Prepared for
Neoen Australia Pty Ltd
ABN: 57160905706

Submissions Report

Great Western Battery

04 Nov 2022
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Submissions Report

Great Western Battery

Client: Neoen Australia Pty Ltd

ABN: 57160905706

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Executive Summary

Neoen Australia Pty Ltd (Neoen) is seeking development consent to construct, operate and maintain a battery energy storage system (BESS) of approximately 500 megawatts (MW) and approximately 1000 megawatt-hour (MWh) at 173 Brays Lane, Wallerawang, NSW 2845 (the Site), as well as a new transmission line that would connect the Battery Energy Storage System (BESS) to the existing Transgrid 330 kilovolt (kV) substation at Wallerawang (the Project). The Project would provide storage and firming capacity to the National Energy Market (NEM) as well as additional services to assist grid stability including frequency control ancillary services.

The Project is considered State Significant Development (SSD) under the *Environmental Planning and Assessment Act 1979* (EP&A Act). As such, an Environmental Impact Statement (EIS) for the Project was prepared in accordance with the relevant provisions of the EP&A Act. The EIS was prepared to address the Secretary's Environmental Assessment Requirements (SEARs) issued by the Secretary of the Department of Planning, Industry and Environment (DPIE) (now referred to as the Department of Planning and Environment (DPE)) on 4 February 2021 and the relevant provisions of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* (NSW) (now replaced by *Environmental Planning and Assessment Regulation 2021* (NSW)) (EP&A Regulation).

The proposed location of the BESS is at Lot 4 Deposited Plan (DP) 751651. The Site consists of the majority of this Lot. The Site is located approximately 1.25 km northwest of the Transgrid Wallerawang 330 kilovolt (kV) substation, located off James Parade, Wallerawang 2845 (Lot 91 of DP 1043967). The Project proposes the installation of a transmission line connection between the Site and the Transgrid Wallerawang 330 kV substation. The Site, transmission line corridor and connection to the substation is collectively referred to as the Project Area.

The Environmental Impact Statement (EIS) for the Project was placed on public exhibition for 28 days from Tuesday 8 March 2022 until Monday 4 April 2022 in accordance with the requirements of the EP&A Act. During the exhibition period, community members and stakeholders were able to submit feedback on the Project to DPE.

This Submissions Report addresses the requirement to consider and respond to all submissions received and has been prepared in accordance with the NSW Government's "*State significant development guidelines – preparing a Submissions Report: Appendix C to the state significant development guidelines"* (DPE, 2021) (the guideline).

Actions taken since exhibition of the EIS include:

- Project refinement in light of comments received
- Consultation with submitters and other relevant parties
- Further assessment of impacts to respond to comments received.

The Project refinement occurred following exhibition, during which WaterNSW informed Neoen that the proposed transmission connection for the Project would cross an existing underground water pipeline (the Fish River Pipeline). Neoen consulted with WaterNSW to understand the separation distances and construction methods required to avoid impacting the Fish River Pipeline. The recommended separation distances mean that the Horizontal Directional Drilling (HDD) proposed to install the transmission connection in this location would need to make sharper turns underground. Whilst the HDD methodology could still be used to cross from the Site to the northern end of the rail corridor, an additional entry/exit pit along this part of the alignment would be required. The project refinement has been assessed and is discussed further in **Section 3.0**.

During the exhibition period 17 submissions were made by various agencies and Lithgow City Council (LCC) . Two submissions were made by the members of the community. Of the 19 total submissions, 11 required a response from various technical specialists to provide further justification or advice to resolve the comments raised. Meetings were held with agencies and LCC depending on the nature of their submission during May and June 2022 to clarify comments raised and agree appropriate responses.

Further assessment has been undertaken and is detailed within this Submissions Report to respond to the comments raised by agencies and LCC. A summary of further assessment that has been undertaken is provided in **Table 3-3**.

Section 4.0 outlines the responses to submissions in detail. Additional investigations and supporting documentation are provided in appendices where relevant.

This Submissions Report demonstrates that the Project is appropriately located and can be undertaken in a manner that would not result in significant impacts on the local community or the environment. The benefits of the Project are considered to outweigh the limited environmental and social impacts, and as such the Project is considered justified and worthy of development consent.

1.0 Introduction

1.1 Background

Neoen Australia Pty Ltd (Neoen) is seeking development consent to construct, operate and maintain a battery energy storage system (BESS) of up to 500 megawatts (MW) and approximately 1000 megawatt-hour (MWh) at 173 Brays Lane, Wallerawang, NSW 2845 (the Site), as well as a new transmission line that would connect the BESS to the existing Transgrid 330 kilovolt (kV) substation at Wallerawang (the Project). The location of the Project and its regional context is shown on **Figure 1-1**.

The proposed location of the BESS is at Lot 4 Deposited Plan (DP) 751651. The Site is located approximately 1.25 km northwest of the Transgrid Wallerawang 330 kV substation. This substation is located at James Parade, Wallerawang 2845 (Lot 91 of DP 1043967). Once constructed the Project proposes to subdivide Lot 4 DP 751651 to separate the BESS from the remaining land uses.

The Project would involve the installation of a transmission line connection between the Site and the Transgrid Wallerawang 330 kV substation. The Site, transmission line easement and connection to the substation is referred to as the Project Area and is shown on **Figure 1-2**.

The Project is considered State Significant Development (SSD) under the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act) as it satisfies the requirements of Clause 2.6 of the *State Environmental Planning Policy (Planning Systems) 2021* (SEPP (Planning Systems)), being:

a. *The development on the land concerned is, by the operation of an environmental planning instrument, not permissible without development consent under Part 4 of the EP&A Act; and*

b. *The development is specified in Schedule 1 or 2 of the SEPP (Planning Systems).*

Part 2.3, Division 4 of the *State Environmental Planning Policy (Transport and Infrastructure) 2021* (SEPP (Transport and Infrastructure) applies to electricity generating works or solar energy systems. Under Division 4, electricity generating work means a building or place used for the purpose of:

a. *Making or generating electricity, or*

b. *Electricity storage.*

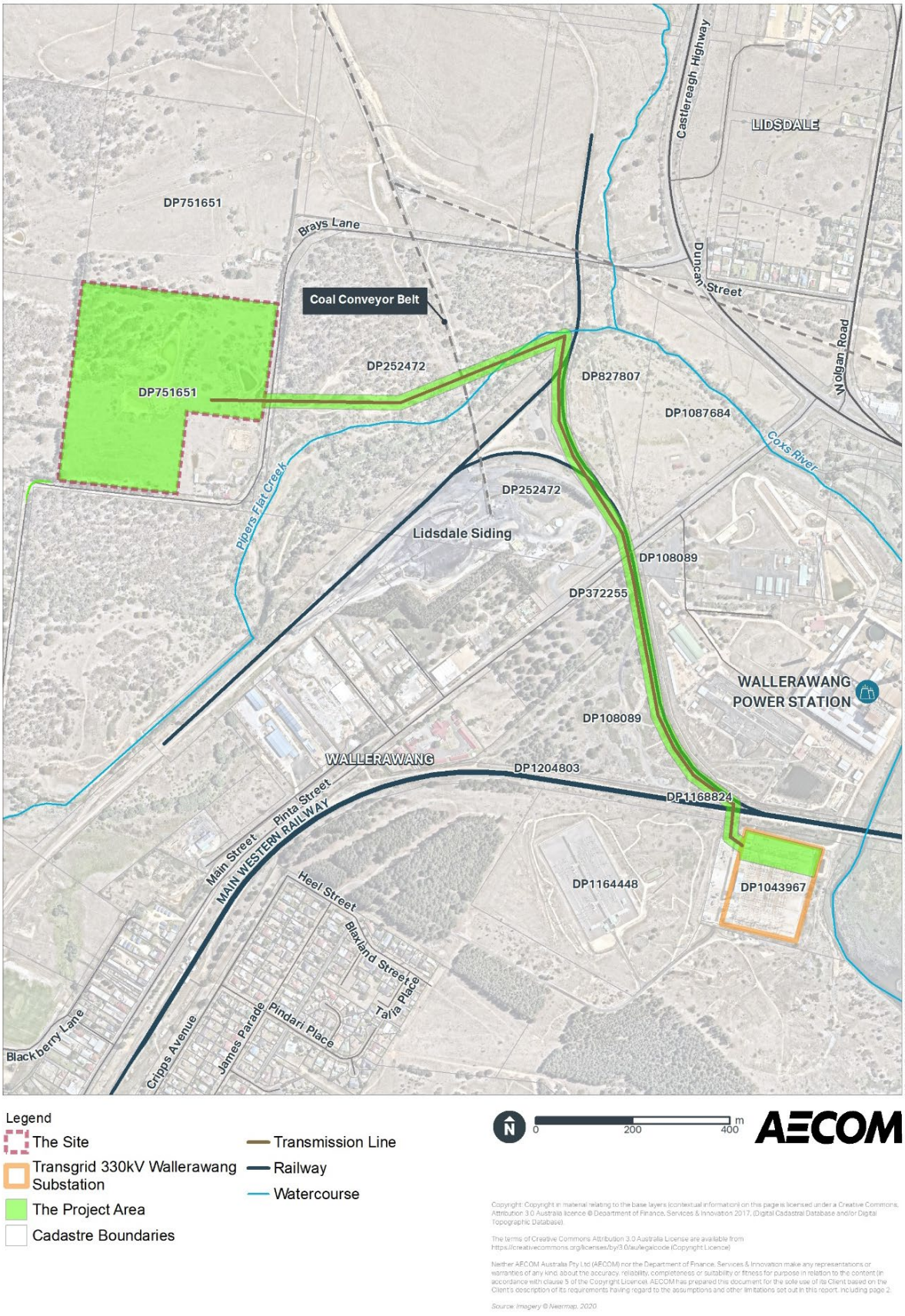
The purpose of the Project is to store energy in chemical form and generate electrical energy on demand in discharge mode. As such, the Project would be for the purpose of electricity storage and Division 4 of the SEPP (Transport and Infrastructure) is applicable.

Clause 2.36 of the SEPP (Transport and Infrastructure) provides that electricity generating works may be carried out by any person with consent on any land in a prescribed rural, industrial or special use zone. The Project is located on land zoned under the Lithgow Local Environmental Plan 2014 (Lithgow LEP) as: RU1 – Primary production; SP2 – Rail Infrastructure Facility; and IN1 – General industrial. These are all prescribed zones. As such, the Project is permissible with development consent.

Clause 20 under Schedule 1 of the SEPP (Planning Systems) 2021 relates to electricity generating works with a capital investment value (CIV) of greater than $30 million. The Project is defined as electricity generating works and the CIV for the Project is estimated to be about $400 million. On this basis, the Project is classified as SSD.

The Environmental Impact Statement (EIS) for the Project (AECOM, 2022) was placed on public exhibition for 28 days from 8 March 2022 until 4 April 2022 in accordance with the EP&A Act. During exhibition, community members and stakeholders submitted feedback on the Project to the NSW Department of Planning and Environment (DPE). This Submissions Report addresses the requirement to consider and respond to all submissions received and has been prepared in accordance with the NSW Government's "*State significant development guidelines – preparing a Submissions Report: Appendix C to the state significant development guidelines"* (DPE, 2021) (the guideline).

Figure 1-1 Regional Context



Source: Imagery © Nearmap, 2020.

Figure 1-2 The Project Area

1.2 Project objectives

Partnering large-scale battery storage with renewable energy will be a key enabler for an affordable, reliable and sustainable energy future for Australia.

Through the provision of a large-scale BESS, the Project would help deliver system security, reliability and a stable energy supply through its ability to store power and consequently, provide input and output power upon demand.

In developing the Project, Neoen seek to deliver a large-scale BESS that would:

- Improve the security, resilience and sustainability of NSW's electricity grid with a cost effective, environmentally sensitive, and proven solution
- Contribute infrastructure that would directly support the NSW Government's commitment to facilitating, supporting and securing private investment in renewable energy developments
- Reduce the potential for future blackout or load shedding events that may occur as a result of an overburdened, underperforming network
- Provide electricity to the NEM during periods of high demand.

1.3 Proponent details

Founded in 2008 in France, Neoen is one of the world's most dynamic independent producers of renewable energy. Neoen already has more than 2 gigawatts (GW) of project in operation or under construction in Australia alone. Neoen has assets in more than 15 countries and operates the world's first lithium-ion power reserve in Hornsdale, Australia (150 MW/194 MWh storage capacity).

From its inception, Neoen's core business model has been to develop, build, own and operate all of its projects for the entirety of their lifespans. This strategy means that Neoen takes a long-term approach to its assets, to the local communities in which they are situated, and to electricity markets overall.

Neoen Australia Pty Ltd (ABN 57 160 905 706) began in Sydney in 2012. Since then, the Australian branch has grown rapidly and represents Neoen's largest portfolio outside Europe. As of July 2021, Neoen has over 2 GW of renewable assets in operation or under construction in Australia, representing over $3 billion Australian dollars in investment. The company intends to reach 5 GW in Australia by 2025.

1.4 Project description

The key components of the Project that would be located at the Site are shown indicatively on **Figure 1-3**.

The Project comprises a BESS with a capacity of up to 500 MW, and 1000 MWh, that would store and discharge energy from the electricity network, and a new underground transmission line that would connect the BESS to the existing Transgrid 330 kV substation at Wallerawang. Areas of the specific references for the Project have been provided in **Table 1-1**.

Table 1-1 Areas of geographic terminology

Terminology	Description	Area (ha)
The Site	The Site consists of part of Lot 4 in Deposited Plan (DP) 751651.	13
The Project Area	The Site, transmission line corridor and connection to the substation is collectively referred to as the Project Area	19
The BESS Facility	The BESS facility relates to the area required to construct the BESS, which constitutes only a portion of Lot 4 DP751651.	7

Terminology	Description	Area (ha)
The Transmission Connection	The transmission connection relates to the land that would be located between the BESS site and the substation, which includes part of the following allotments: • Lot 8 and 9 DP252472 • Lot 1 and 2 DP108089 • Lot 10 DP1168824 • Lot 1115 DP1204803 • Lot 91 DP1043967	12
Disturbance footprint	The disturbance footprint relates to the land that will be impacted during the construction and operation of the Project, including the portion of Lot 4 DP751651 that would be used to construct the Site, land within the transmission connection where disturbance will occur, and any works within the Brays Lane corridor.	13

Key features of the Project, and an updated project description is included in **Appendix A**. These features comprise the proposed development for which development consent is sought under this State Significant Development Application (SSDA).

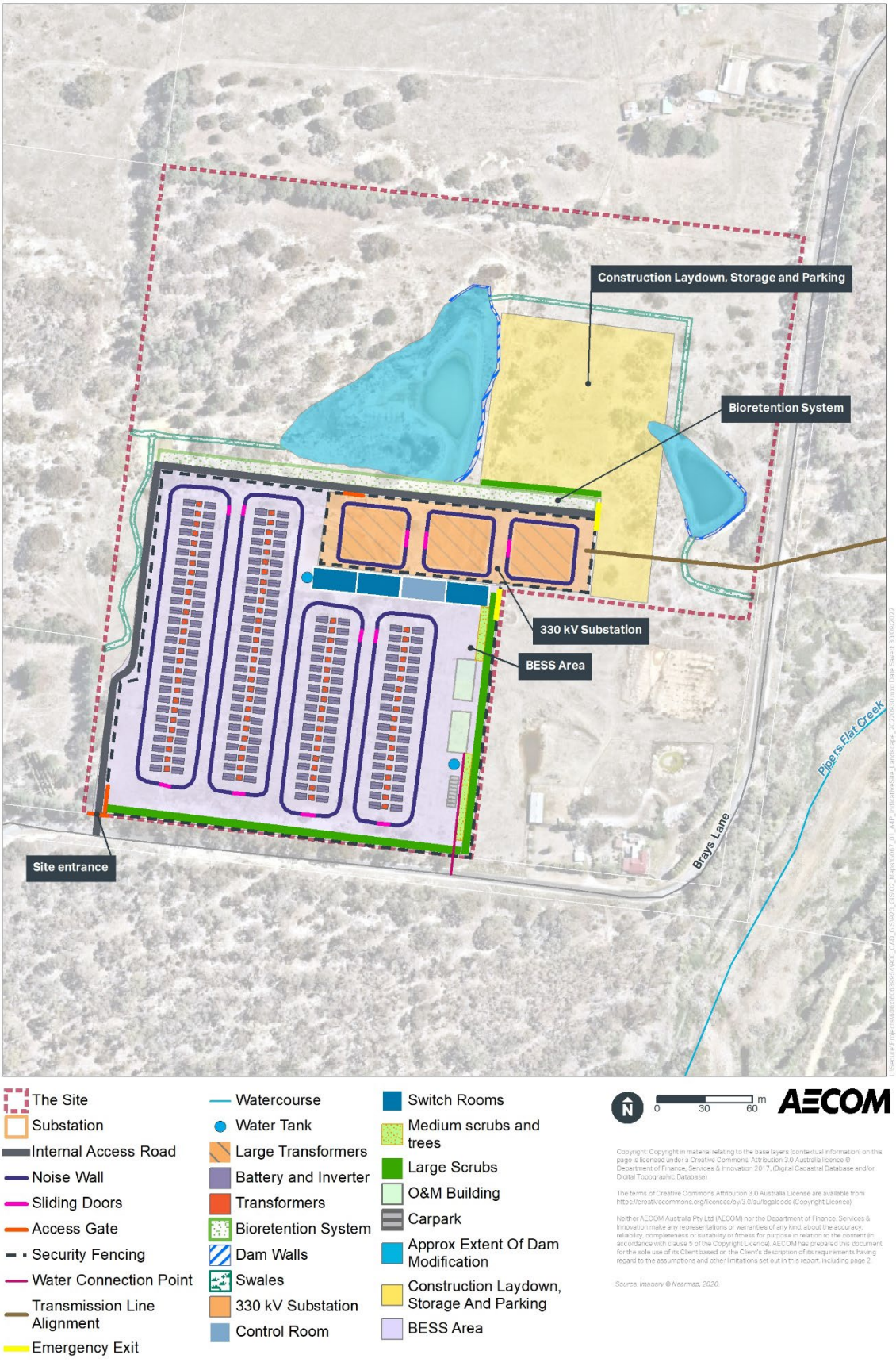


Figure 1-3 Indicative Layout of the Site

1.5 Purpose of this Submissions Report

This Submissions Report has been prepared in broad accordance with the NSW Government's "*State significant development guidelines – preparing a Submissions Report: Appendix C to the state significant development guidelines"* (DPE, 2021) (the guideline). This guideline provides a detailed explanation of the form and content requirements for Submission Reports. Pursuant to the *Environmental Planning and Assessment Regulation 2021* (EP&A Regulation), a Submissions Report submitted to Department of Planning and Environment (DPE) in support of an SSD application must be prepared having regard to the SSD guidelines prepared by the Planning Secretary.

A summary of compliance against the criteria of Appendix C of the State significant development guidelines has been provided in **Table 1-2**.

Table 1-2 Submissions Report requirements (DPE, 2021)

Requirement	Reference
Executive summary	Included at the preface of this Submissions Report
Introduction	**Section 1.0**
Analysis of submissions	**Section 2.0**
Actions taken since exhibition	**Section 3.0**
Response to submissions	**Section 4.0**
References	**Section 6.0**
Submissions Register	**Table 4-1**
Updated mitigation measures	**Appendix B**

In line with the guideline, **Section 5.0** provides a conclusion to this Submissions Report and provides an updated project justification and evaluation that considers the outcomes of the EIS and the additional information provided in this report.

2.0 Analysis of submissions

2.1 Overview of submissions received

This section summarises the agency and community submissions that were received in response to the public display of the EIS.

Submissions were received and accepted by DPE during the public exhibition of the EIS from 8 March 2022 to 4 May 2022 (28 days). Submissions were accepted by DPE via electronic submission (online) at www.majorprojects.planning.nsw.gov.au

Copies of the full submissions can be viewed or downloaded from the NSW Major Projects website[1].

A total of 19 submissions were received during the public exhibition of the EIS, these included 16 agency submissions, one key stakeholder submission (Lithgow City Council (LCC)), and two community submissions. An overview of the submissions made during the EIS exhibition period is provided in **Table 2-1**.

Table 2-1 Overview of submissions received

Position	Number of submissions from government agencies and other organisations	Number of submissions from community members	Total
Support	-	-	
Comment	17	-	17
Objection	-	2	2
Total			19

Agencies and organisations that provided responses included:

- Department of Planning and Environment (DPE) – Energy Assessments Team
- DPE – Water
- WaterNSW
- Environment Protection Agency (EPA).
- Transport for New South Wales (TfNSW)
- UGL Regional Linx
- Biodiversity Conservation Science Directorate (BCS)
- Rural Fire Service
- DPE – Agriculture
- DPE – Crown Lands
- DPE – Fisheries
- NSW Fire and Rescue
- Department of Premier and Cabinet (DPC) – Heritage NSW
- Heritage Council
- Department of Regional NSW – Mining, Exploration and Geoscience (MEG)
- Transgrid.

[1] https://pp.planningportal.nsw.gov.au/major-projects/projects/mod-1-transmission-line-connection-and-design

2.2 Approach

2.2.1 Agency and Lithgow City Council (LCC)

Each agency submission was examined in detail to identify and understand the issues raised. The content of each agency submission was reviewed and summarised in this report. Where possible, the verbatim of the agency submission has been used. This means that while the exact wording of a particular submission may not be presented in the summary of the issue, the intent of each individual issue raised has been captured and a corresponding response to each issue has been provided.

To assist in the accurate description of key issues raised by agencies and LCC, meetings were held to further clarify issues. Details regarding meetings held with agencies and LCC are provided in **Section 3.3.1**.

