Waste	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. 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. • Stockpiles and excess fill material will be managed in accordance with managed in accordance with the EE Standards and the Environmental Guidelines Handbook and EMS 0013 – Spoil management. • Waste material generated on site will not be left on site once the works have been completed. • 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.	Contractor
Fill material	• Fill material will be stockpiled in dedicated areas and managed in accordance with the EE Standards and the Environmental Guidelines Handbook and EMS 0013 – Spoil management.	Contractor
Before You Dig Australia	The Project Manager will conduct BYDA searches prior to works commencing on site.	Contractor
Impacts on neighbouring properties – electricity supply	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. Interruptions and outages are currently not expected as part of this project	Contractor

Table 9.1 Summary of environmental safeguards and management measures

Impact	Environmental safeguards	Responsibility
Noise	• All potentially affected residents will 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 Environmental Services Team. If generators are required to operate at night, acoustic consultants may be required to undertake noise assessment prior to their use.	Contractor
Air quality	• Prior to commencement of construction activities, develop appropriate communications to notify the potentially impacted residences of the Project (duration, types of works, etc.) and relevant contact details for environmental complaints reporting. • Maintain complaints logbook throughout the construction phase which will include any complaints related to dust. If a dust complaint is received, the response actioned will be detailed in the logbook. • Record any exceptional incidents that cause dust and/or air emissions, either on or off site, and the action taken to resolve the situation in the logbook. • Erect shade cloth barriers to site fences around potentially dusty activities such as excavation and material stockpiles where practicable. • Keep site fencing and barriers clean using wet methods (such as through application of sprays), as required • Deploy a water cart to ensure that exposed areas and topsoils/subsoil are kept moist, where necessary • Modify working practices by limiting activity during periods of adverse weather (hot, dry, and windy conditions) and when dust is seen leaving the site. • 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 measures. • Traffic movement and speed will be restricted over disturbed areas of ground and unsealed access tracks. • Ensure vehicle loads entering and leaving sites are covered to prevent escape of materials during transport. • Soil/spoil tracked onto roadways will be cleaned up on a regular basis. • Excavated materials will be managed as per sections 8.5.4 and 8.6.3. • Vehicles and machinery will not be left idling when not in use to reduce exhaust emissions. • Dust suppression techniques, including wetting down surfaces will be used as necessary. • Dust mitigation and management techniques will be used as per EE's Environmental Guidelines Handbook.	Contractor

Table 9.1 Summary of environmental safeguards and management measures

Impact	Environmental safeguards	Responsibility
Aboriginal heritage	• A buffer area of 5 m around the southern extent of EEP S2 PAD03 must be fenced off to ensure the site is not impacted by project works including site benching earthworks and project truck access. No works, worker parking, laydown areas, stockpiles, etc are to occur within the buffer area. • Works will be confined to the project site. No works, worker parking, laydown areas, stockpiles, etc. will be located outside the project site boundaries. • All on-site personnel are to be made aware of their obligations under the *National Parks and Wildlife Act 1974*. This includes protection of Aboriginal sites and the reporting of any new or suspected Aboriginal sites. This may be done through an on-site induction or other suitable format. • In the event that additional Aboriginal, or suspected Aboriginal objects are uncovered during the works, then works in that area are to stop and the area is to be cordoned off. The project manager is to contact an archaeologist to assess whether the material is considered an Aboriginal object under the meaning of the *National Parks and Wildlife Act 1974 and* advise on the required management and mitigation measures. Works are not to recommence in the cordoned off area until heritage clearance has been given and/or the required management and mitigation measures have been implemented. • In the event that human remains, or suspected human remains are uncovered during the construction, works in that area are to stop and the area is to be cordoned off. The project manager is to contact the NSW Police to establish whether the area is a crime scene. If it is not a crime scene, Heritage NSW is to be notified via the Environment Line on 131 555 and management measure are to be devised in consultation with the local Aboriginal community. Works are not to recommence in the area until the management measures have been implemented.	Contractor
Non-Aboriginal heritage	An unexpected finds procedure will be followed in the event that any unexpected heritage items, archaeological remains or potential relics of Non-Aboriginal origin are encountered. Work will only re-commence once the requirements of that Procedure have been satisfied.	Contractor
Safety and hazards	The following mitigation measures will be implemented to ensure management of safety and hazards: • 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.	Contractor

Table 9.1 Summary of environmental safeguards and management measures

Impact	Environmental safeguards	Responsibility
Bushfire	The CEMP prepared for the project will make provision for the following bushfire protection measures: • 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. • 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. • The project will be constructed and maintained in accordance with EE Company Procedure GAM 0011.	Contractor

10 Conclusion

The investigations and assessment undertaken as part of this REF has determined that the construction of Badgerys Creek zone substation will have minimal environmental impact 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.