Issues raised in the agency and LCC submissions have been individually addressed in **Section 4.1** through to **Section 4.17**.

2.2.2 Community

Given the number of community submissions received, each submitter has been addressed according to their provided contact details. As such, no submitter identification numbers have been assigned.

Each community submission was reviewed to identify and understand the issues raised. The relevant content of each community submission has been summarised into this report. Where possible, the verbatim of the community submission has been used. This means that while the exact wording of a particular submission may not be presented in the summary of the issue, the intent of each individual issue raised has been captured and a corresponding response to each issue has been provided.

Submitters can locate the issues raised in their submission and where these issues have been addressed in **Section 4.18**.

3.0 Actions taken since exhibition

This section of the Submissions Report summarises the actions that have been taken since the lodgement of the EIS to DPE and during exhibition. Pursuant to the requirements of the guidelines, this section summarises the refinements made to the Project (**Section 3.1**), details of additional consultation that has been undertaken (**Section 3.2**) and provides a summary of further assessment that has been undertaken in response to the submissions received (**Section 3.3**).

3.1 Project refinement

3.1.1 Proposed refinement

Neoen is proposing to use horizontal directional drilling (HDD) to install part of the transmission connection and had committed to using this approach to install the connection between the Site and the northern end of the rail corridor to avoid potential impacts to biodiversity values (refer to **Figure 4-1**). The distance between the Site and the northern end of the rail corridor is approximately 650 m (refer to **Figure 1-2**).

Following exhibition of the EIS, WaterNSW informed Neoen that the proposed transmission connection for the Project would cross an existing underground water pipeline (the Fish River Pipeline). Neoen consulted with WaterNSW to understand the separation distances and construction methods required to avoid impacting the Fish River Pipeline. The recommended separation distances mean that the transmission connection would need to make sharper turns underground than originally considered. The separation distances were discussed with the cabling contractors, and it was agreed that whilst the HDD methodology could still be used to cross from the Site to the northern end of the rail corridor, an additional entry/exit pit along this part of the alignment is likely to be required to account for the required separation distances and the turns required to install the transmission connection. The additional drill rig location means that the cable pulls between the pit locations are possible to complete.

Neoen has completed a review of the land between the Site and the northern end of the rail corridor and identified a suitable location for the additional drill rig location that would avoid as far as practicable additional environmental impacts. The location of the additional pit is shown on **Figure 4-1**.

The works relating to the use of the additional pit include:

1. Use of an existing unsealed vehicle track off Brays Lane to the proposed additional pit location (approximately 280 m in length)
2. Excavation down to approximately 1 m below natural ground to accommodate a prefabricated concrete cable joining pit
3. Installation of the joining pit (2.5 m x 9 m) and works required to join underground cables terminating within it
4. Establish a temporary equipment laydown area of 15 m x 12 m
5. Installation of a temporary drill rig of 15 m x 8 m
6. Rehabilitation of the hardstand and laydown area to allow it to return to close to its existing condition once construction is completed.

3.1.2 Justification for project refinement

The EP&A Regulation requires certain SSD documents to be prepared having regard to the State Significant Development Guidelines[2]. Section 37 of the EP&A Regulation allows the applicant for an SSD project, with agreement of the consent authority, to amend or vary an application before it is determined. Guidance to amend or vary an SSDA is provided through the application of Appendix D of

[2] Department of Planning and Environment (2021). *State Significant Development Guidelines*. Issued November 2021 and retrieved from https://www.planning.nsw.gov.au/-/media/Files/DPE/Guidelines/Policy-and-legislation/SSD-Guidelines/State-Significant-Development-Guidelines.pdf?la=en

the SSD guidelines[3]. **Appendix D** provides two options to amend of vary a project, which include (and are defined as):

- *Amendment: a change in what the applicant is seeking consent for made during the assessment. It requires changes to the project description in the EIS or modification report and amendments to the associated DA or modification application. Applications can only be amended with the agreement of the consent authority, or*
- *Refinement: A change that fits within the limits set by the project description and does not change what the applicant is seeking consent for or require an amendment to the DA for the project.*

Importantly, refinements are separate to amendments, being changes that fit within the limits set by the project description and do not change what the applicant is seeking consent for or require an amendment to the DA for the project.

When considering the requirements contained under section 37 of the EP&A Regulation and Appendix D of the SSD guidelines, a refinement can be justified in the event it can demonstrate compliance with the following requirements:

Criterion 1. The refinement resides within the limits set by the original project description, and

Criterion 2. The refinement does not change what the applicant is seeking consent for or require an amendment to the SSDA.

An assessment against these criteria has been undertaken, to demonstrate that the additional HDD drill rig location (as detailed in **Section 3.1.1**) constitutes a project refinement rather than an amendment.

3.1.2.1 Criterion 1

To consider compliance against the first requirement for a project refinement, it is important to first establish the limits of the original project description. As stated within **Section 1.0**, an EIS was submitted to DPE on 8 March 2022 for the construction and operation of a BESS at the Site. Section 4.2 of the EIS provided an overview of the Project

The Project overview (reproduced and updated in **Appendix A** states that the Project includes the "*Installation of a new underground transmission line from the BESS to the existing Transgrid Wallerawang 330 kV substation…*". Further context regarding the transmission connection was provided in section 4.2.3 of the EIS, with an indicative alignment provided in **Figure 4-2** of the EIS. Based on this information, the limits of the Project (detailed in the EIS), as it relates to the proposed refinement can be summarised as follows:

(a) A new underground transmission connection line would be constructed between the BESS and the Transgrid Wallerawang 330kV substation.

(b) The transmission line would be installed underground using a combination of trenching and under boring methodologies (e.g., HDD).

(c) Constructed generally in accordance with the alignment provided in **Figure 4-2** of the EIS.

The proposed refinement is considered compliant with the limits (a) and (b) as the additional drill rig location facilitates the use of HDD to install the proposed transmission connection between the BESS and the Transgrid Wallerawang 330kV substation.

When considering the limit (c), the Project refinement deviates slightly from the alignment provided in **Figure 4-2** of the EIS. A comparison between the original alignment and the project refinement is provided in **Figure 3-1**. The purpose of establishing a project alignment is to understand the land affected by the Project and the potential impacts that may arise. As such, while the refinement proposes a slightly altered alignment, compliance with this limit should be evaluated on whether the refinement constitutes a significant change to land affected or a significant impact on environmental

[3] Department of Planning and Environment (2021). *Appendix D to the SSD guidelines – preparing an Amendment Report*. Issued November 2021 and retrieved from https://www.planning.nsw.gov.au/-/media/Files/DPE/Guidelines/Policy-and-legislation/SSD-Guidelines/SSD-Guide---preparing-an-amendment-report-App-D.pdf

matters. The proposed refinement does not include works on any additional Lots. The environmental matters that would be potentially impacted as a result of the project refinement include:

- Aboriginal heritage
- Biodiversity
- Construction noise impacts.

Each environmental matter is explored in further detail to determine whether the project refinement would constitute a significant impact.

Aboriginal heritage

In December 2021, AECOM finalised an Aboriginal Cultural Heritage Assessment Report (ACHAR) for the Project. As detailed in the ACHAR (AECOM, 2021), information regarding the Aboriginal heritage values of the ACHAR study area was obtained through a combination of background research, archaeological survey and test excavation and Aboriginal community consultation.

The ACHAR prepared for the Project provided the following key findings:

- There are no previously recorded Aboriginal sites located within the study area
- Based on available desktop information, including historical aerial photographs, land within the study area appears to have been severely disturbed as a result of historical land use activities, with the most severe impacts to natural landform elements and soil profiles therein associated with the construction of Brays Lane and the main driveway into Lot 1 DP126659
- Land within the study area is considered to retain negligible potential for Aboriginal objects (as defined by the *National Parks and Wildlife Act 1974*) in surface and subsurface contexts.

These key findings established that the likelihood of impacting Aboriginal heritage within the previously investigated study area is highly unlikely.

Following identification of the additional dill rig location, AECOM prepared an Addendum ACHAR to address potential impacts to Aboriginal heritage values as a result of the project refinement (refer to **Appendix C**). The study area for the Addendum ACHAR comprised a 585 m linear corridor that has a maximum width of about 40 m.

Based on a desktop review of existing Aboriginal heritage data sources for the Addendum ACHAR study area, as well as the results of an archaeological survey of the area, undertaken on 11 August 2022, the Addendum ACHAR found that:

- Two Aboriginal sites are present within the study area: previously recorded surface and subsurface artefact scatter SU1a-A5 (AHIMS IS #45-1-2716) and newly recorded isolated artefact ‘GWB-IA1-22’ (AHIMS ID #45-1-2891). Both sites have been assessed as being of low scientific significance.
- The mapped boundary of previously recorded artefact scatter SU1a-A5 is located partially within the Addendum ACHAR study area. However, the results of archaeological surveys undertaken for the Project, including that carried out to support the preparation of the Addendum ACHAR, indicate that none of the surface-based Aboriginal objects identified in association with this site occur within or immediately adjacent to the Addendum ACHAR study area.
- In general, land within the Addendum ACHAR study area is considered to be of low Aboriginal archaeological sensitivity, with existing archaeological data for the Project suggesting an occupational emphasis on elevated low gradient landform elements away from the floodplain proper.
- Any subsurface archaeological deposits present within those portions of the Addendum ACHAR study area that have not been significantly disturbed are likely to be of low conservation value, consisting of low to very low-density deposits.
- Land within the Addendum ACHAR study area retains variable Ground Integrity (GI). While sections of the study area, including the proposed drill rig hardstand and laydown area, have

been significantly disturbed as a result of historical land use activities, the majority of land within this area retains moderate GI.

In view of these findings, and taking into consideration the nature of the proposed refinement within the Addendum study area, the following recommendations were made:

- Additional archaeological investigations within the bounds of the Addendum ACHAR study area, including a supplementary program of test excavation, are unwarranted. While Aboriginal archaeological deposits of low conservation value are likely to present within parts of the Addendum ACHAR study area, physical impacts to these deposits as a result of the proposed works are considered unlikely due to: a) the nature of the works proposed within identified areas of subsurface archaeological potential (i.e., HDD at nominal depth of 1.5 m below ground level (b.g.l).) and b) significant ground disturbance within the bounds of the proposed additional drill rig hardstand and laydown area.
- All light and heavy vehicle movements within the mapped boundary of previously recorded artefact scatter SU1a-A5 (45-1-2716) should be restricted to the existing vehicle track present within this portion of the study area. An access corridor centred on the existing track and taking into account the maximum width of the vehicles required for the HDD installation process should be demarcated using high visibility fencing. Fencing should be installed prior to works commencing and remain in place until works are completed. All fencing works should be undertaken by, or under the supervision of, a qualified Aboriginal heritage specialist. Sections of SU1a-A5 outside of the recommended access corridor should be clearly defined in the Project's Construction Environmental Management Plan (CEMP) as 'no-go zones'.
- To ensure no inadvertent impacts during construction, newly recorded isolated artefact 'GWB-IA1-22' should be protected via high visibility fencing. Fencing should be installed prior to works commencing and remain in place until works are completed. All fencing works should be undertaken by, or under the supervision of, a qualified Aboriginal heritage specialist. The location of GWB-IA1-22 should be clearly defined in the Project's CEMP as a 'no-go zone'.
- Proposed management measures for SU1a-A5 and GWB-IA1-22 should be included in the Project's Aboriginal Cultural Heritage Management Plan (ACHMP).
- Should any confirmed or suspected Aboriginal objects be identified within the Addendum ACHAR study area during construction, the Unexpected Aboriginal Heritage Finds Procedure (UAHFP) detailed in the ACHMP would be followed.
- All contractors engaged to complete the proposed works within the Addendum ACHAR study area should be made aware of the nature and location of SU1a-A5 and GWB-IA1-22, as well as their associated 'no-go zones'.

On this basis it is not anticipated that the project refinement would constitute a significant impact with regard to Aboriginal heritage. The project refinement should be considered consistent with the limits established by the original project.

Biodiversity

A systematic biodiversity assessment was conducted in a broad study area covering areas in which the additional works related to the project refinement would take place on 13 July 2022 by Paul Price (Senior Restoration Ecologist, Accredited Assessor #BAAS18089), under the terms of Biosis' Scientific Licence issued by the Environment Energy and Science (EES) under the NPW Act (SL100758, expiry date 31 March 2023). A fauna survey was also conducted 13 July 2022 by Joel Nicholson (Project Zoologist) under approval 11/355 from the NSW Animal Care and Ethics Committee (expiry date 31 January 2022).

The study area was surveyed in accordance with the Biodiversity Assessment Method (BAM) (DPE, 2020), which involved:

- The identification and mapping of Plant Community Types (PCTs) according to the structural definitions held in the BioNet Vegetation Classification database, with reference to information provided in State Vegetation Type Map: Central Tablelands Region Version 1.0. VIS_ID 4778 (DPE, 2018)

- The identification of native and exotic plant species, according to the Flora of NSW (Harden, 1992) (1993) (2000) (2002) with reference to recent taxonomic changes
- Targeted searches for plant species of conservation significance according to Surveying threatened plants and their habitats (DPIE, 2016b)
- Incidental observations using the "random meander" method (Cropper, 1993)
- An assessment of the natural resilience of the vegetation of the Site
- Identifying and mapping fauna habitats (e.g., hollow-bearing trees, rock outcropping etc.), assessing their condition and value to threatened fauna species, and considering threatened species' habitat constraints
- Observations of animal activity and searches for indirect evidence of fauna (such as scats, nests, burrows, hollows, tracks, scratches and diggings).

The following plant community types (PCT) were recorded during the survey:

- PCT 677 - *Black Gum grassy woodland of damp flats and drainage lines of the eastern Southern Tablelands, South-eastern Highlands Bioregion*
- PCT 732 - *Broad-leaved Peppermint - Ribbon Gum grassy open forest in the northeast of the South Eastern Highlands Bioregion*

In addition, one vegetation type was recorded that did not equate to a PCT – urban/native/exotic. A floristic targeted survey was also undertaken over the duration of the biodiversity assessment for Black Gum *Eucalyptus aggregata* (Vulnerable *Environment Protection and Biodiversity Conservation Act 1999* and *Biodiversity Conservation Act 2016*).

The suggested location for the additional drill rig location is proposed within the area of urban/native/exotic vegetation. The results of the recent biodiversity survey and proposed location of the additional HDD drill rig (including access track) is detailed in a revised Biodiversity Development Assessment Report (BDAR) (Biosis, 2022) provided as **Appendix D**.

Based upon the low condition of the urban/native/exotic vegetation, the lack of habitat features and native floristic/structural diversity, additional targeted surveys are not required within the area proposed for the additional drill rig location, access track, or supporting laydown and hardstand areas. The outcomes of this additional assessment were shared with DPE Biodiversity Conservation Sciences Group (BCS) during a meeting on Friday, 29 July 2022. In light of the results provided to BCS, they confirmed that no additional survey is required on the basis that there is no increased impact to biodiversity as a result of the project refinement. On this basis, the project refinement should be considered consistent with the limits established by the original project.

Construction noise impacts

AECOM prepared a Noise and Vibration Impact Assessment (NVIA) (AECOM, 2022) to support the EIS for the Project. The NVIA assessed potential construction noise impacts against the *Interim Construction Noise Guideline* (ICNG) as the principal guideline for the assessment and management of construction noise in NSW. Chapter 5.0 of the NVIA presented the construction noise impact assessment. This assessment included the use of a directional drill rig with a weighted sound power level of 103 dB(A). The construction noise modelling results were presented in Table 5-2, Table 5-3 and Appendix C of the NVIA. Ultimately, the results indicated that noise levels during all construction phases and activities (including HDD activities) complied with the noise management levels at residential and non-residential receivers.

The project refinement will introduce an additional HDD drill rig at a location sited approximately 375 m east of the BESS site. To determine the potential impacts associated with the project refinement, AECOM completed additional construction noise impact modelling.

Table 3-1 presents the number of residential properties where the Noise Management Levels (NMLs) are likely to be exceeded during the day.

Table 3-1 Number of residential buildings where construction noise levels may exceed NMLs - Day

Phase	Exceedance of NML			Highly affected >75 dB(A)
	1 10 dB	11 20 dB	>20 dB	
Enabling works	1	4	0	0
Civil, structural, mechanical, electrical works and transmission connection	34	3	2	0
Commissioning	3	1	0	0
Demobilisation	2	3	0	0

Table 3-1 above shows that noise levels during all construction phases and activities (inclusive of the project refinement) are expected to mostly comply with the noise management levels at the residential receivers. During the Project's construction phases during the day, the Civil, structural, mechanical, electrical and commissioning works phase is predicted to cause the most exceedances.

During this work phase, there are expected to be 34 exceedances of the NML, however these are expected to be <10 dB. Noise levels at three residential receivers are expected to exceed the NML by 11 - 20 dB, and more than 20 dB at two receivers. None of the construction phases are expected to result in noise levels which exceed the 'highly noise affected' level of 75 dB(A) for residential receivers. Feasible and reasonable mitigation measures would be detailed in the Construction Noise and Vibration Management Plan (refer to **Section 4.4.2.1**).

Noise levels during the Civil, structural, mechanical, electrical and transmission connection works were originally predicted in the EIS to have 92 exceedances to the NML. This has now reduced to 39 exceedances due to the further details provided on the construction methodology where the lengths of the transmission corridor to be drilled using HDD and trenching were confirmed. On this basis, the project refinement should be considered consistent with the limits established by the original project.

3.1.2.2 Criterion 2

To demonstrate compliance with Criterion 2 the refinement must not change what the applicant is seeking consent for or require an amendment to the SSDA. In order to ascertain compliance with this Criterion, it is important to establish the description of the Project and the land to which it relates.

Chapter 2.0 of the EIS details the Project Area and Chapter 4 of the EIS summaries the extent of the Project for which development consent is sought. The declaration provided as part of the EIS summarises these requirements as follows:

> *Neoen Australia Pty Ltd (Neoen) is seeking development consent to construct, operate and maintain a battery energy storage system (BESS) of approximately 500 megawatts (MW) and approximately 1000 megawatt-hour (MWh) at 173 Brays Lane, Wallerawang, NSW 2845 (the Site), as well as a new transmission line that would connect the BESS to the existing Transgrid 330 kilovolt (kV) substation at Wallerawang (the Project). The Project would also provide storage and firming capacity to the National Energy Market as well as additional services to assist grid stability including frequency control ancillary services.*
>
> *The proposed location of the BESS is on located at 173 Brays Lane, Wallerawang NSW 2854, on Lot 4 DP 751651.*
>
> *The Project would involve the installation of a new transmission line connection between the Site and the Transgrid Wallerawang 330 kV substation. The new transmission line would traverse:*
>
> - ***Lot 8 and Lot 9 DP 252472** (emphasis added)*
> - *Lot 2 DP 108089*
> - *Lot 1 DP 108089*

- *Lot 10 DP 1168824*
- *Lot 1115 DP 1204803*
- *Lot 91 DP 1043967.*

The project refinement is consistent with the project description for which development consent is sought under SSDA – 12346552, as the refinement relates to transmission infrastructure to connect the proposed BESS to the existing Transgrid Wallerawang substation. The project refinement is solely contained within an allotment that was previously identified within the EIS (refer to emphasis above). As such, no additional parcels of land are being introduced for assessment as a result of the project refinement. On this basis, the project refinement is consistent with Criterion 2.

3.1.3 Summary

Appendix D of the SSD guidelines provides the opportunity to seek consent for a project refinement during the response to submissions; on the basis the project refinement can demonstrate compliance with the following requirements:

Criterion 1. The refinement resides within the limits set by the original project description, and

Criterion 2. The refinement does not change what the applicant is seeking consent for or require an amendment to the SSDA.

An assessment against this criterion has been undertaken, to further demonstrate that the additional HDD location constitutes a project refinement, rather than an amendment. When considering Criterion 1, the project refinement is consistent within the existing limits of the Project. This has been established through comparable construction methodologies previously detailed and assessed within the EIS. Further evidence is provided when considering the deviation from the transmission alignment, whereby additional assessment has been conducted to ensure that there is no significant impact to environmental matters, as a result of the project refinement. The outcome of this additional assessment has established that it is highly likely that the project refinement will not introduce significant impacts. As such, the project refinement should be considered consistent with the limits established by the project, and therefore compliance with Criterion 1.

With regards to Criterion 2, the project refinement is consistent with the project description for which development consent is sought under SSDA – 12346552, *viz*, as the refinement relates to transmission infrastructure to connect the proposed BESS to the existing Transgrid Wallerawang substation. The proposed project refinement is solely contained within an allotment that was previously identified within the EIS. As such, no additional parcels of land are being introduced for assessment as a result of the project refinement. On this basis, the project refinement should be considered consistent with Criterion 2.

The additional HDD pit is required as a response to matters raised in a submission provided by WaterNSW. Any impact from this inclusion of this additional HDD pit would be temporary and would not be significant. In light of this additional assessment, we believe that the additional HDD drill rig location represents a project refinement, pursuant to **Appendix D** of the SSD guidelines. Given the minor and temporary nature of the project refinement Neoen believe that an Amendment Report is not required. Neoen request that DPE confirm that this is acceptable.

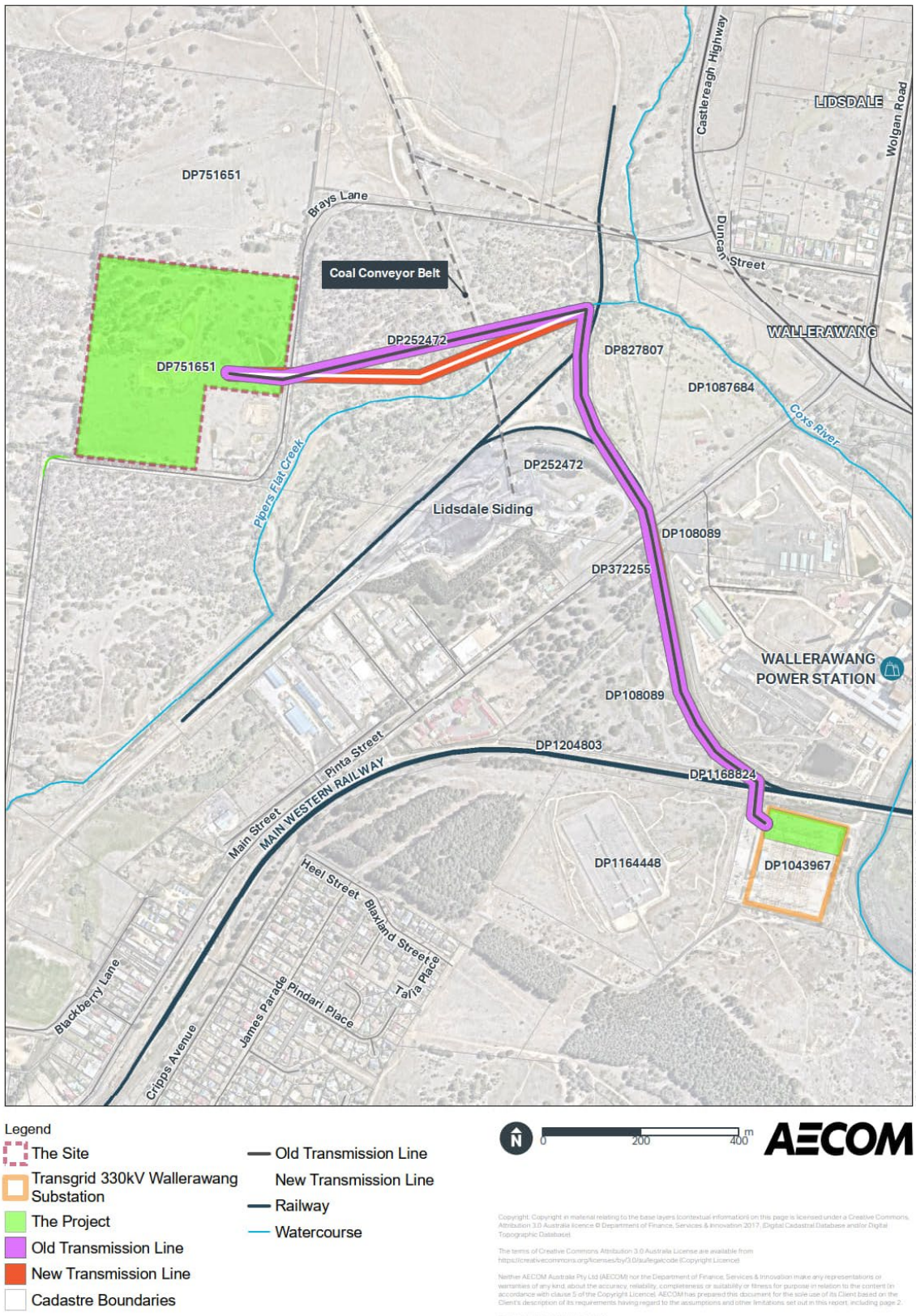


Figure 3-1 Comparison between the original alignment and the project refinement

3.2 Dwelling entitlement

During the preparation of this Submissions Report, DPE requested NEOEN investigate whether directly adjacent lots to the northwest of the Site have dwelling entitlements and if they do whether the Project design / footprint would or could be changed to account for any entitlement / future residential development. The relevant adjoining allotments include:

- Lot 226, DP751651
- Lot 233, DP751651.

There are no dwellings currently present on Lots 226 and 233 DP751651. AECOM has reviewed the two relevant Certificates of Title (CT) for the allotments to determine whether there is existing dwelling entitlements. This review has determined that there are no formal dwelling entitlements registered on the CT and correspondence deposited plan (DP751651) for either of the allotments.

In order to erect a dwelling within Lot 226 and 233 on DP 751651 the lots must meet the minimum lot size (as well as achieve compliance with a number of other development standards). Both allotments are zoned RU1 Primary Production, under the *Lithgow Local Environmental Plan 2014* (LEP), with a minimum lot size of 40 hectares (ha). The areas for both lots have been summarised in the table below.

Lot/ DP	Area
226 DP751651	~16.3 ha
233 DP751651	~16.4 ha

It is evident that both of the allotments are significantly less than the minimum lot size under the Lithgow LEP. Clause 4.2A under the Lithgow LEP relates to '*erection of dwelling houses, dual occupancies and secondary dwellings on land in certain rural and environment protection zones'*. This clause applies to land zoned RU1 Primary production and consists of the following objectives –

a. To minimise unplanned rural residential development,

b. To enable the replacement of lawfully erected dwelling houses, dual occupancies and secondary dwellings in certain rural and environmental protection zones.

Of importance to this advice is clause 4.2A(3) under the Lithgow LEP, which states:

Development consent must not be granted for the erection of a dwelling house, a dual occupancy or a secondary dwelling on land to which this clause applies unless the land –

(a) Is a lot that is at least the minimum lot size shown on the Lot Size Map in relation to that land, or
(b) Is a lot created under an environmental planning instrument before this Plan commenced and on which the erection of a dwelling house, dual occupancy or secondary dwelling was permissible immediately before that commencement, or
(c) Is a lot resulting from a subdivision for which development consent (or equivalent) was granted before this Plan commenced and on which the erection of a dwelling house, dual occupancy or secondary dwelling would have been permissible if the plan of subdivision had been registered before that commencement, or
(d) Is an existing holding, or
(e) Would have been a lot or a holding referred to in paragraph (a), (b), (c), or (d) had it not been affected by –
    a. A minor realignment of its boundaries that did not create an additional lot, or
    b. A subdivision creating or widening a public road or public reserve or for another public purpose, or
    c. A consolidation with an adjoining public road or public reserve or for another public purpose.

Following review of the CTs and based on the information available during the preparation of this response, the subject allotments do not meet the criteria contained under clause 4.2A of the Lithgow LEP to erect a dwelling. The erection of a dwelling on these RU1 Primary Production lots would be inconsistent with objectives contained under clause 4.2A(1) and the performance criteria stated in clause 4.2A(3); resulting in development that is not permissible under the Lithgow LEP.

For the avoidance of doubt, it does not appear that a dwelling entitlement can be established unless Lots 226 and 233 in DP751651 were amalgamated with another allotment so that the created lot would exceed the minimum lot size. As an example, an amalgamation of the two lots above do not meet the minimum lot size requirements. As a result, the Project does not need to consider potential impacts on residential developments within these lots. Instead, it should be recognised that the assessment presented within the Environmental Impact Statement (AECOM 2022) has suitably characterised the nearby sensitive receivers and undertaken an impact assessment that is commensurate with the proposed level of impact.

3.3 Consultation

This section details consultation activities that have been undertaken during the public exhibition of the EIS and during the development of this Submissions Report.

3.3.1 Consultation during exhibition

The EIS was placed on display for a total of 28 days, as detailed in **Section 1.0**. Neoen continued to consult with stakeholders during this period to discuss the EIS, using existing contact points and approaches established for the Project.

Written submissions received during the EIS exhibition period were forwarded from DPE to Neoen for consideration, review and preparation of this Submissions Report. This report will be made publicly available on the DPE Major Projects website.

3.3.2 Consultation post EIS exhibition

Neoen have undertaken consultation activities with agencies, LCC, and the community.

Following each meeting, meeting minutes were reported detailing the consultation outcomes for reference during the production of the Submissions Report. A summary of these consultation activities has been provided in **Table 3-2**.

Table 3-2 Consultation post EIS exhibition

Stakeholder	Date	Method	Summary
LCC	16 May 2022	Online meeting	A meeting was held between LCC, AECOM and Neoen. During the meeting, issues raised in LCC's formal submission were clarified and an approach for each issue was proposed and subsequently agreed. Each issue raised by LCC is summarised and responded to in **Section 4.1**. These responses reflect the discussions of this meeting. Main discussion points of the meeting included: Discussion of the temporary bridging beams proposed to be used to allow for the safe egress of oversized/overmass (OSOM) vehicles over the existing culverts on Brays Lane Neoen's commitment to provide relevant environmental management plans to Council for their review and comment prior to these plans being finalised and construction commencing.

Stakeholder	Date	Method	Summary
			Commitment to obtain a Subdivision Certificate and Occupation Certificate following determination of the SSD application for the Project.
LCC	11 July 2022	Online meeting	A meeting was held between LCC, AECOM and Neoen. During the meeting, the following main points were discussed and agreed: Engineers have reviewed the design for the bridging beams and have concluded that the placement of the temporary bridging beams within existing road corridor would ensure the weight of the oversized vehicles bypasses the culverts. Accurate weight values are set out in **Section 4.17**. Discussion of a shuttle bus to reduce the local parking being used by the 200 workers for the peak construction of the Project. Neoen suggested that the pick up/drop off location could be located in Wallerawang to support local businesses and suggested various options. Council agreed that a number of options were available in and around Wallerawang and that the precise pick up and drop off locations could be detailed in the Traffic Management Plan. Operational water supply was agreed to be sourced from potable water supply in Brays Lane, where Council would provide meter and billing.
TfNSW	17 May 2022	Letter and briefing note	A briefing note was sent to TfNSW in response to issues raised within their submission. The briefing note summarised the issues raised and proposed approaches to assess and respond to issues were provided.
TfNSW	06 June 2022	Online meeting	A meeting was held between TfNSW, Neoen and AECOM to discuss the TfNSW submission and briefing note described above. During the meeting, issues raised in TfNSW's formal submission were clarified and an approach for each issue was proposed and subsequently agreed. Each issue raised by TfNSW is summarised and responded to in **Section 4.5**. The responses reflect the outcomes of this meeting. The main discussion points of this meeting included: • Consideration of the likely origin point of workers, plant, equipment and materials and the potential impact that this may have on the road network • Further intersection assessment required for the proposed use of the Castlereagh Highway / Brays Lane intersection for construction workers to assess intersection safety and whether turn treatments / intersection upgrades are required. Note: following this meeting Neoen has decided not to allow Project construction traffic to use this intersection. • Confirmation that the Castlereagh Highway / Main Street intersection and the Great Western Highway / Barton Avenue intersection already had the highest level of safety treatments available for vehicle movements.

Stakeholder	Date	Method	Summary
			• Discussion regarding the use of a shuttle bus to transport construction workers and likely pick up and drop off locations • The timing and potential impacts of the works occurring as a part of the demolition of the Wallerawang Power Station • Confirmation from Neoen that no access treatments or upgrades are proposed to be undertaken • Confirmation that further information regarding the stipulations of Section 2.97 and 2.98 of the SEPP (Transport and Infrastructure) 2021 will be provided • Confirmation that soil analysis to document the presence or absence of contaminated materials in the rail corridor would be undertaken following determination of the SSD application, but prior to installation of the transmission connection in the rail corridor. The outcomes this study would be shared with TfNSW. • Neoen agreed to coordinate landowner's consent with TAHE and UGL (noting that landowners consent for UGL had already been provided).
BCS	16 May 2022	Online meeting	A meeting was held between BCS, AECOM, Biosis and Neoen. During the meeting, issues raised in BCS's submission were clarified and an approach for each issue was proposed and subsequently agreed. Each issue raised by BCS is summarised and responded to in **Section 4.7**. The responses in this section reflects the outcomes of this meeting. Main discussion points of the meeting included: • Biosis agreed to review and update of the various data errors within the BDAR and BAM-C calculations • Biosis agreed to review spatial data and figures within the BDAR and update where inconsistencies have been raised by BCS • AECOM and Biosis agreed to confirm the extent of impacts from surface disturbance after review of previous two points • Biosis to review any species that were excluded for consideration in the BDAR, and provide additional justification • It was agreed by all meeting attendees that a Koala Assessment Report would not be required as the consent authority for the Project is the NSW Minister for Planning not a local council.
WaterNSW	4 May 2022	Online meeting	A meeting was held between WaterNSW, Neoen and AECOM. During the meeting issues raised in the formal submission were clarified and an approach for addressing each issue was proposed and agreed. Each issue raised by WaterNSW is responded to in **Section 4.3**. These responses reflect the outcomes of this meeting. The main discussion points of this meeting included: • WaterNSW noted their comments on the model that had been used for the water quality assessment.

Stakeholder	Date	Method	Summary
			AECOM showed the model that had been used to inform the assessment. WaterNSW confirmed that their comments were based on a review of a different model. AECOM agreed to provide the correct model direct to WaterNSW for their review. • Neoen agreed with exploring options to reduce the size of the bioretention area as the Project undergoes detailed design. • AECOM reviewed the proposed wastewater holding tank and other on-site treatment options and will provide justification regarding the preferred solution. • Connection to the sewer for waste management was not recommended by WaterNSW, in agreeance with Neoen and AECOM. • WaterNSW do not require a Soil and Water Management Plan (SWMP) as part of the Submissions Report but expect that development of a SWMP would be a condition of consent and that they would be consulted during the development of this management plan. • Further details regarding the maintenance of operational stormwater management infrastructure would be provided within the Submissions Report. • Neoen will review the location of the Fish River Pipeline and propose control measures within the Submissions Report to avoid potential impacts to this infrastructure (refer to **Section 4.3.2**).
EPA	19 May 2022	Online meeting	A meeting was held between the EPA, Neoen and AECOM to discuss the issues raised within the EPA's submission. The meeting discussed and clarified the issues in the submission. These issues are summarised and responded to in **Section 4.4**. The main discussion points of the meeting included: • Agreement that 'electricity storage' is not a scheduled activity under the *Protection of Environmental Operations Act 1997* (NSW) and therefore the Project does not require an Environment Protection Licence (EPL). • Agreement the Submissions Report would provide further explanation of the HVAC system and management of water/coolant during operation • Further details of the Noise Policy for Industry (NPfI) assessment criteria used for the noise impact assessment are to be provided within Submissions Report, including evidence of representative background noise levels, the full calculation of NPfI, and a feasibility test considering the mitigation options which were considered for night time operation. • Difference between day/night sound power levels are to be assessed with regards to the reasonable and feasible test and comply with the NPfI framework • The Project layout figures to be amended to show receivers are not impacted by egress openings provided within the noise walls.

Stakeholder	Date	Method	Summary
DPE	Multiple meetings	Online meetings	Several meetings were held between the DPE, Neoen and AECOM to update DPE on the progress of responding to agency submissions. Key discussion points included: • Overviews of the above agency meetings • Commitment to comply with recent standards regarding Preliminary Hazards Analysis (PHA), and confirming that the approach would be communicated to DPE Hazards to ensure suitability. • Confirmation that proposed area for battery storage is large enough taking into account separation distances. It was noted that this separation was based on Tesla packs and that Neoen has not committed to a supplier. With other suppliers, more room may be required. A separate analysis has been provided to the DPE Hazards team (refer to **Section 4.1.4**) • The neighbour agreement would be formally signed before determination. A summary of this agreement would be provided in the Submission Report. • For the contamination assessment DPE would accept a desktop assessment provided in the form of a letter as per agreement made with TfNSW that will clarify and confirm findings of the EIS regarding likely risk of contamination and the proposed management measures. • DPE requested the Submission Report incorporate analysis and justification regarding the set-backs from Brays Lane and Receivers (particularly R1) to provide appropriate landscaping. The landscaping commitments of the Project meet the intent of the set-back objectives. This is addressed in **Section 4.1.2.2**. • The owner of 233 Brays Lane (R1) owns the lots to the north, northwest and west of the Site. DPE requested that any dwelling entitlements for this lot be investigated and if the land is capable of being developed, the potential for the Project to impact potential future use as a residential property in this location be assessed. • DPE do not wish to put a cap on delivery capacity of the Project, that is, the approval would be for a BESS of up to 500 MW capacity. AECOM advised upper limit on capacity would be appropriate (up to 500 MW) for conditions of consent, and standards that are required to be met as per the provided submission.

Neoen aims to maintain community engagement throughout the approval process, and prior to and during the construction of the Project. Continued community consultation and engagement, through the means of social and traditional media, will encourage community involvement in the Project. Neoen will take particular care with key stakeholders including neighbouring landowners, ensuring they are kept satisfied and informed by undertaking private briefings.

A specific email address, dedicated phone number and online forum would be set up to receive and address any expressions of concern from the community during the construction and operation of the Project.

Ongoing consultation may include key milestone updates, notifications regarding upcoming construction works which may disrupt the community; changed access arrangements; and communication of the established complaints handling procedure. This would also include publishing Project updates in the Neoen webpage for the Project.

Subject to Project approval, consultation during construction particularly with regards to any community complaints, would be guided by a Construction Environmental Management Plan (CEMP). The CEMP would be developed in conjunction with a construction contractor, should the Project be approved. Once operational, any matters raised, or complaints received, about the Project would be dealt with under existing Neoen community consultation policy and procedures.

3.4 Further assessment of impacts

Further assessment of impacts has been undertaken as part of this Response to Submissions Report in order to appropriately respond to comments raised by agencies and LCC.

A summary of further assessment that has been undertaken is provided in **Table 3-3**.

Table 3-3 Summary of further assessment of impacts

Assessment	Where located	Summary of further assessment
Stormwater Modelling	**Section 4.3.1**	A review of the MUSIC model was undertaken to address WaterNSW concern that the stormwater management proposed does not meet Neutral or Beneficial Effect (NorBE).
Wastewater management	**Section 4.3.1**	A review of the proposed wastewater management system was undertaken and additional justification for the proposed pump-out system was provided to address concerns of using the pump-out system based on previous development outcomes assessed by Water NSW.
Fish River Pipeline investigation	**Section 4.3.2**	An investigation was undertaken to address WaterNSW's concern that there would be increased electrification risks associated with the intersection of the transmission line and water supply infrastructure. WaterNSW recommended that the Project should adopt similar mitigation measures to those that were implemented for works near the Warragamba pipeline.
Surface water	**Section 4.2.1**	A review and reassessment of the Water Management System at the Site was undertaken to address DPE Water's comments about the Project's impacts on downstream water users and the environment.
Compliance of Dams	**Section 4.2**	Reassessment of the dam compliance and licencing requirements was undertaken to address DPE Water's comments regarding potential non-compliance with regulatory framework and lack of clarification of how the dam has been considered within the regulatory framework.
Groundwater	**Section 4.2.4**	A review of the groundwater interception possibility and extent was undertaken to address the DPE Water's concern of the Project's need to obtain a Water Access Licence under the *Water Management Act 2000*.

Assessment	Where located	Summary of further assessment
Noise and vibration technical memorandum	**Section 4.4.3**	Additional noise impact assessment was undertaken in order to respond to issues raised in the submission from the EPA, including: • Inclusions of unrepresentative Background Noise Levels in the calculation of the RBL • A review of noise trigger levels • Confirmation of methodology for annoying noise characteristics • Clarification on the difference in day/night sound power levels for battery packs • Explanation for gaps in noise walls and assessment to demonstrate no additional noise impact is experienced by nearby receivers as a result.
Visual Impact Assessment	**Section 4.1.2**	Further visual impact assessment was undertaken in order to address the following issues raised by DPE, including: • Provision of cross-section drawings of the Project including noise barriers and proposed cut and fill levels • Provision of details of proposed visual mitigation including landscape screening.
Preliminary Hazard Analysis	**Section 4.1.4**	Additional Preliminary Hazard Analysis has been undertaken to provide: • Verification of the BESS being accommodated in its own designated area (complying with all relevant codes and standards) • Confirmation of compliance of the Department Hazardous Industry Advisory.
Traffic analysis	**Section 4.5.3**	The Project construction routes were altered to avoid the Bray Lane / Castlereagh Highway intersection, negating the need to undertake a traffic analysis to determine the effect of construction traffic on this intersection.
SEPP (Transport and Infrastructure) Assessment	**Section 4.5.6**	Additional assessment of the Project against Section 2.97 and Section 2.98 of the SEPP (Transport and Infrastructure) was undertaken and summarised within the Submissions Report, to address TfNSW concern this was not adequately assessed within the EIS.
Addendum ACHAR	**Appendix C** and summarised in **Section 3.1.2**	An addendum ACHAR has been prepared to assess the potential Aboriginal cultural heritage impacts of the Project refinement.
BDAR and BAM-C	**Appendix D** and summarised in **Section 4.7**	A review of the BDAR prepared for the EIS has been undertaken to provide clarification, amend inconsistencies, rectify minor errors within the BAM calculator inputs and outputs, update figures, and to assess potential impacts associated with the Project refinement.

4.0 Response to submissions

This section provides verbatim text from the original submission as well as a response to those submissions. A summary of the submissions received throughout the exhibition period and where they have been addressed is provided in **Table 4-1**.

Table 4-1 Submissions register

Group	Name	Where addressed in this Submissions Report
Public authorities	Department of Planning and Environment (DPE)	**Section 4.1**
	DPE – Water	**Section 4.2**
	Water NSW	**Section 4.3**
	NSW Environment Protection Authority (EPA)	**Section 4.4**
	Transport for New South Wales (TfNSW)	**Section 4.5**
	UGL Regional Linx	**Section 4.6**
	Biodiversity Conservation Science Directorate	**Section 4.7**
	DPE – Agriculture	**Section 4.8**
	DPE – Crown Lands	**Section 4.9**
	DPE – Fisheries	**Section 4.10**
	DPC – Heritage NSW	**Section 4.11**
	Heritage Council	**Section 4.12**
	Department of Regional NSW – Mining, Exploration and Geoscience (MEG)	**Section 4.13**
	NSW Fire and Rescue	**Section 4.14**
	Rural Fire Service	**Section 4.15**
Local government	Lithgow City Council (LCC)	**Section 4.17**
Stakeholder groups	Transgrid	**Section 4.16**
Community	Colin Barker and an anonymous individual	**Section 4.18**

4.1 Department of Planning and Environment (DPE)

The Department of Planning and Environment (DPE) provided a submission in response to the public exhibition of the EIS. All issues raised in the DPE submission are summarised below and addressed respectively.