With implementation of identified mitigation measures, 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 environmental assessment will be prepared for any other works associated to this project that are not covered in this REF.
- It is required that all works be undertaken in accordance with this REF, Decision Statement (Notice of Determination) issued in relation to this REF, the associated CEMP and ESCP and any other specific mitigation measures that have been developed for this project.

References

ABS 2016, *Badgerys Creek,* Australian Bureau of Statistics. Viewed 20.10.2022. https://www.abs.gov.au/census/find-census-data/quickstats/2016/SSC10132

ANZG 2018, *Australian & New Zealand Guidelines for Fresh & Marine Water, Australian and New Zealand Governments*, https://www.waterquality.gov.au/anz-guidelines.

Artefact 2020, *Elizabeth Enterprise Precinct Stage 1 Archaeological Test Excavation Report,* prepared for Mirvac Projects Pty Ltd.

Artefact 2022, *Elizabeth Enterprise Precinct Stage 1 Aboriginal Cultural Heritage Assessment Report,* prepared for Mirvac Projects Pty Ltd.

Australian Museum 2018, *The Sydney Basin*, viewed 21 October 2022, https://australian.museum/learn/minerals/shaping-earth/the-sydney-basin/.

DECCW 2010, *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW,* Department of Environment, Climate Change and Water.

DIRDC 2018, *Western Sydney Airport Education Program, Stage 3 lesson 1: Badgerys Creek's past*, Department of Infrastructure, Regional Development and Cities.

DPE 2021, *Elizabeth Enterprise Precinct – Stage 1 Mirvac Projects Pty Ltd,* NSW Department of Planning, Industry and Environment, viewed 2 December 2022, https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=PDA-18225495%2120210517T062249.898%20GMT

DPE 2022a, *Western Sydney Aerotropolis Precinct Plan,* NSW Department of Planning and Environment.

DPE 2022b, NSW Planning Portal, NSW Department of Planning and Environment.

DPE 2023, Western Sydney Aerotropolis Precinct Plan, Department of Planning and Environment.

Eco Logical Australia 2022, *Aboriginal Archaeological Technical Report,* prepared for Ingham Rural Property Group Pty Limited.

ecologique 2024, Badgerys Creek Zone Substation Biodiversity Assessment Report.

EE 2022, *RIT-D draft project assessment report, providing supply to the Badgerys Creek development area,* Endeavour Energy.

EPA 2014, *Waste classification guidelines*, NSW Environment Protection Authority.

EPA 2017, *Noise Policy for Industry,* NSW Environment Protection Authority.

Ethos Urban 2021, *Request for Secretary's Environmental Assessment Requirements,* prepared on behalf of Mirvac Projects Pty Ltd.

GeoEnviro 2022, *Geotechnical investigation proposed Badgerys Creek Substation, part lot 5 DP 860456 no 1669-1723 Elizabeth Drive, Badgerys Creek*, prepared for Mirvac Projects Pty Ltd, GeoEnviro Consultancy Pty Ltd.

GSC 2018a, *Greater Sydney Region Plan - A Metropolis of Three Cities*, Greater Sydney Commission.

GSC 2018b *Our Greater Sydney 2056 Western City District Plan – connecting communities*, Greater Sydney Commission.

Investment NSW 2021, *A Metropolis of Three Cities Concept Map*

Landcom 2004, *Soils and Construction*, 4th edition.

NSW DPE n.d., *Blacktown residual,* Department of Planning and Environment.

NSWEH n.d., bt Blacktown Residual, New South Wales Department of Environment and Heritage.

NSW Government 2024, The Central Resource for Sharing and Enabling Environmental Data in NSW.

NSW Government 2024a, State Heritage Inventory.

NSW Government 2024b, Historical Imagery.

TfNSW 2024, NSW Road Network Classifications, Transport for New South Wales.

Appendix A
Design plans

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Appendix B

Elizabeth Enterprise Precinct Stage 1 Aboriginal Test Excavation Report (Artefact 2020)

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Appendix C

Elizabeth Enterprise Precinct Stage 1 Aboriginal Cultural Heritage Report (Artefact 2022)

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Appendix D

Noise Impact Assessment (EMM 2022)

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Appendix A
Proposed site layout

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Appendix B
Unattended noise monitoring

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Appendix E

Biodiversity Values Map and Threshold Report

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Appendix F
Project brief

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Appendix G
Geotechnical assessment

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Appendix H

Protected Matters – MNES layers – 14 October 2024

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Appendix I
Biodiversity assessment report

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