4.1.1 Issue: Project scope

4.1.1.1 Issue

DPE have requested clarification of the following aspects of the Project:

- The respective location and lengths of the proposed transmission corridor to be either trenched or underbored
- The Site area and development footprint for the BESS, the transmission corridor, and any additional works proposed outside of these areas.

DPE also noted that any changes to the Project from that presented in the EIS, should be supported by appropriate assessment of impacts including (but not limited to) biodiversity, heritage and amenity impacts.

4.1.1.2 Response

It is confirmed, as per the details provided in the EIS, the Project would involve the installation of a transmission line connection between the Site and the Transgrid Wallerawang 330 kV substation. The alignment of the proposed transmission connection would traverse:

- Lot 8 and Lot 9 of DP 252472
- Lot 2 DP 108089
- Lot 1 DP 108089
- Lot 10 DP 1168824
- Lot 1115 DP 1204803
- Lot 91 DP 1043967.

Installation of a new underground transmission connection from the BESS to the existing Transgrid Wallerawang 330 kV substation would be constructed using a combination of underboring (HDD) and trenching methodologies. Underboring would be utilised where required to avoid areas of environmental sensitivity associated with waterways, biodiversity and Aboriginal heritage, as well as railway and road crossings. This transmission connection would traverse a distance of approximately 1.9 km in length and be drilled to a variable depth to account for Black Gum root systems. The transmission line would be located generally about 1.5 m underground, and could vary to 2-3m deep. Of the 1.9 km length, approximately 1.3 km would be underbored and 530 m would be trenched, as shown on **Figure 4-1**. Within the Transgrid Wallerawang 330 kV substation, perimeter, the transmission line would come above ground to connect to the substation switchyard.

The BESS facility would be developed on part of Lot 4 Deposited Plan (DP) 751651. The part of the Lot that was initially identified for development of the BESS was referred to as the Site and is shown in **Figure 4-1**. Following investigations, approximately 10 ha of the Site would be used for the construction of the BESS facility. This 10 ha area includes the future location of the BESS and associated substation, construction laydown, storage and parking area, dam upgrades, swales, landscaping (refer to **Figure 1-3**). The 10 ha area excludes the mature native vegetation located to the north west of the Site.

Once the BESS and associated infrastructure is constructed, the construction laydown, storage and parking area would be rehabilitated to similar to its existing condition allowing for stormwater management considerations. Following construction, the majority of this area, the dams and other land not needed for the BESS facility would be returned to the current landowner as part of the proposed subdivision of the Lot. Once constructed, the BESS facility would occupy approximately 7 ha of south western part of Lot 4 DP 751651.

The location of the transmission corridor from the BESS facility to the Transgrid Wallerawang 330 kV substation is shown on **Figure 4-1** and described above. This figure shows where HDD drill rigs will be required. Equipment laydown areas for HDD and trenching would be located along the alignment at the HDD drill rig locations. No works to roads or access tracks are required to move equipment to these locations.

Outside of the Site and the transmission corridor the only works that are required relate to:

- The proposed new access to Brays Lane from the Site (refer to **Figure 1-3**)
- Inclusion of gravel or road base on the outer edge of the final right hand turn on Brays Lane before entering the Site to assist with the movement of overmass / oversized vehicles during construction of the BESS

These works are both in the Brays Lane road corridor. The area where gravel or road base would be placed would be rehabilitated and revegetated following construction in consultation with Lithgow City Council.

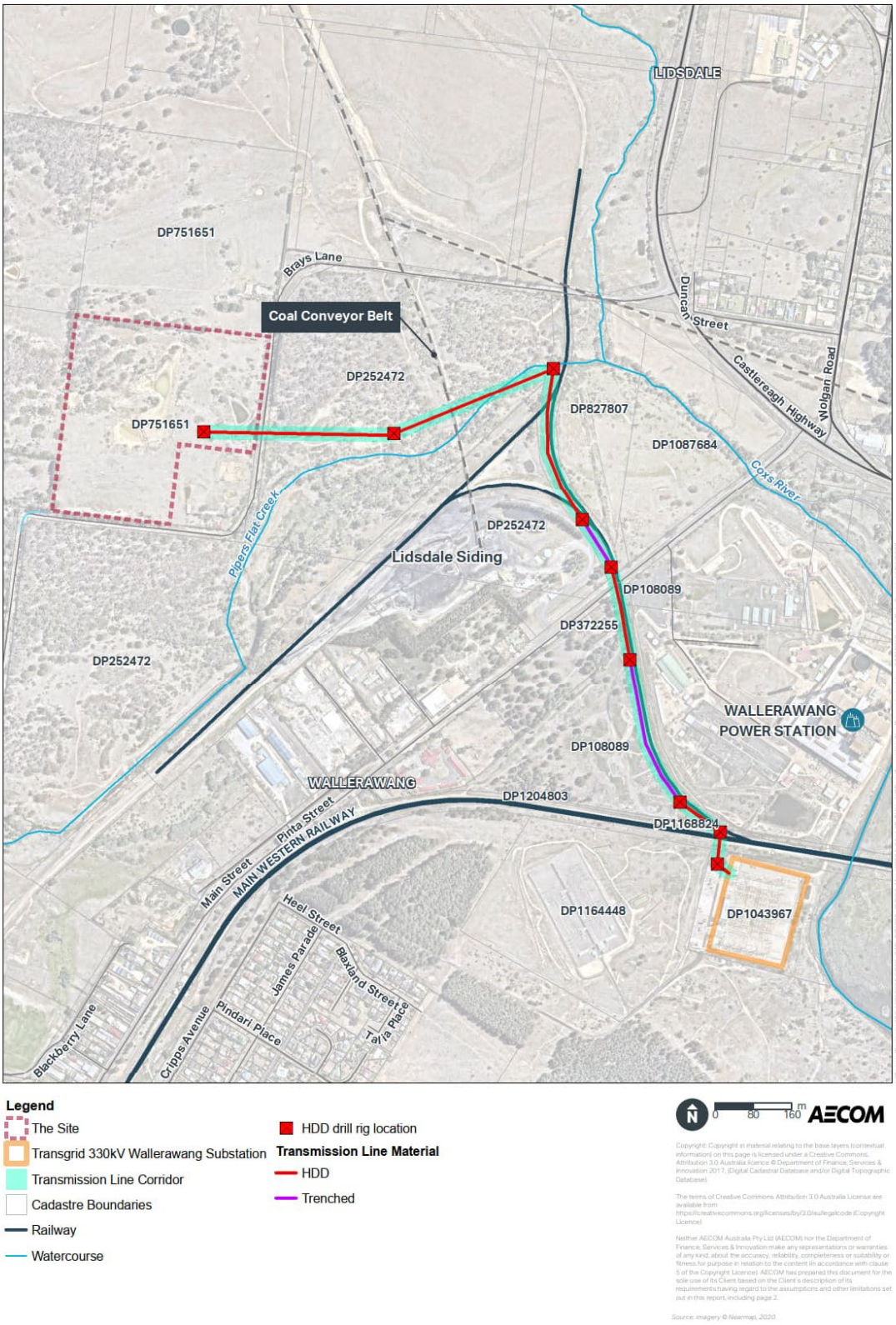


Figure 4-1 Proposed location of trenching and HDD methods of installing the new transmission line

4.1.2 Issue: Visual impact assessment

4.1.2.1 Issue

DPE have requested for clarification of the following aspects of the visual impact assessment:

- The separation distances between surrounding receivers and the Project, the Project Site boundary, and the transmission line corridor
- Which surrounding receivers are associated and non-associated, including revised tables and figures
- Provide cross-section drawings (including Reduced Levels) of the construction including noise barriers and proposed cut and fill
- Provide details of proposed visual mitigation including landscape screening.

4.1.2.2 Response

Separation distances and receivers

Section 5.2 of the NSW Wind Energy Guideline (DPE, 2016) defines associated and non-associated properties as follows:

- Associated properties include: owners and occupiers of land proposed to host wind turbines or related infrastructure, owners and occupiers of land required for access during construction and/or maintenance, or landowners who have reached a financial or in-kind agreement in relation to the proposal
- Non-associated properties include: landowners who have not reached a financial or in-kind agreement in relation to the proposal.

For the purpose of this response it is assumed that the definitions for ‘associated properties’ and ‘non-associated properties’ align with the terms ‘associated receivers’ and ‘non-associated receivers’ from the NSW Wind Energy Guideline respectively. The term ‘wind turbine’ has also been replaced with ‘BESS’.

On this basis the five receivers closest to the Site are considered either ‘associated receivers’ and ‘non-associated receivers’ for the following reasons:

- R1 (233 Brays Lane): The landowner for this property has reached a financial agreement in relation to the Project
- R2 (173 Brays Lane): The tenant at this property currently occupies the land where the BESS facility is proposed
- R3 (137 Brays Lane): The landowner at this property currently owns the land where the BESS facility would be constructed and has reached a financial agreement in relation to the Project
- R4 (113 Brays Lane): The landowner has no financial or in-kind agreement in relation to the Project
- R5 (91 Brays Lane): The landowner has no financial or in-kind agreement in relation to the Project

Given their proximity to the Site and the potential impacts associated with the Project, Receivers R1, R2, R3 and R4 have all been subject to more detailed and personal consultation (refer to Table 6-3 of the EIS). Receivers located nearby the Site are shown on **Figure 4-2**.

The proposed transmission connection would also pass-through land managed or owned by Lithgow City Council, Transport for NSW and Transgrid. As detailed within the EIS and this report, consultation has been undertaken with each of these organisations.

The remaining residential or sensitive receivers are at least 500 m from the Site and have been, and would continue to be, consulted with as per the methods detailed for the broader community in the EIS.

Table 4-2 below shows the distance from the Site, the BESS facility and the transmission corridor for the five sensitive receivers within 500 m of the Site.

Table 4-2 Associated and non-associated receivers

Receiver ID	Address	Distance from the Site (m)	Distance from the transmission corridor (m)	Associated / non associated
R1	233 Brays Lane, Wallerawang, NSW 2845	97	289	Associated
R2	173 Brays Lane, Wallerawang, NSW 2845	23	170	Associated
R3	137 Brays Lane, Wallerawang, NSW 2845	159	417	Associated
R4	113 Brays Lane, Wallerawang, NSW 2845	278	541	Non-associated
R5	91 Brays Lane, Wallerawang, NSW 2845	479	721	Non-associated

For the transmission line corridor, the closest sensitive receiver not listed in **Table 4-2** is located at 134 Main Street, Wallerwang. This receiver is approximately 235 m from the nearest HDD drill rig location. The second closest sensitive receiver to the transmission line corridor not listed in **Table 4-2** is located at 25 Duncan Street, Lidsdale. This receiver is approximately 325 m from the nearest HDD drill rig location. Similar to R5 these and other receivers from the broader community have been, and would continue to be, consulted with as per the methods detailed in the EIS.

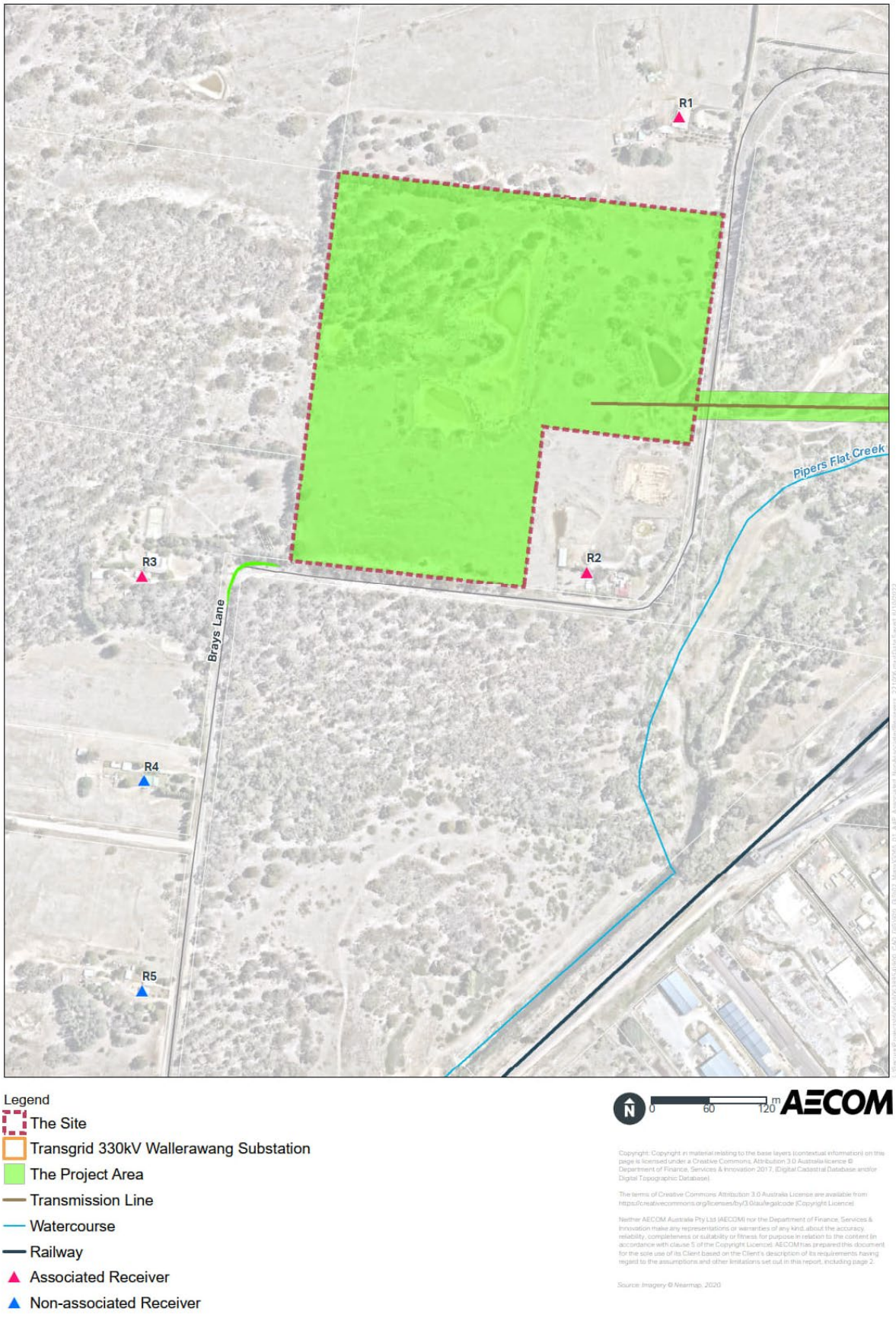


Figure 4-2 Associated and non-associated receivers in the vicinity of the Site

Cross sections, cut and fill

Noting that the project layout is conceptual and subject to detailed design, Indicative cross sections for the BESS facility and a cut and fill heat map is provided in **Appendix E**.

The cut and fill plan for the Project estimates that approximately 5,000 m^3 of fill would need to be imported to facilitate construction of the BESS facility. This would equate to approximately 166 trucks being required to import the fill throughout the construction period. This number of trucks over the construction period is considered negligible and can be accommodated within the estimate provided in the EIS of 20 trucks per day during peak construction.

The material to be imported to Site would be restricted to ENM and/ or VENM. Certificates would be provided upon receipt to confirm the quality of material received on site. The source of this material would be subject to availability and would be determined during the construction phase of the Project. The source of this material could come from large civil or extractive industry projects across the central west or from the various tunnelling projects occurring and planned to occur in Metropolitan Sydney and the wider area. It is widely understood that the amount of available ENM and VENM in and around the Sydney region as a result of the various road and rail tunnelling projects means that sourcing this material would not be an issue.

Proposed visual mitigation

The proposed landscape plan is considered to be a suitable visual mitigation strategy to provide sufficient screening of the BESS from nearby visual receivers.

A conceptual landscape plan is provided as **Appendix F**. The purpose of the landscape planting is to minimise the visual impact that the BESS would have on the surrounding residential receivers. The landscaped areas would assist in screening the 10 metre high noise walls within the Site, in order to mitigate sightlines from the south and east. Bioretention planting on the north of the Site would maximise pollutant removal whilst grass swales are introduced to the west of the BESS.

The proposed planting treatment draws upon the existing planting palette within the township and the wider Lithgow City Council region. Trees and shrubs that are native to the area would provide the appropriate heights and character to lessen the visual impact of the BESS.

The tree selection for site screening from the east includes *Eucalyptus blakelyi*, a hardy native tree that has a moderate to fast growth of up to 20 m tall. *Acacia obtusifolia* is a fast growing, bushy native tree that would assist in the screening of the noise walls and will grow up to 15 m. *Banksia integrifolia* is another hardy native tree growing at a moderate pace in full sun that will reach up to 15 m. Further emphasis on screening has been placed on the eastern boundary with the introduction of a large shrub planting mix. Southern and eastern large shrub planting has maximum maturity heights of up to 10 m. This combination of taller trees, shrubs and dense shrubs will help to mitigate the visual impact.

Due to the hardy nature of all proposed planting species, the landscape maintenance would be low, would not require a great deal of water once established and would grow quickly to minimise the potential for weeds. The proposed sizing and types of species proposed in **Appendix F** would allow the landscaping to be effective within 3 years of planting. Species have also been chosen in accordance with their longevity in this environment. Planting would be managed in line with Asset Protection Zone requirements to reduce bushfire risks.

Measures to mitigate potential visual impacts are detailed under Measures V1 to V6 in **Appendix B**.

4.1.3 Issue: Neighbour agreements

4.1.3.1 Issue

DPE have requested evidence of neighbour agreements between Neoen and surrounding receivers impacted by the Project.

4.1.3.2 Response

Neoen has come to an agreement with the two neighbours related to the landowner of the Site, residing at 137 and 173 Brays Lane. These agreements will be provided to DPE separately. Neoen will continue to work with and consult Project neighbours during the development and construction. Neoen are still working on reaching an agreement with the neighbour residing at 233 Brays Lane. When this final neighbour agreement has been finalised, it will be provided to DPE.

4.1.4 Issue: Preliminary hazard analysis

4.1.4.1 Issue

DPE requested additional information from the Preliminary Hazard Analysis in response to, and in consideration of the 2021 Victorian Big Battery fire incident where fire propagation to the roof of the adjacent BESS sub-unit occurred. This additional information should:

- Verify that the BESS would be accommodated within its designated area, accounting for adequate separation between BESS sub-units (containers, enclosures etc) to prevent fire propagation. This verification should consider relevant codes and standards (including, but not limited to: NFPA 855, AS 5139, IEC 62897, UL 9540, FM Global DS 5- 33, and UL 9540A test reports)
- Demonstrate that the fire risks from BESS can comply with the Department's Hazardous Industry Advisory Paper No. 4, 'Risk Criteria for Land Use Safety Planning'
- Consider undertaking the above points for both containerised and modular BESS systems.

4.1.4.2 Response

AECOM engaged Planager to address the above submissions from DPE. Planager produced a memo which outlined the additional information required to address the concerns raised by DPE. Due to the commercially sensitive nature of the details requested by DPE, Neoen has provided their response separately.

As outlined in the EIS, the BESS design, separation distances and overall layout of the Project is subject to the detailed design phase. In summary, during the detailed design phase:

- Separation distances would be determined in accordance the relevant codes and practice to ensure unimpeded access and prevention of fire propagation
- Installation of the BESS would be done so in a way to ensure the spread of fire originating within the BESS shall be kept to a minimum, and preventative measures would be implemented to prevent the spread of fire between BESS enclosures
- The size of BESS would be designed to fit within the Project area to account for necessary separation distances, controls and measures required for the preferred technology type and to meet a future development consent
- Neoen undertake compliance testing to ensure that the Project would comply with the Department's Hazardous Industry Advisory Paper No. 4, *Risk Criteria for Land Use Safety Planning.*

4.1.5 Issue: Landowner's consents

4.1.5.1 Issue

DPE have requested for evidence of landowner's consent for all land proposed to be developed.

4.1.5.2 Response

Landowner's consent has been obtained by Neoen and would be provided under separate cover to support the Submissions Report, pursuant to the requirements of the *Environmental Planning and Assessment Regulations 2021*.

4.1.6 Issue: Voluntary Planning Agreement (VPA)

4.1.6.1 Issue

DPE requested evidence of agreements reached between Neoen and LCC regarding the terms of the proposed Voluntary Planning Agreement.

4.1.6.2 Response

A Voluntary Planning Agreement has been agreed between Neoen and LCC. Evidence of this agreement will be provided to DPE separately.

4.2 Department of Planning and Environment – Water

The NSW Department of Planning and Environment – Water (DPE Water) provided a submission in response to the public exhibition of the EIS. All issues raised in the DPE submission are summarised below and addressed respectively.

4.2.1 Issue: Downstream water users

4.2.1.1 Issue

DPE Water has provided a recommendation to

- Clarify the potential impacts to downstream water users and the environment due to the any proposed reduction in peak discharges and associated reduced water availability. Where alternate water supply options are proposed for existing water users, confirmation should be provided of their viability.

4.2.1.2 Response

The EIS states that the proposed design would provide flow attenuation to reduce peak discharge. The reduced peak discharge refers only to the runoff rate. The Project does not propose to reduce the total runoff volume and there is no proposed water demand or water extraction proposed for the Project that would reduce the total volume of runoff. There is no impact expected to water availability for the downstream environment.

The dams to the south east of the proposed BESS facility close to 173 Brays Lane, would have their catchments reduced by two thirds (refer to **Figure 4-3**). However, upon completion of construction of the Project, the land containing Dam 4 and Dam 5 would be returned to the landholder of 173 Brays Lane as part of the subdivision of the Lot (refer to **Figure 4-3**). This would maintain and potentially increase the property's water supply security compared to the existing situation.

If the landholder requires water to be pumped from Dam 4 to Dam B (refer to **Figure 4-3**) for the purpose of stock watering, there would be a requirement for a Water Access Licence (WAL) or a Water Supply Licence (WSL) for the purpose of pumping reticulated water. This licence would be based on a stock watering of
1-2 m^3 per day.

4.2.2 Issue: Surface water management system

DPE Water has provided a recommendation to:

- Review the surface water management system at the Site with the aim to maximise the separation of clean and dirty water at the site and to maintain water volumes for users and the environment downstream.

4.2.2.1 Response

The EIS identifies potential impacts to surface waters during the construction phase including the need to separate clean (upstream) runoff from dirty (construction site) runoff. Specific reference is made to the construction and laydown areas being established in accordance with the guideline Managing Urban Stormwater: Soils and Construction (Landcom 2004, a.k.a. the Blue Book). Mitigation measures for the Project include controls such as the identification of upslope run-on waters from undisturbed areas of catchment and diversion of these around un-stabilised areas of the Site. Recommendations are also made for the diversion of existing drainage lines, with channels of appropriate capacity to be established prior to commencing construction works.

For the operation of the Project, the potential impacts to surface waters would be similarly managed. Upstream (clean) runoff would be diverted around the Project and into Dam 3. Site (dirty) runoff would be directed to stormwater treatment systems prior to discharge to the downstream environment. Site runoff would be treated sufficiently to meet the Neutral or Beneficial Effect (NorBE) requirements.

The maintenance of water volumes for users and the environment downstream is addressed in the response under **Section 4.2.1**.

4.2.3 Issue: Dam compliance

DPE Water have recommended that a review of the proposed dams at the Site is completed to ensure they meet the requirements of the water regulatory framework, including relevant exclusions and licence requirements. Further clarification of how the dams on the Site have been considered within the water regulatory framework has also been requested.

4.2.3.1 Response

A review of the *Water Management (General) Regulation 2018* (Water Regulation) was undertaken to review the requirements of the water regulatory framework applying to the proposed dams at the Site (Dam 4 and Dam 5). Under Part 2 Division 2, Section 21 of the Water Regulation, a person is exempt from the offences outlined in Section 60A(1) and (2) of the Act in relation to the taking of water from a water source for the purposes outlined in Schedule 1 of the Water Regulation. This exemption includes flood detention and mitigation as long as the dam is located on a minor stream and does not involve reticulated or pumped water.

A minor stream is defined within Part 3 of the Water Regulation as any stream that is specified by the hydroline spatial data and is classed as first or second stream order, does not maintain a permanent flow, and does not at any time carry flows emanating from a third or higher order stream. As the streams on which both dams would be located are 1st and 2nd order streams with an ephemeral flow, the dams would be considered exempt from a Water Access Licence (WAL).

In some cases where a person is exempt from a WAL, a Water Supply Licence (WSL) or work approval, may be required. Under Part 3 Subdivision 3 Section 39(1) of the Water Regulation, a person is exempt from the offences outlined in Section 91B(1) of the Water Act where a person who is a landholder constructs or uses any water for the purposes set out in Schedule 1 Water Regulation. A water supply licence or work approval would not be required for Dam 5.

The land owner may require water to be pumped from Dam 4 to Dam B. Where this is the case, there would be a requirement for a WAL or a WSL for the purpose of pumping reticulated water for the purpose of stock watering. This licence would be based on a stock watering water demand of 1-2 m^3/d.

4.2.4 Issue: Post approval recommendations

DPE Water have provided two post approval recommendations, including that:

- A Soil and Water Management Plan be prepared to address stormwater management and sediment and erosion control. The plan should address the requirements of the guideline Managing Urban Stormwater: Soils and Construction (Landcom 2004) and the Guidelines for Controlled Activities on Waterfront Land (NRAR 2018)
- In the event groundwater is intercepted, Water Access Licence (WAL) under the *Water Management Act 2000* must be obtained unless the take is less than or equal to 3ML of water per year for any aquifer interference activities listed in Clause 7 of Schedule 4 of the Water Management (General) Regulation 2018.

4.2.4.1 Response

Neoen agree to these recommendations becoming conditions of consent for the Project should consent be granted. In addition, management and mitigation measure SW1 within the EIS (refer to Section 20.2.1), confirms that "*A Soil and Water Management Plan (SWMP) would be prepared for the Project in accordance with the requirements and principles of the Managing Urban Stormwater – Soils and Construction, Volume 1 (the Blue Book) (Landcom 2004), Volume 2A (DECC1 2008 a) and Volume 2D (DECCW 2008b).*" Management and mitigation measure SGC1 within the EIS (refer to Section 20.2.1), states that the SWMP would include measures to manage the unexpected interception of groundwater during construction. These measures can include the recommendation made by DPE – Water above.

4.3 Water NSW

Water NSW provided a submission in response to the public exhibition of the EIS. All issues raised in the Water NSW submission are summarised below and addressed respectively.

4.3.1 Issue: Water quality in the Sydney Drinking Water catchment

4.3.1.1 Issue

Water NSW have noted that Chapter 8 of State Environmental Planning Policy (Biodiversity and Conservation) 2021 (SEPP Biodiversity and Conservation) applies to the Project due to the location within the Sydney Drinking Water Catchment.

Water NSW have raised a concern that the pre-development scenario in the stormwater quality model does not realistically represent the Site, and when corrected, the proposed stormwater management does not achieve a neutral or beneficial effect (NorBE) on water quality as required by the SEPP. Biodiversity and Conservation (cl.8.8). Water NSW have identified that the proposed stormwater management measures may also not be sustainable for long-term maintenance and management for such a large asset.

Water NSW further notes that the proposed human wastewater management (i.e. pump-out system) during station's operation is not a preferable option within Sydney Drinking Water Catchment. Based on Water NSW's experience, pump-out system often results in mismanagement and poor practices, which adversely impact water quality.

Water NSW requests to be consulted with during the development of the Submissions Report to address the following recommendations:

- Stormwater quality modelling and associated detailed stormwater management plan for a long-term sustainable stormwater management.
- Management and maintenance of the stormwater management measures as a part of the Operational Environmental Management Plan
- Wastewater management report
- Conceptual Soil and Water Management Plan(s) for the Construction Phase of the Project.

4.3.1.2 Response

A number of the points made under Issue: 'Water quality in the Sydney Drinking Water catchment' are interrelated and as such they have been addressed below under the following subheadings:

- Stormwater quality modelling
- Management and maintenance of the stormwater management measures as a part of the Operational Environmental Management Plan
- Wastewater management system
- Development of construction soil and water management plan.

Detailed responses are provided below.

Stormwater quality modelling

In the meeting between AECOM, Neoen and Water NSW on 4 May 2022 it was confirmed that Water NSW had reviewed an incorrect MUSIC model, which was not reflective of the Project, as assessed in the EIS. AECOM provided Water NSW with the revised model. Juri Jung from Water NSW issued an email to AECOM on the 19 May 2022 after reviewing the revised MUSIC model prepared for the Project, in which the following additional comments were made:

- *I agree that only BESS area is modelled (not including external catchments)*
- *I consider that pre-development's source node adopt "agricultural" or "residential" rather than "rural res" considering the land use of this area, which will make slightly easier to meet NorBE*
- *In pre-development scenario, dam 2 and partially dam 3 should be added as a treatment node because they work as water quality ponds, which will reduce pre's* (sic, predevelopment scenario) *load*

AECOM was asked to consider these points in revising the MUSIC model. The MUSIC model was subsequently revised and the following changes were made.

Pre-development source nodes - Rural Grazing source nodes for the BESS area were changed from Rural Res to Agricultural Node as per the advice given, and in accordance with Water NSW MUSIC Modelling Guidelines Table 4.1 (*Using MUSIC in the Sydney Drinking Water Catchment*, Published by Water NSW, Parramatta, June 2019). Table 4.1 states that rural grazing is best represented by the agriculture source node pollutant generation values.

Pre-development scenario treatment nodes – In order to represent the treatment that may be provided by the dams in the pre-development scenario, that scenario was revised as follows:

- The BESS catchment was divided into two catchments to more accurately represent the catchment draining to Dam 2, such that:
    - 50% of the BESS catchment discharged to Dam 2 (representing approximately the BESS footprint over the pre-development existing area that would currently discharge to Dam 2)
    - 50% of the BESS catchment that does not currently discharge to Dam 2 was discharged directly to the receiving node, representing the flows from Cat3_Int node that would currently drain away from the dams to the south-east.
- The Dam 2 catchment is about 40% within proposed BESS area (Cat2_Int), and 60% external (Cat2_Ext), so the treatment node for Dam 2 was split into 2 nodes to represent the proportion of Dam 2 that would be available to treat runoff from the BESS area as follows:
    - BESS runoff is discharged to a dam sized at 40% of the previous Dam 2, which was included in calculations for NorBE
    - External catchment runoff is discharged to a dam sized at 60% of the previously modelled Dam 2 node, which because it is outside of the BESS footprint, does not report to the pre-development node for NorBE calculations.

The small Dam 3 (existing dam) surface area that sits in the proposed BESS footprint was included in the pre-development scenario to maintain a consistent total catchment area with the post-development scenario. However, the treatment provided by Dam 3 was not included in the model because the area of the dam included in the BESS footprint is very small, and therefore the treatment provided by the dam was considered to be negligible. Dam 3 was still modelled as a source node. Dam 2 was modelled as a source node and considered as a pond treatment node. The dams in the pre-development scenario are shown in **Figure 4-3** below.

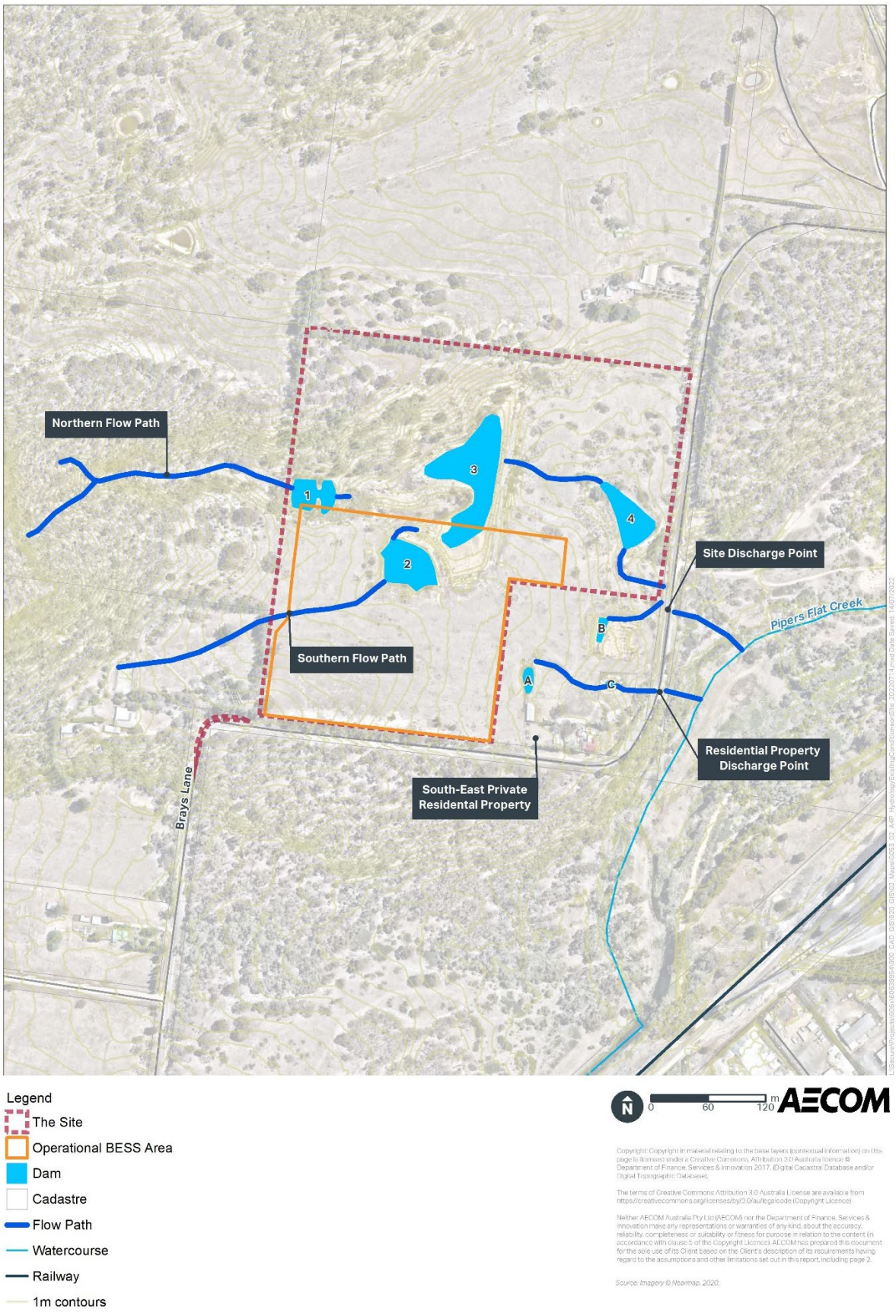


Figure 4-3 Pre-development scenario dams on the operational BESS Site

Treatment in the post-development scenario – The post-development scenario was then adjusted to optimise the size of the proposed treatment systems (bioretention). As a result of the adjustments to the model, the bioretention surface area and filter area were able to be reduced from 2500 m^2 to 1850 m^2, whilst still achieving more than 10% improvement in water quality, measured as a reduction in pollutant loads. The model output is summarised in **Table 4-3**. Hence the Project is expected to have a net beneficial impact to the quality of stormwater runoff.

Table 4-3 Pollutant removal predicted by the revised MUSIC model

	Sources		Residual Loads		% Reduction			
	Pre	Post	Pre	Post	Pre	Post	Difference	% Improvement
Flow (ML/yr)	13.8	39.6	**12.7**	**35.9**	7.97	9.34		
TSS[1] (kg/yr)	1330	7230	**971**	**208**	27	97	763	79
TP[2] (kg/yr)	5.52	11.70	**4.31**	**1.82**	21.90	84.40	2.5	58
TN[3] (kg/yr)	32.8	87.1	**28.3**	**25.3**	13.7	71	3	11

Notes

1. *Total suspended solids*
2. *Total Phosphorous*
3. *Total Nitrogen*

Management and maintenance of the stormwater management measures as a part of the Operational Environmental Management Plan

Water NSW raised concerns about the sustainability for long-term maintenance and management of a large stormwater asset such as the bioretention system proposed for stormwater treatment. This was discussed in the meeting with Water NSW on 4 May 2022.

A bioretention system is proposed for stormwater treatment. This would include at the upstream extent a sediment forebay for the collection of coarse sediments. Immediately downstream, stormwater runoff would be discharged over a vegetated filter media for the removal of fine sediments and dissolved pollutants such as dissolved nitrogen and phosphorus. A subsurface pipe about 1 m below the surface of the media would collect treated runoff for discharge to the downstream environment (Dam 3).

In response to this concern about the large size of the bioretention system that would be required to meet NorBE targets, and as a result of the revised MUSIC modelling, the size of the proposed bioretention basin is expected to be about 25 % smaller than the design that was proposed in the EIS. Modelling using a bioretention system as the treatment was intended to test the feasibility for a realistic worst-case scenario for the Project to determine required footprint for this system.

Further, as the Project progresses, Neoen have agreed to investigate options to minimise the required bioretention area as project design continues to undergo refinement. The filter area could be reduced by using proprietary products such as the Filterra filter media by Ocean Protect. This has been investigated to determine the suitability to further reduce the area required for stormwater treatment, and it was noted that the Filterra product has been adopted and approved by Water NSW. It was agreed that for future water quality modelling of the Filterra treatment performance, the most recent treatment performance / approved values as agreed to by Water NSW and Filterra manufacturer should be used.

Finally, Neoen noted that an ongoing maintenance contract to maintain this asset would be sought, preferably this would be provided by the selected stormwater treatment device manufacturer.

A summary of requirements to help ensure the construction and operation of the bioretention basin is successful are outlined in **Table 4-4**. The majority of these requirements were listed as management and mitigation measures in the EIS with exception of the last two recommendations, and further specifications on some items (italicised).

Table 4-4 Construction and maintenance recommendations

Measure	Responsibility	Timing
The design and construction of the bioretention basin would be overseen by a person with previous experience in the construction and successful operation of these systems	Design contractor and construction contractor	Detailed design and construction
Drainage systems, filtration media and vegetation would be installed in accordance with agreed designs to ensure proper functioning throughout the life of the treatment system	Construction contractor	Construction
Erosion and sediment control measures would be in place during the construction phase of the Project to ensure that the construction and the downstream environments are protected from high sediment loads	Construction contractor	Prior to construction
The bioretention system would be brought online at the end of the construction phase once major earthworks at the Site are complete to minimise the risk of clogging from sediments	Construction contractor	Construction
Vegetation would be selected based on local climate and rainfall regime.	Design contractor	Detailed design
Maintenance requirements for bioretention systems include: • Monitoring for scour and erosion • Monitoring for and regular removal of accumulated litter, fine sediment, pests and debris • Weed removal and plant re-establishment to maintain high nutrient removal efficiency • Monitoring overflow pits for structural integrity and blockage • If clogging or contamination is observed, replacement of vegetation and removal of the surface layers of affected filter media layer may be required. *Monitoring would be undertaken four times per year, and after significant rainfall.* *Monitoring and maintenance would be undertaken by personnel knowledgeable in the function of stormwater treatment systems and experienced in bush regeneration.*	Operator	Operation
Proprietary products used for stormwater treatment would be installed and maintained in accordance with the manufacturer's recommendations.	*Construction contractor and Operator*	*Construction and Operation*
Opportunities to reduce the area required for the bioretention basin whilst still maintaining compliance against NorBe requirements would be investigated during detailed design.	*Construction contractor*	*Prior to construction*

Wastewater management system

As noted in the EIS, the Project would operate as a mostly unattended, but monitored facility. Operation of the Project would require five or six staff to periodically attend Site for maintenance activities. As such, the volume of wastewater produced is expected to be minimal.

Estimates of average water usage for the operation of the Project from the EIS (Appendix G: Water Cycle Management Study) are provided below:

- Potable water and amenities for six full time equivalent employees onsite 5 days per week. Consumption of 5L/day/person = 30 L/day x (5/7) days/week = 21.4 L/day average daily demand. This is considered a conservative and 'worst-case' scenario as it likely that there would be fewer employees on site most of the time.
- One site toilet and associated wash basin requiring 0.1 kL/day. Used for 5 days per week = average daily demand would be 0.71 kL/day (estimates based on guidance by Blacktown City Council 2020)
- General washdown facilities allowing for 1 tap with daily usage 0.005 kL (Blacktown City Council 2020). Used for 5 days per week = 0.004 kL per day. It is assumed that this would drain to the wastewater holding tank.

The above estimates are summarised in **Table 4-5**. This gives an average daily water demand (potable) of 0.077 kL/day for when the Site is attended. Whilst these estimates are averages, the capacity of the storage tank has allowed a 10% additional capacity to allow for higher wastewater production rates in a precautionary scenario for water usage.

Table 4-5 Project wastewater production rates

Water Use	Average Volume Wastewater Produced (kL/day)
Potable water and amenities	0.002
Toilets (one toilet)	0.071
General washdown	0.004
Total	**0.077**

It is conservatively assumed that 100% of this demand would become wastewater. Therefore, it is estimated that the Site would generate approximately 0.539 kL of wastewater every week when the Site is attended.

Three options were assessed in considering how operational wastewater from the Project would be managed.

- Connection to sewer
- Installation of a septic tank
- Installation of a pump-out wastewater holding tank.

A summary of the water treatment system options considered for the Project is presented in **Table 4-6**.

Table 4-6 Summary of water treatment options assessed for the Project

Option assessed	Connection to sewer	Septic tank	Pump out system
Option summary	Install a sewer pipe to connect the site facilities to the main sewer network in Wallerawang. The main sewer is approximately 1 km from the Site. Construction works to install a sewer connection would involve crossing several roads including Brays Lane and Main Street.	A storage tank for wastewater that allows the water to percolate into a soil absorption field (drain field). The septic tank is a buried, water-tight container usually made of concrete, fiberglass, or polyethylene. The tank holds the wastewater long enough to allow solids to settle to the bottom forming sludge, while the oil and grease floats to the top as scum. The liquid then exits the tank into the drain field through piping to allow the wastewater to filter through the soil.	A storage tank that is pumped out regularly by a licensed contractor. The septic tank is a buried, water-tight container usually made of concrete, fibreglass, or polyethene. This is similar to the septic tank option, however a tanker with a vacuum pump is required to regularly collect the wastewater to empty the tank. No drain field is required. A suitable access road for the tanker is required.
Benefits	• Minimal risk posed to the Sydney Drinking Water Catchment	• Minimal maintenance required • System contained on-site with no off-site disturbance or maintenance	• Minimal maintenance required • Minimal risk posed to Sydney Drinking Water Catchment • System contained on-site with no off-site disturbance or maintenance • Underground structure minimises the environmental impact footprint • Low cost of installing the tank • There are readily available storage tanks on the market with instruments to monitor wastewater levels • Minimal disruption to the environment during construction stage

Option assessed	Connection to sewer	Septic tank	Pump out system
Disadvantages	• Significant distance to the nearest sewer connection • Public and environmental disruption from installation of sewer pipe, particularly across road crossings and other underground utility assets in the area, including the Fish River Pipeline • Cost of installing a sewer pipe of this length for a small amount of waste not reasonable	• Insufficient land to accommodate a septic tank's effluent management area, due to the proposed subdivision (vegetated areas of the Site will be returned to the landholder after construction) • Moderate risk posed to Sydney Drinking Water Catchment by applying waste to land • Potential flooding of sewage due to drain field overload, causing environmental harm	• Requires regular maintenance by a licensed contractor due to risk of overflow • Suitable access will be required for the tanker to empty the tank • Condition monitoring equipment will be required to monitor the level of the tanks to trigger an alarm when the tank will need to be emptied
Suitability	Not suitable for the Project	Not suitable for the Project	Suitable for the Project

Due to the Project's low rate of wastewater production, the geographical constraints of the Site having limited available land for an effluent management area, and the Site being a significant distance from the nearest sewer connection, it was concluded that the most reasonable and feasible wastewater management solution would be a pump-out system, with appropriate mitigation measures in place. The pump-out system would be located adjacent to the operation and maintenance (O&M) buildings on the Site. The exact location and details of the system would be further developed during detailed design.

According to the assumptions discussed above (refer to **Table 4-5**), a wastewater holding tank of at least 10 kL capacity is proposed. This allows for 10% above the estimated average wastewater production rates to allow for a precautionary scenario. The wastewater holding tank would need to be emptied every 18 weeks (on average, based on 539 L/week) by a 10,000 L vacuum tanker truck. The waste would be disposed of at an appropriately licensed waste facility off-site. However as discussed above, this is a highly conservative estimate in which we assume 5-6 staff are at the Site at all times. In practice, the Site is usually unmanned and monitored remotely.

A wastewater management report would be prepared during detailed design, which would confirm the design and supplier of the proposed holding tank and pump-out system and the respective operation and maintenance requirements (refer to mitigation measure SW20, **Appendix B**). This report would describe requirements for monitoring, procedures for operation and maintenance of the appropriate equipment, tank emptying procedure, responses to emergencies such as spills, overflow, alarms and reporting schedules. Alarms would be triggered for the tank to be emptied when it is at approximately 80% capacity, however this would be confirmed during the detailed design phase. As a commitment to further consultation, Neoen would consult with Water NSW on the proposed operational and maintenance measures in wastewater management report prior to the report being finalised.

Finally, it is considered that Water NSW's concerns regarding some facilities not being closely monitored are less likely to be an issue at a BESS, since these facilities are highly secure, connected and closely and constantly monitored 24-hours a day, 365 days per year. As such it is less likely that the alarms proposed for the holding tank would be missed.

Development of construction soil and water management plan

Soil and Water Management Plan(s) would be required for the construction phase of the Project. In a pre-lodgement meeting with AECOM on 4 May 2022, Water NSW confirmed that they do not require a detailed Soil and Water Management Plan (SWMP) as part of the Submission Report or prior to determination. It was confirmed that a Soil and Water Management Plan (SWMP) would be developed as part of the CEMP to guide the construction phase of the Project following determination and prior to construction commencing. As is typical for projects of this size, the SWMP would build on the measures identified as part of the SSD application and would incorporate and respond to information from the detailed design. The SWMP would include measures to manage soils and surface water considerations. AECOM expect that DPE would include Water NSW as an agency that would need to be consulted in the preparation of the SWMP as part of a condition of consent. This would ensure that WaterNSW was involved in the preparation of this document prior to construction commencing.

The SWMP would outline:

- The objectives of the SWMP
- Performance criteria and key performance indicators to measure the success of plan
- Legislative requirements including reference to relevant conditions of consent and management and mitigation measures
- A summary of the activities that are likely to cause impacts related to soil and water and the potential impacts identified in the SSD application documentation (including the EIS), such as; earthworks and site modifications which change the surface water behaviour of the Site, increased vehicle movement, stockpiling and mobilisation of sediment etc.
- A summary of the proposed approach to managing potential impacts, following the relevant guidelines, including Managing Urban Stormwater: Soils and Construction (Landcom 2004)
- A list of the measures that would be implemented to meet the legislative requirements and the performance criteria alongside information on who is responsible for each measure and the frequency and/or timing that applies to each measure
- An outline of the monitoring requirements that would be implemented to meet the legislative requirements and the performance criteria alongside information on who is responsible for monitoring and the frequency and/or timing that applies
- Information on reporting requirements, associated risks, compliance management and the approach to corrective actions.

As mentioned in **Sections 4.2.2** and **4.2.4**, the SWMP would address the requirements of the guideline Managing Urban Stormwater: Soils and Construction (Landcom 2004) and the Guidelines for Controlled Activities on Waterfront Land (NRAR 2018). Specific measures included in these guidelines which may be applicable to managing soil and water for the Project include:

- Temporary diversion drainage
- Sediment fences
- Stabilised site access
- Filter strips (buffers)
- Sediment basins (if determined to be required through soil loss calculations)
- Topsoil management
- Progressive rehabilitation.

Risks to be considered in regard to feasibility of these measures include:

- Staging of construction
- Timing of installation of control measures and operation/maintenance
- Land availability.

These measures and risks would be captured within the SWMP for the Project, which would be prepared in consultation with Water NSW.

4.3.2 Issue: Impacts to existing water supply infrastructure

4.3.2.1 Issue

Water NSW notes that they manage the Fish River water supply scheme within and near the Project Area. The Fish River water supply pipeline (the pipeline) associated with the scheme runs directly adjacent to Brays Lane, Wallerawang. The proposed new transmission line will traverse the pipeline in some locations (Bray Lane, Lot 8 DP 252472 near Pipers Flat Creek and at Main Street). Any interaction with this pipeline has the potential to disrupt WaterNSW's ability to supply water to its customers (Oberon and Lithgow Councils, Mount Piper power station, and about 230 properties along its route) which poses a significant risk to Water NSW.

Water NSW is concerned that the EIS has

1. Not mentioned the crossing of, or interaction with, the Fish River water supply pipeline,
2. Not assessed impacts of the project on the pipeline.

NSW Water have therefore recommended that the following be considered:

- Damage from striking the pipeline (including trenching and underboring) occurring close to, under or over the pipeline and associated infrastructure. Asset protection controls and monitoring when working around the pipeline should be specified.
- Damage from vibration and ground movement – Water NSW requires that the Project confirms velocity limits and the foreseeable impacts the works will have on Water NSW assets. Excavation methods must not trigger the maximum allowable limits set within the German Standard DIN 4150 – Part 3 - "Structural Vibration Part 3: Effects of vibration in structures", when measured at Water NSW assets. Vibration monitoring should occur prior to and during construction. Water NSW supports the proposed mitigation measures contained in the EIS (NV1, NV2) and requires that any identified risks to the Fish River water supply pipeline and proposed measures to mitigate those risks be included in the Construction Noise and Vibration Management Plan
- Impact of the 330kV transmission line to water supply infrastructure – Water NSW's main concerns relate to the increased risks from the electrification of the metal pipeline transferring water such as unacceptable coating stress voltage, low frequency induction voltages, touch/step potential and operational / maintenance barriers. Water NSW requests any modelling undertaken in these regards and information on how these risks have been considered and incorporated into the project design
- Inhibiting access to our inspection points, valves and scour lines – the Project should be designed, constructed and operated in such a way that it does not impact the environment or restrict Water NSW from operating and maintaining the pipeline
- Water NSW requests direct consultation regarding alignment of the transmission line corridor to ensure our assets are adequately considered and protected, and that our ability to access and operate the pipeline is not inhibited
- If the Project is approved, Water NSW requests that the proponent supply the final 'works as executed plans' for the transmission corridor to Water NSW, so that the agency is aware of the actual alignment and location of the high voltage asset (in relation to our assets), to ensure personnel are protected if working in this area.

4.3.2.2 Response

Introduction

Fish River Pipeline is an important water supply scheme for the Central Highlands, western parts of the Great Dividing Range and south of Oberon, supplying water to many small towns within this region, including Wallerawang. In Wallerawang, the pipeline is situated such that the proposed transmission connection would cross it four locations, as shown on **Figure 4-4** below. Measures to protect the pipeline during the installation of the transmission connection are discussed further within this response.

Following receipt of the submission, WaterNSW have been approached to provide details on the age, construction and design of the pipeline where the transmission connection is likely to cross it. No additional information on the construction of the pipeline has been provided, as such the information below is from the following publicly available sources.

- Nomination of Fish River Water Supply Scheme as a National Engineering Landmark (D Barrat, 2008)
- Contract awarded for Fish River Pipeline project (Cella L, 2017)
- 2011 – 2012 Annual Report (State Water Corporation, 2012)
- Project Case study Fish River Water Supply: Stage 2 Pipeline replacement (Clover, 2017)
- Water NSW / FRWS - Part Replacement of Stage 2 Pipeline - 04749F31 (Water NSW, 2016)
- Emergency works being undertaken at Fish River Water supply (Lithgow Mercury, 2020).

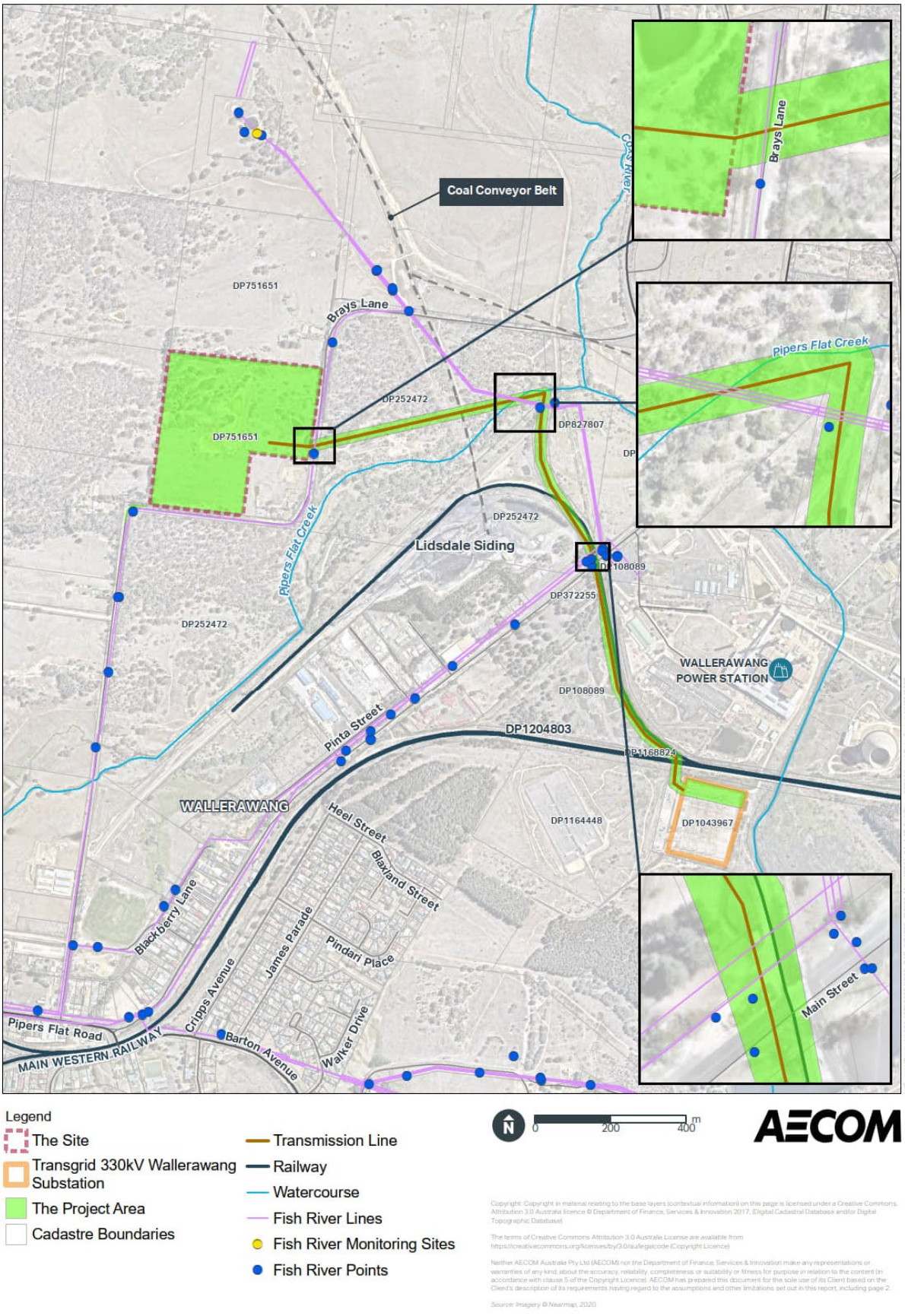


Figure 4-4 Location of the Fish River Pipeline in relation to the Project

In Wallerawang the pipeline is located underground with an average depth of 1.5 m below ground surface (BGS). It was originally built from pipelines ranging from DN750, DN500 and DN150 in size. In this location the pipeline was originally made from composite materials including lead-jointed cast iron and reinforce concrete pipes. Since construction, the pipeline has undergone various upgrades including:

- Upgrades to the pipeline across Lake Wallace at Wallerawang to a cement pipe in the 1990s
- Upgrades of 3.7 km of pipeline from concrete to cement lined steel pipe south of the Site, between Duckmaloi and Rydel Dam in 2011-2012
- Replacement of the pipeline between Oberon and Wallerawang in 2017 where the material of pipe and location is unknown
- Emergency works at Wallerawang on the pipeline in 2022, where the scope of this is unknown.

The exact composition and state of the pipeline close to the transmission connection is unknown. To address the uncertainty, mitigation measures have been identified for the Project to allow the transmission connection to be safely constructed and avoid impacts to the pipeline.

To help develop these mitigation measures Water NSW advised in a meeting with DPE on 10 June 2022 that the *Guidelines for Development adjacent to the Upper Canal and Warragamba Pipelines* (WaterNSW, 2021) (the Warragamba Guideline) should be reviewed as these guidelines provide applicable measures that are approved by Water NSW to protect their pipeline assets. They recommended that mitigation measures from this guideline should be considered for this Project.

The six bullet points provided in the Water NSW response relating to this issue have been responded to under the headings below. These include:

- Damage from striking the pipeline
- Damage from vibration and ground movement
- Electrification risks
- Access
- As executed plans.

To consistently address the comments from Water NSW an overarching management and mitigation measure has been developed. To manage and agree the process for installing the transmission connection beneath the pipeline, a Fish River Pipeline Management Plan (FRPMP) would be produced as part of the Construction Environmental Management Plan (CEMP). This plan would be produced in consultation with Water NSW and would be based on the outcomes of the non-destructive investigations around the pipeline to confirm depth and location. The FRPMP would:

- Outline the objectives of the FRPMP.
- Provide performance criteria and key performance indicators to measure the success of plan.
- Present key drivers including reference to relevant conditions of consent and management and mitigation measures.
- Provide information on the location and design of the Fish River Water Supply Pipeline where it is proposed to be crossed by the transmission connection as provided by WaterNSW and/or the non-destructive investigations.
- Confirm detailed design information on the proposed HDD approach for the transmission connection where it crosses the Fish River Water Supply Pipeline. This approach would be consistent with the measures discussed in this report and be informed by the preferred HDD contractor. Where required, additional justification would be provided that the approach would not impact the integrity of the pipeline. Inclusion of this detail in this plan would provide Water NSW with an opportunity to comment on the detailed design of the transmission connection before it is finalised.

- Outline the activities related to the installation of the transmission connection that could impact on the Fish River Water Supply Pipeline. These would be consistent with the potential impacts discussed in this report.
- Present the proposed measures for managing potential impacts for agreement with Water NSW. Where applicable, these measures would be based on the *Guidelines for Development adjacent to the Upper Canal and Warragamba Pipelines* (WaterNSW, 2021). The plan would outline who is responsible for each measure and the frequency and/or timing that applies to each measure.
- Provide monitoring requirements that would be implemented to meet the performance criteria alongside information on who is responsible for monitoring and the frequency and/or timing that applies. If required, monitoring would include a vibration monitoring program or procedure which would include vibration monitoring during drilling works at relevant transmission connection / pipeline intersection locations.
- Provide information on reporting requirements, associated risks, compliance management and the approach to corrective actions.

The FRPMP would include the following safeguards:

- All excavation work would be completed with reference to the Work Health and Safety (Excavation Work) Code of Practice by Safe Work Australia
- All works would be undertaken in accordance with Australian Standard (AS3798:1996) Guidelines on earthworks for commercial and residential developments
- Unobstructed access would be provided to inspection points, values and scour lines to allow ongoing maintenance by Water NSW
- If required, geotechnical investigations would be undertaken in accordance with the following relevant guidelines and standards:
    - Australian Standard 1726 Geotechnical Site Investigations
    - Australian Standard 1289 Methods of Testing Soils for Engineering Purposes.

Additional safeguards specific to the discussion below have also been identified.

Damage from striking the pipeline

The Water NSW submission noted that damage to the pipeline could occur from striking it during trenching and underboring activities. Trenching would not be used to install the transmission connection where it is proposed to cross the pipeline. Where the transmission connection crosses the pipeline, it would be installed using horizontal directional drilling (HDD).

HDD requires the use of drill rigs at either end of each section of drilling. Often the rigs require a small excavation of around a 1 m in depth to allow drilling to commence and be received. The Warragamba Guideline suggests that excavation activities within 5 m of these pipelines should be considered high risk and may require further investigation and discussion with Water NSW. Neoen would prioritise drill rig locations that are greater than 5 m from the pipeline, and where a drill rig is proposed within 5 m of the pipeline would discuss this with Water NSW as required in the Warragamba Guideline. The outcomes of these discussions would be captured in the FRPMP.

As noted by Water NSW, care also needs to be taken during the drilling activity to ensure that the drill head for the HDD does not strike the pipeline. The precise depth and location of the pipeline where the transmission connection would cross it would be confirmed using non-destructive identification (NDI) methods. Once confirmed the proposed depth for the transmission connection where it passes under the pipeline would be discussed and agreed with Water NSW. The drill head to install the transmission connection would be drilled at least 4 metres below the pipeline, unless otherwise agreed with Water NSW and detailed in the FRPMP. Given the level of control provided by HDD contractors, the buffers and exclusions zones noted above would mean that it would highly unlikely that the pipeline would be struck during the installation of the transmission connection.

On this basis the following safeguards would be included within the FRPMP (refer to **Appendix B**, mitigation measure G4):

- The HDD drill rigs and the associated excavations would not be located within 5 m of the surface location of the Fish River Water Supply Pipeline.
- The transmission connection would be installed at least 4 metres below the Fish River Water Supply Pipeline unless agreed otherwise with Water NSW.

Damage from vibration and ground movement

The Water NSW submission outlines potential risks associated with vibration and ground movement. It notes that "*excavation methods must not trigger the maximum allowable limits set within the German Standard DIN 4150 – Part 3 - Structural Vibration Part 3: Effects of vibration in structures, when measured at Water NSW assets*".

The Noise and Vibration Assessment for the Project (provided as Appendix H of the EIS), provided an assessment of potential vibration impacts during construction including during installation of the transmission connection. Vibration intensive activities (e.g. jackhammers, pile driving, significant earthmoving), would not be used to install the transmission connection close to the pipeline. The HDD rigs required for the installation of the transmission connection beneath the pipeline would be located at least 5 m from the surface location of the underground pipeline unless agreed by Water NSW. The HDD rigs are not considered a vibration intensive activity and therefore the minimum set up distance from the pipeline means that cosmetic damage from vibration of this plant is unlikely.

The Water NSW submission noted support for the proposed mitigation measures presented in the EIS and requested that "*any identified risks to the Fish River water supply pipeline and proposed measures to mitigate those risks be included in the Construction Noise and Vibration Management Plan*". As noted above, Neoen are proposing to develop a management plan specific for the proposed works close to the Fish River Water Supply Pipeline (the FRPMP). Whilst damage to the pipeline from HDD vibration impacts are unlikely, this conclusion would be confirmed following the appointment of the HDD contractor and identification of the proposed HDD plant. On this basis the following safeguards would be included within the FRPMP (refer to **Appendix B**, mitigation measure G5):

- Unless otherwise agreed with Water NSW, the installation of the transmission connection must not trigger the maximum allowable limits set within the German Standard DIN 4150 – Part 3 - Structural Vibration Part 3: Effects of vibration in structures, when measured at the Fish River Water Supply Pipeline or another agreed location. Evidence of compliance with this measure would be documented within the FRPMP.
- If required, a vibration monitoring program or procedure would be developed and included within the FRPMP. As and where needed, this would include vibration monitoring requirements before and during drilling works at relevant transmission connection / pipeline intersection locations.

Electrification risks

The Water NSW submission outlines a number of potential risks to the pipeline if it was to be become electrified by the proposed transmission connection. Electrification of metal pipelines transferring water is a risk which can result from the placement of a transmission line adjacent to this type of pipeline. However, the composition of the pipeline at this stage is not confirmed, as following consultation with Water NSW, it remains unclear what works were completed on the pipeline during the 2017-2022 upgrades/ maintenance activities.

The outcomes of the non-destructive investigations would help confirm the location of the pipeline and potentially its composition at each point where the transmission connection is planned to pass beneath it. Once confirmed the electrification risk can be understood and mitigation developed.

The Warragamba Guideline outlines Water NSW's expectations for identifying and mitigating potential risks to personnel and water supply infrastructure. In line with the requirements of this guideline, the FRPMP would (refer to **Appendix B**, mitigation measure G6):

- Demonstrate how the Project would not present a safety risk to Water NSW personnel and would avoid damage to the Fish River Water Supply Pipeline and related infrastructure, including but not limited to risk from:

  - Earth Potential Rise (EPR) and step and touch potentials being above acceptable limits
  - Load current and Fault current Low Frequency Induction (LFI)
  - Capacitive coupling during storage, handling, and construction of pipeline
  - A.C. and D.C. Traction systems
  - Accidental contact of pipelines with other electrical systems such electrical distribution or traction systems.
- Confirm how the Project would not increase stray currents and where risk is identified, complete testing:
  - Prior to construction and energisation
  - Post construction and energisation
  - Under normal operational load conditions.
- Demonstrate how the requirements of *AS/NZS4853 Electrical Hazards on Metallic Pipelines* standard, would be addressed (where applicable)
- Demonstrate how the requirements of *AS 2832.1 Cathodic Protection of Metals, Part 1: Pipes and Cables* standard, would be addressed (where applicable)
- Confirm how future excavation and construction work planned by Water NSW would not be impeded by earthing grids of electrical infrastructure potentially related to the Project.
- Include a notification requirement to inform Water NSW of any new or altered electrical conditions within 1 km of Fish River Water Supply Pipeline related to the Project.

Neoen proposes that as part of the FRPMP, evidence would be presented to Water NSW to demonstrate that suitable design measures are in place to mitigate potential risks to the pipeline.

Access

The Water NSW submission requests that the Project be designed, constructed and operated in such a way that does not restrict Water NSW from operating and maintaining the pipeline and that consultation occurs regarding the proposed design.

Figure 4-4 shows the location of the proposed transmission connection alignment and the pipeline and its related infrastructure (the location of the pipeline and its related infrastructure was provided by Water NSW). The construction of the Project and specifically the transmission connection is unlikely to inhibit Water NSW from accessing the pipeline and related infrastructure. This conclusion is based on the location of the proposed and existing infrastructure and the proposed construction methodology. In addition provided the necessary risk assessments are completed and appropriate standards, controls and mitigation measures are employed, the operation of the Project would also not inhibit the operation and maintenance of the pipeline.

The approach to designing and constructing the transmission connection would be developed as the Project progresses and following completion of the non-destructive investigations, appointment of the HDD contractor and development of the detailed design. To ensure that Water NSW is involved in the design process and has the opportunity to comment, a commitment has been made to develop the FRPMP in consultation with Water NSW.

As executed plans

Water NSW has requested that Neoen provide "*the final 'works as executed plans' for the transmission corridor*". Neoen can confirm that these plans would be provided once the installation and commissioning of the transmission connection is complete (refer to **Appendix B**, mitigation measure G7).

4.3.3 Issue: Connection to local water supply

4.3.3.1 Issue

Water NSW note that it is their understanding that the Project will cart in potable water for the construction stage and connect to the local water supply network during operation. It was noted that LCC will need to be contacted to approve any connection to local potable water network.

4.3.3.2 Response

Neoen discussed the proposed connection to the local potable water network with Lithgow City Council on 11 July 2022 (refer to **Section 3.3.2**). For operation, it was confirmed that Neoen should follow the standard approach to connect the project to the Brays Lane potable water pipeline through the Council water connection process. Should the Project be consented, further discussions with Lithgow City Council regarding this connection would be undertaken.

4.4 Environment Protection Authority (EPA)

The NSW Environment Protection Authority (EPA) have provided a submission in response to the public exhibition of the EIS. All issues raised in the EPA submission are summarised below and addressed respectively.

4.4.1 Issue 1: Environment Protection Authority Licencing

4.4.1.1 Issue

The EPA have noted that the EIS has contrasting statements between page 2 and Section 5.4.4 where the Project is described as "*the purpose of the project is to store energy in chemical form and generate electrical energy on demand in discharge mode*" and "*the project does not involve the generation of electricity*" as the "*project stores and releases electricity that has already been generated*". Further contrasts are made during discussion of the SEPP (Infrastructure) where references to electricity generation are made.

Recommendations from the EPA include:

- The EPA recommends that clarification be made on whether the Great Western Battery Project is defined as electricity generating works or not for the purposes of the POEO Act.

4.4.1.2 Response

The Project does not generate electricity; it stores it and releases it at periods of high demand or when required. Within the statutory context section of the EIS, the Project is described as 'electricity generating works'. This is because the EP&A Act, through the Environmental Planning Policy (Transport and Infrastructure) 2021 (SEPP (Transport and Infrastructure)), defines 'electricity generating works' as "*a building or place used for the purpose of:*

a. Making or generating electricity, or

b. Electricity storage.[4]

As such, SEPP (Transport and Infrastructure) allows for electricity storage infrastructure (such as the Project) to seek development consent under the 'electricity generating works' land use category.

However, the Project does not generate electricity (and indeed releases approximately 15% less energy than is captured from the network) and does not meet the specifications laid out in *Protection of Environmental Operations Act 1997* (NSW) (POEO Act) as 'electricity generating'.

For the purposes of the POEO Act, the Project is not listed as a scheduled activity, as electrical storage is not listed within the electricity generation definitions under this schedule. Therefore, an EPL is not required. The EPA team agreed with this conclusion at a meeting on 19 May 2022 (refer to **Section 3.3.2**).

[4] Refer to Section 2.35 of SEPP (Transport and Infrastructure): https://legislation.nsw.gov.au/view/html/inforce/current/epi-2021-0732#sec.2.35

4.4.2 Issue 2: Heating, ventilation, and air conditioning units

4.4.2.1 Issue

The EPA have noted that cooling water will be utilised within the heating, ventilation, and air-conditioning unit (HVAC) systems. The EPA request further information regarding the HVAC system, including the associated volumes, handling, storage, treatment, and or disposal of the cooling water.

4.4.2.2 Response

The HVAC system is a cooling system for batteries to prevent overheating. Each Megapack 2 is characteristic of the following elements:

- Contains 360 L of 50/50 mixture ethylene glycol and water as the cooling agent
- Contains a fully closed-loop thermal management system
- Requires coolant level checks during annual service, with coolant replacement approximately every 10 years.

There would be limited quantity of coolant stored on site for servicing purposes. All ongoing maintenance of the HVAC systems would be managed through contracts with the supplier. Coolant would be disposed of as necessary by the maintenance contractor. Spillages would be contained within the battery enclosures. During operation of the Project, spill kits would be located close to locations where chemicals, fuels, oils etc. are stored. Chemicals including, fuels, oils and cooling agent would be managed in accordance with relevant EPA guidelines, including *Storing and Handling Liquids: Environmental protection, participant's manual* (NSW EPA, 2007).

4.4.3 Issue 3: Noise impact assessment

The EPA have provided detailed comments on the Noise Impact Assessment undertaken as part of the Project EIS. These comments have been separated below in order to provide focused responses.

4.4.3.1 Issue: Noise Monitoring

The EPA have commented that the noise levels at Location 1 during the evening periods on the 13 and 15 March 2021 are significantly higher than all other periods. The RBLs recorded on these days are 47 and 50 dB, which is more than 10 dB above the next highest measured evening RBL. The EPA raised concern that this may suggest that they are not representative of long-term background noise level trends and should not be included in the calculation of the RBL. The EPA further notes that that unless the applicant can demonstrate that RBLs of this level occurs consistently all year round, they should be considered extraneous and not included in the calculation of the RBL.

Concern was raised the monitoring at Location 2 at 113 Brays Lane, Wallerawang does not appear to have enough valid periods, however since the minimum RBLs have been used, it does not affect the outcome of the assessment and no further comment is made on this by the EPA. In addition, it was noted that the monitoring at Location 3 at 29 Cripps Ave, Wallerawang does not appear to have enough valid data as Table 2-2 shows that only four valid periods were measured out of a minimum of 21 periods (7 days valid data). However, in Table 4-1, the intrusive level for the evening has been set at 35 dBA.

Recommendations provided by the EPA regarding this issue include:

- Additional data is provided to demonstrate these measurements are representative of long-term levels with sufficient valid data
- Or the minimum RBL of 30 dBA should be used for Locations 1, 2 and 3.

4.4.3.2 Response

173 Brays Lane, Wallerawang (R2)

Environmental noise measurements have been conducted at 173 Brays Lane, Wallerawang (R2) on a number of occasions. The results of the measurements conducted by AECOM in March 2021 and obtained from Hatch report *Proposed Lidsdale Siding Upgrade Project Environmental Noise Impact Assessment report reference H-338807 Rev 3 dated 14 August 2012* are presented in **Table 4-7** below.

Table 4-7 Existing background noise measurement results for 173 Brays Lane, Wallerawang

Measurements	Rating Background Noise Level (RBL), dB(A)		
	Day[1]	Evening[1]	Night[1]
4-17 March 2021[3]	35 (33)[2]	33 (Daily L_{A90} range 30-53)	30 (29)[2]
29 May – 12 June 2008[4]	43	43 (Daily L_{A90} range 36-48)	40
9-22 September 2011[4]	39	42 (Daily L_{A90} range 38-51)	44
4-5 January 2012[4]	40	40 (Daily L_{A90} range 40-40)	46

Notes:

1. *Day: 7am to 6pm (Monday – Saturday) and 8am to 6pm (Sunday and Public holidays); Evening: 6pm to 10pm; Night: 10pm to 7am (Monday – Saturday) and 10pm to 8am (Sunday and Public holidays)*
2. *Where the rating background level is found to be less than 35 dB(A) during the daytime then it is set to 35 dB(A). Where is it found to be less than 30 dB(A) during evening or night-time then it is set to 30 dB(A) in accordance with NSW NPfI*
3. *Measurements conducted by AECOM for the Great Western Battery Project*
4. *Measurement results obtained from the Hatch report Proposed Lidsdale Siding Upgrade Project Environmental Noise Impact Assessment report reference H-338807 Rev 3 dated 14 August 2012*

The EPA has noted that the measurements conducted by AECOM in March 2021 include periods of increased noise levels during the evening on some days (13 and 15 March). Similar increases in the evening period can be seen in the graphical measurement results presented in Appendix C1 and C2 of the Hatch report for May 2008 and September 2011 respectively. It is noted that the other measurements detailed in the Hatch report are undertaken during different seasons of the year.

The Wallerawang Power Station was in operation during the 2008, 2011 and 2012 noise measurements and has since been decommissioned. The operation of the power station is likely to have influenced the measured noise levels for those dates. The power station was coal powered and would therefore have had a steady production rate with a steady associated noise levels. It would not have had a significant increase of noise emission over a short period of time and therefore is not likely to be responsible for the sharp increase in noise levels identified during the evening period.

The existing Lidsdale Siding coal loading facility is in close proximity to R2 (173 Brays Lane, Wallerawang), approximately 300 metres to the south east. The coal loading facility operates 24 hours a day, with intermittent operation of the coal conveyor throughout the day and evening. AECOM project personnel who have visited the Site have confirmed that these sharp increase in noise levels are due to the operation of the existing coal loader.

It is therefore considered that coal loading facility is responsible for the increased evening noise events.

In addition to the above, the evening RBL determined from the March 2021 results, inclusive of the high noise events, is substantially, lower than previously determined RBLs for the same location. This will result in more conservative evening project noise trigger level for the Project than other previous developments in the vicinity.

With consideration of the above, the noise events are deemed to not be extraneous but part of the existing noise environment at the receiver and therefore are not required to be excluded from the noise measurement results when determining existing levels and project specific noise levels.

29 Cripps Lane, Wallerawang

It is noted that the intrusive level for the evening was set at 40 dB(A) for Location 3 at 29 Cripps Avenue, Wallerawang. Given the distance from the BESS facility to this location (approximately 1 kilometre), compliance would be achieved if the evening intrusive level was set at 35 dB(A), based on a minimum RBL of 30 dB(A).

4.4.3.3 Issue: Project noise trigger levels

The EPA note that the project noise trigger levels provided in the EIS would need to be reviewed and amended accordingly following the resolution of the matters raised on the RBLs.

4.4.3.4 Response

Based on the discussion presented in **Section 4.4.3.2** the project noise trigger level for Location 1 have not be amended.

Based on the discussion presented in **Section 4.4.3.2** the project noise trigger level for Location 3 could be amended to 35 dB(A) during the evening period.

The predicted noise levels at NCA3, as a result of the Project, are substantially less than 35 dB(A) during the evening period. The reduction in the project noise trigger level would not result in non-compliance at this location.

4.4.3.5 Issue 3.3: Annoying characteristics

The EPA noted that it is unclear how the annoying characteristics were assessed as the NVIA in the EIS does not demonstrate that the procedure in the NPfl Fact Sheet C has been followed. It was further noted that assessment is limited to only the closest receiver and does not indicate impacts to all other receivers.

Recommendations provided by the EPA regarding this issue include:

- Calculations and data used to support the NVIA's conclusions that no annoying characteristics are present
- Review and confirmation appropriate NPfI methods were followed need to be provided.

4.4.3.6 Response

Table 4-8, Table 4-9, Table 4-10and **Table 4-11** show the spectral results at the receivers during evening and night-time operation of the Project during neutral and noise enhancing meteorological conditions.

Table 4-8 Evening – neutral meteorological conditions spectral results at receivers

Address	Evening worst case Unweighted noise level (dB)																	Overall levels	
	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1000 Hz	1250 Hz	1600 Hz	2000 Hz	2500 Hz	3150 Hz	4000 Hz	5000 Hz	dB(A)	dB(C)
R1 - 233 Brays Lane	44	40	38	37	42	31	29	34	32	31	27	29	24	24	19	18	14	3	40	48
R2 - 173 Brays Lane	45	40	38	37	42	32	28	32	30	29	26	28	24	24	20	21	18	12	39	49
R3 - 137 Brays Lane	45	41	40	37	43	29	27	32	30	29	25	27	23	23	19	20	17	10	39	49
R4 - 113 Brays Lane	39	35	34	30	36	22	21	26	24	23	20	22	18	17	12	12	8	-	33	43
R5 - 91 Brays Lane	36	32	30	27	33	19	18	24	21	20	16	17	12	11	5	4	-	-	30	41

Table 4-9 Evening – noise enhancing meteorological conditions spectral results at receivers

Address	Evening worst case Unweighted noise level (dB)																	Overall levels	
	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1000 Hz	1250 Hz	1600 Hz	2000 Hz	2500 Hz	3150 Hz	4000 Hz	5000 Hz	dB(A)	dB(C)
R1 - 233 Brays Lane	46	41	40	39	44	33	31	36	34	33	29	31	27	26	21	22	18	7	42	50
R2 - 173 Brays Lane	46	41	39	38	43	33	29	33	31	30	27	29	26	26	22	23	21	14	40	50
R3 - 137 Brays Lane	46	42	41	38	44	30	28	34	31	30	27	29	26	26	21	23	21	13	41	50
R4 - 113 Brays Lane	41	37	35	32	38	24	23	29	27	25	22	24	20	20	15	16	12	2	35	45
R5 - 91 Brays Lane	39	35	33	31	36	22	23	28	26	23	20	21	16	15	9	9	4	-	33	43

Table 4-10 Night – neutral meteorological conditions spectral results at receivers

Address	Night worst case Unweighted noise level (dB)																		Overall levels	
	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1000 Hz	1250 Hz	1600 Hz	2000 Hz	2500 Hz	3150 Hz	4000 Hz	5000 Hz	dB(A)	dB(C)
R1 - 233 Brays Lane	46	43	45	37	33	33	29	27	25	24	25	23	17	20	13	9	8	-	37	50
R2 - 173 Brays Lane	47	43	45	38	33	33	28	26	23	22	23	22	16	20	14	12	12	2	37	50
R3 - 137 Brays Lane	47	44	46	38	34	31	27	26	24	22	23	22	16	20	13	11	11	1	37	51
R4 - 113 Brays Lane	41	38	40	31	27	24	21	20	18	16	18	16	10	14	6	3	3	-	31	45
R5 - 91 Brays Lane	39	36	38	28	24	22	20	18	16	14	15	12	6	9	-	-	-	-	29	43

Table 4-11 Night – noise enhancing meteorological conditions spectral results at receivers

Address	Night worst case Unweighted noise level (dB)																		Overall levels	
	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1000 Hz	1250 Hz	1600 Hz	2000 Hz	2500 Hz	3150 Hz	4000 Hz	5000 Hz	dB(A)	dB(C)
R1 - 233 Brays Lane	48	45	47	39	35	34	31	30	27	26	27	25	20	23	15	13	13	-	39	52
R2 - 173 Brays Lane	48	44	46	39	33	34	29	27	24	23	24	23	18	22	16	14	15	5	38	51
R3 - 137 Brays Lane	49	45	47	39	35	32	28	27	25	23	24	23	18	22	15	14	14	4	39	52
R4 - 113 Brays Lane	43	40	42	33	29	26	23	22	20	18	20	18	13	16	9	7	7	-	33	47
R5 - 91 Brays Lane	41	38	40	31	27	25	23	21	19	17	17	15	8	12	3	-	-	-	31	45

From **Table 4-8, Table 4-9, Table 4-10** and **Table 4-11** it can be seen that during these periods, under neutral and noise enhancing weather conditions, nearby receivers are not subject to “annoying characteristics” such as tonality or dominant low-frequency content. The sources at the facility are not intermittent during the night-time period. Therefore, no correction is considered necessary in accordance with Fact Sheet C of the *Noise Policy for Industry* (NPfI) (NSW EPA, 2017).

4.4.3.7 Issue: Noise mitigation

The EPA submission noted that the Noise Impact Assessment (NVIA) report for the EIS provides a clear and informative report of the considered mitigation measures. The EPA welcomes this type of presentation of mitigation investigations.

However, the EPA commented that there is no discussion of methods to lower noise emissions/reducing operations at night. As there are exceedances of the PNTLs of up to 4 dB during the night, and whilst it appears a lower sound power level was used for the night period, the investigation and assessment of mitigation for the night period should be provided and clarified.

The EPA note an example mitigation used by other BESS systems including to reduce fan duty to 20% at appropriate periods with estimated reductions in the region of 14 dB.

Further comment from the EPA notes that in the EIS Figure 4-1 and NIA report Figure 2-1, the noise walls have openings/gaps in their southern ends. After reviewing the location of the BESS relative to the receivers, it appears that these openings are in the same direction as the receivers, which appears to have the potential to reduce the effectiveness of the barriers.

Recommendations provided by the EPA regarding this issue include:

- Within the noise mitigation, there should be mention of what causes the difference in day/night sound power levels for the battery packs, what specific night-time measures have been considered and if controlling fan duties was included as part of the mitigation considerations.
- Provide an explanation and justification for the barrier design features (with gaps facing receivers) or provide an alternative design with improved mitigation performance.

4.4.3.8 Response

The reduction in sound power level for the Tesla Megapack during the night-time period is due to a lower fan duty. Fan duty cannot always be reduced in the evening period due to high customer demand for power during the early evening period in particular. Therefore, the noise impact assessment is considered to be representative of the likely operating conditions.

The openings in the noise walls, which are required for maintenance access would be sliding doors, and would be acoustically similar to a continuous wall. An updated figure reflecting this situation is shown below in **Figure 4-5**.

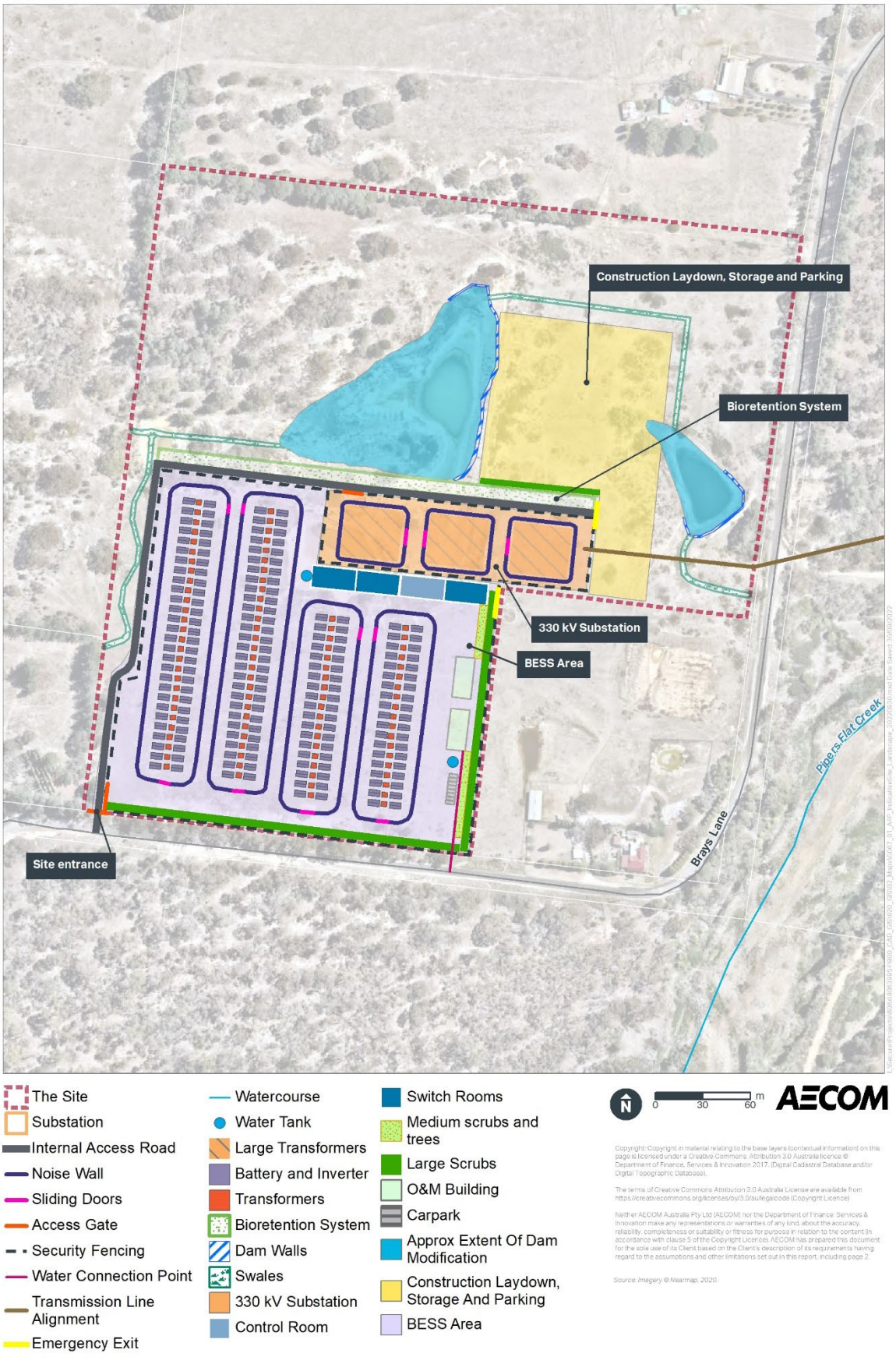


Figure 4-5 Site Layout updated to reflect sliding access doors

The predicted noise levels for Noise enhancing meteorological conditions (adverse) and Standard meteorological conditions (neutral) at each sensitive receiver during operation of the Project, are presented in **Table 4-12**. These results have been taken from Table 13-18 and 13-19 of the EIS and represent the worst-case operational scenario if all doors within the proposed noise walls are open.

Table 4-12 Noise levels at sensitive receivers as reported in the EIS

Receiver	Day/Evening		Night	
	Neutral	Adverse	Neutral	Adverse
R1 - 233 Brays Lane	40	42	37	39
R2 - 173 Brays Lane	39	40	37	38
R3 - 137 Brays Lane	39	41	37	39
R4 - 113 Brays Lane	33	35	31	33
R5 - 91 Brays Lane	30	33	29	31

The operational noise model was updated to include sliding access doors in place of noise wall openings, to reflect the design shown in **Figure 4-5**. The adjusted adverse (Noise enhancing meteorological conditions) and neutral (Standard meteorological conditions) noise conditions at each sensitive receiver during operation of the Project, is presented in **Table 4-13**. This is reflective of the standard operation of the BESS where all sliding doors within the proposed noise walls are closed. In this scenario there is no change in impact to any assessed receivers with the exception of R1 - 233 Brays Lane. Under standard operating conditions of the BESS, this receiver would experience reduced noise impacts across the day, evening and night periods, compared with the adverse scenario detailed above when all sliding doors are open.

Table 4-13 Adjusted noise levels at sensitive receivers after the inclusion of sliding access doors in the noise walls

Receiver	Day/Evening		Night	
	Neutral	Adverse	Neutral	Adverse
R1 - 233 Brays Lane	38	40	36	38
R2 - 173 Brays Lane	39	40	37	38
R3 - 137 Brays Lane	39	41	37	39
R4 - 113 Brays Lane	33	35	31	33
R5 - 91 Brays Lane	30	33	29	31

The inclusion of the sliding doors into the noise model has reduced the anticipated noise impacts for the sensitive receiver at R1 - 233 Brays Lane. Instead of an exceedance of 4dBA as noted in the EIS, there is now a reduced exceedance of 2dBA at this location. The updated anticipated noise impacts of the Project operation are presented in **Figure 4-6, Figure 4-7, Figure 4-8** and **Figure 4-9** for each time of day and meteorological scenario.

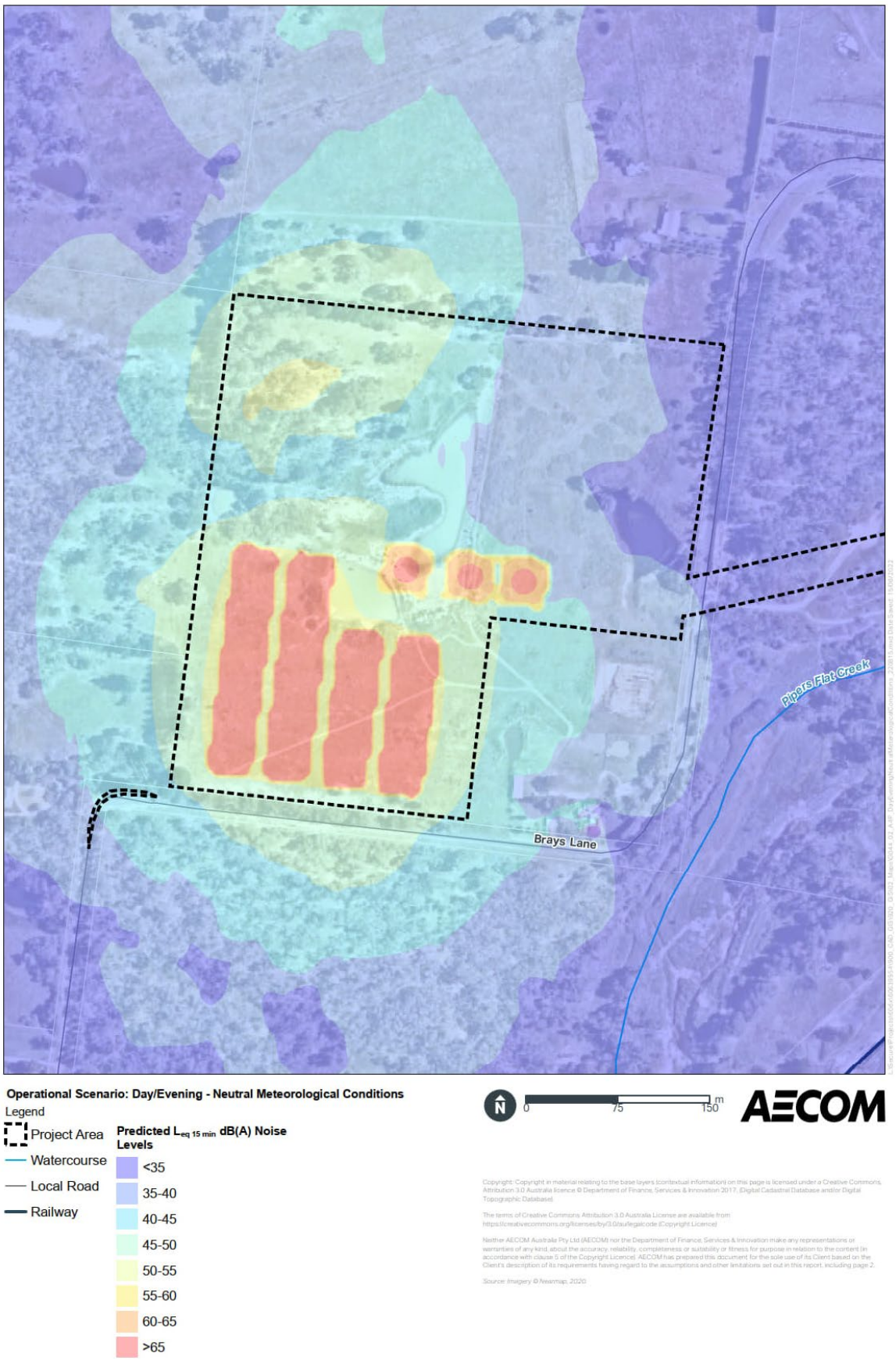


Figure 4-6 Operational noise impacts during the day / evening under neutral meteorological conditions

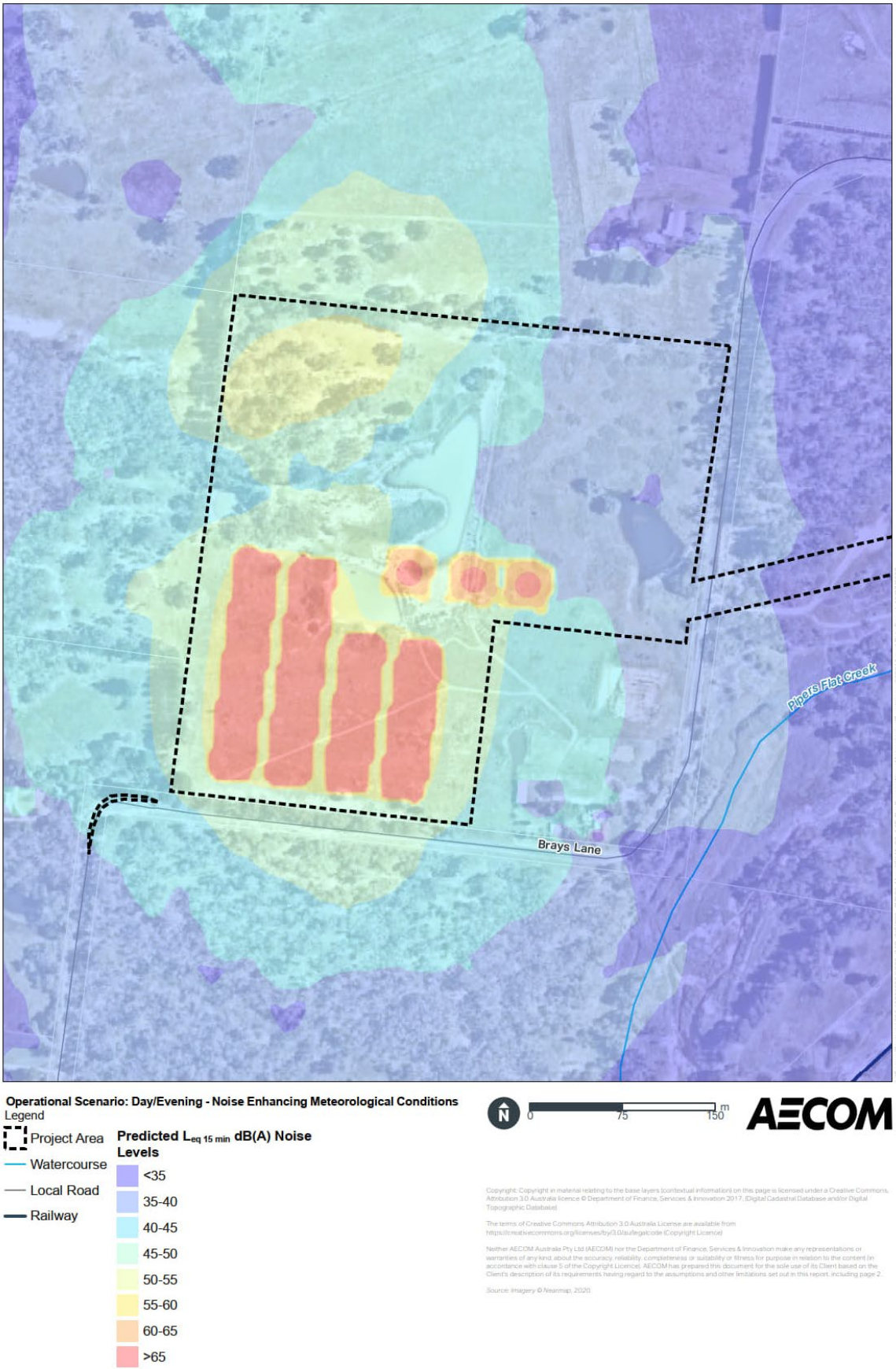


Figure 4-7 Operational noise impacts during the day / evening under adverse meteorological conditions

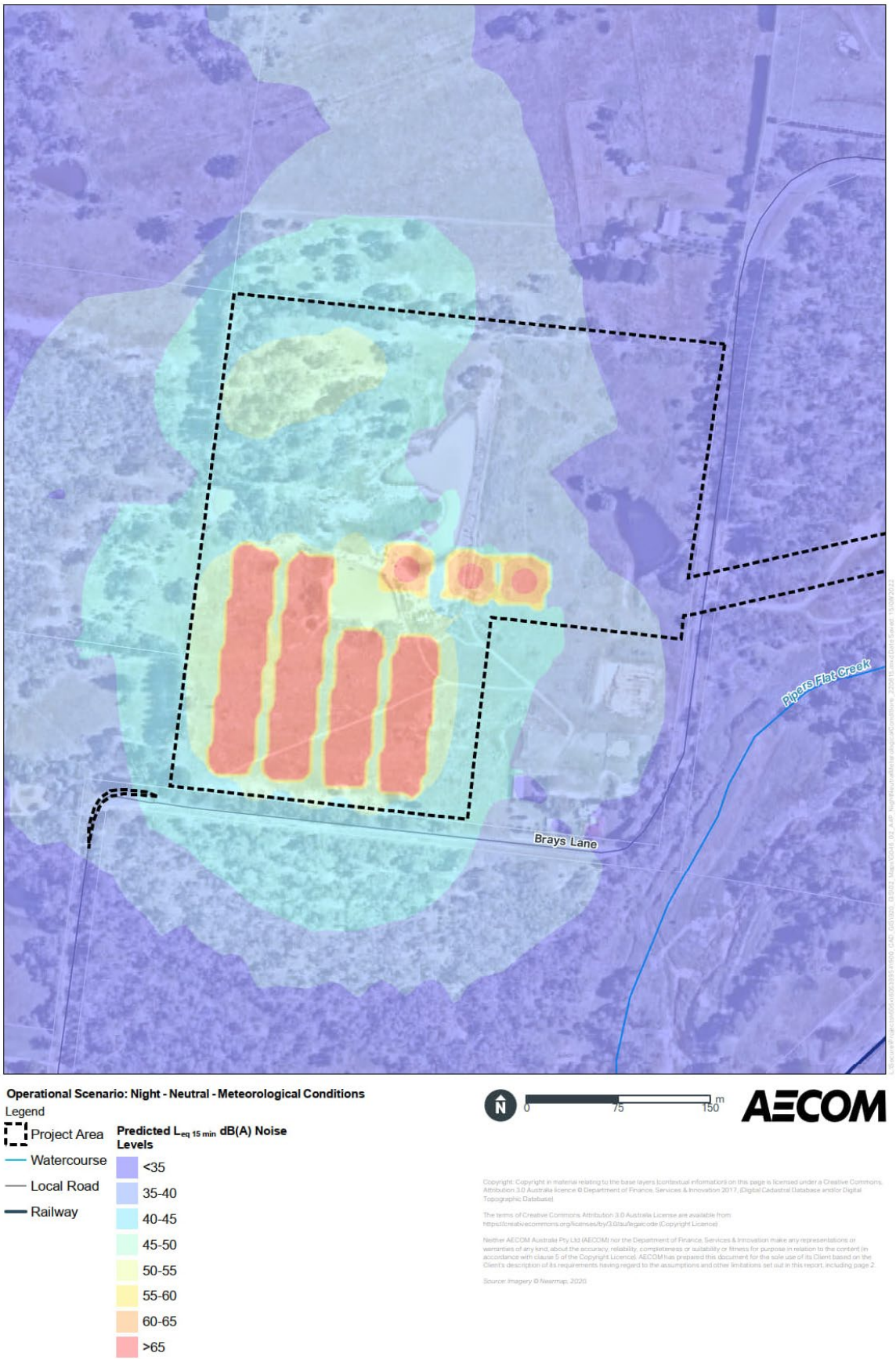


Figure 4-8 Operational noise impacts during the night under neutral meteorological conditions

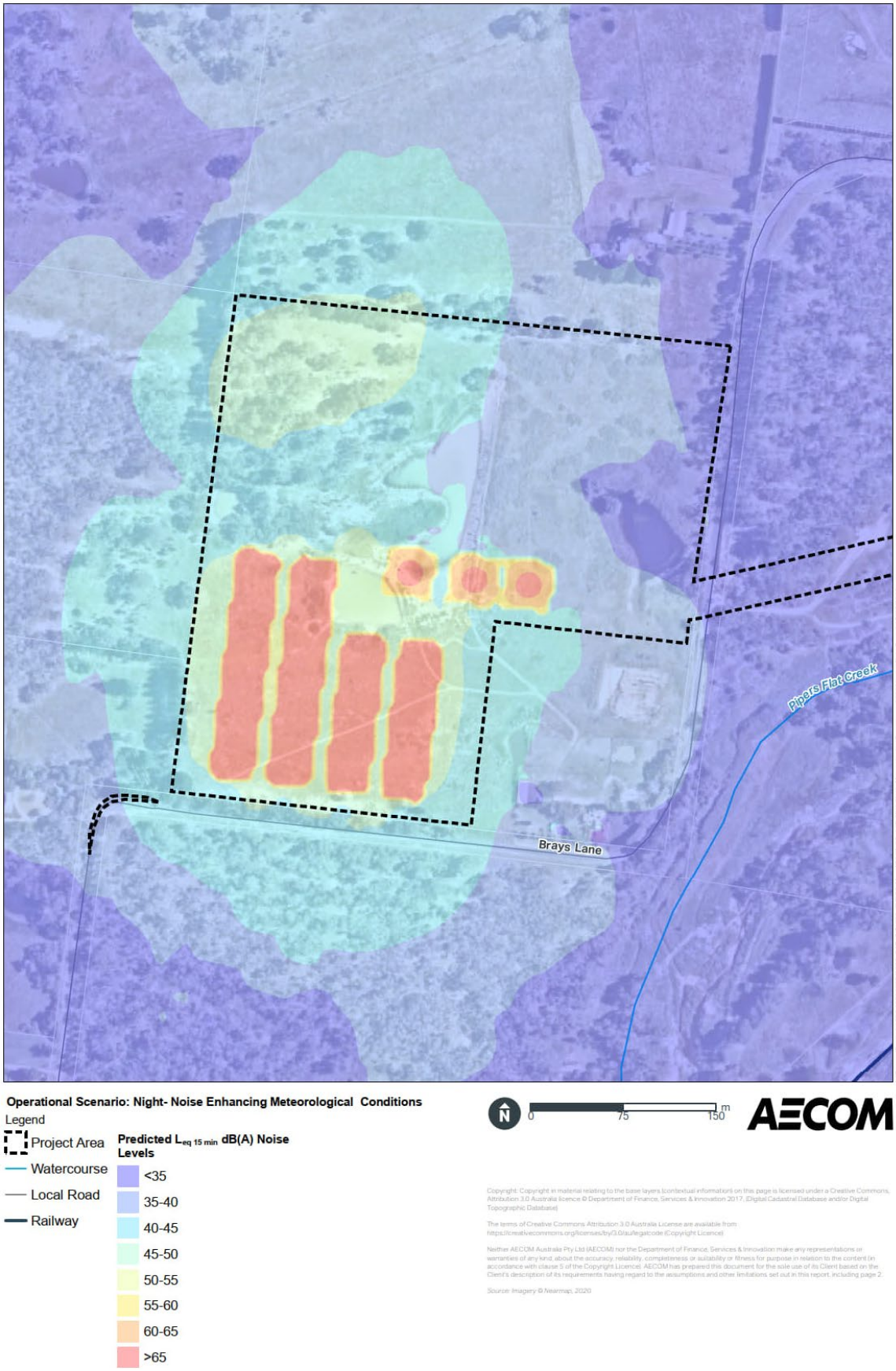


Figure 4-9 Operational noise impacts during the night under adverse meteorological conditions

4.4.3.9 Issue: Outcomes and impacts

The EPA noted that the EIS identified noise levels up to 4 dB above the PNTLs during the day, evening and night at three existing residential receivers near the proposed BESS. The EPA note that these predicted impacts are with extensive mitigation works proposed, including significant structures in 10 m noise walls with an acoustic absorptive lining and lower noise equipment selected.

The NPfI classifies these residential impacts as a moderate impact and suggests that at-property treatment may be used to assist in reducing impacts.

Recommendations provided by the EPA regarding this issue include:

- DPE carefully consider the outcomes of the noise assessment and the risk of additional impacts, considering the already high degree of mitigation applied to the proposed operations and the potential uncertainty regarding equipment sound power levels indicated.

4.4.3.10 Response

The sound power levels used in the noise impact assessment are understood to be representative of the equipment likely to be installed based on Neoen's experience with similar facilities. However, the inclusion of the sliding doors into the noise model has reduced the anticipated noise impacts for the sensitive receiver at R1 - 233 Brays Lane. Instead of an exceedance of 4dBA as noted in the EIS, there is now a reduced exceedance of 2dBA at this location. Agreements with potentially affected sensitive receivers are discussed in **Section 4.1.3**.

4.5 Transport for New South Wales (TfNSW)

TfNSW have provided a submission in response to the public exhibition of the EIS. All issues raised in the TfNSW submission are summarised below and addressed respectively.

4.5.1 Issue 1: Traffic impact assessment

4.5.1.1 Issue

TfNSW noted that limited information is provided in relation to OSOM, heavy and light vehicle routes apart from the proposed access points to the site from the Great Western Highway and Castlereagh Highway. Clarification is required on the proposed routes to and from the site for construction vehicles, i.e., where will construction materials and equipment be sourced, details are required on the proposed origin to destination routes.

TfNSW note that consideration should be given to the timing and impacts of works occurring as a part of the demolition of the Wallerawang Power Station on the proposed scheduling of the works proposed of the Project.

4.5.1.2 Response

Confirmation of light vehicle and heavy vehicle routes

Neoen have reviewed the likely source locations for the light vehicles and heavy vehicles for the Project. Light vehicles would predominantly include workers moving to and from the Site. Heavy vehicles would be used for the delivery of plant, project components and fill and the removal of waste.

Light and heavy vehicles movements are predominantly likely to originate from the south of Wallerawang as this is where the majority of the larger local and regional population centres are located and where key construction materials are also imported, created or stored. It is likely that the majority of the contractors would be sourced from locations to the south and east around Lithgow and potentially beyond to Sydney, although opportunities for local contractors would be pursued where these resources are available. It is also possible that a small number of workers may approach Wallerawang from the west, from towns such as Bathurst. Contractors may approach Wallerawang from the north but the low population centres in this direction mean that the number of light vehicle movements is

expected to be very low[5]. Contractors may choose to stay locally in Wallerawang or at other locations where accommodation exists nearby such as Lithgow.

Given that the majority of the light and heavy vehicles are likely to approach Wallerawang from the south, it is expected these vehicles would use the Great Western Highway and Castlereagh Highway to approach the township and enter the township via the Main Street / Castlereagh Highway intersection. Fewer vehicles are expected to arrive from the west and those that do could potentially use the Barton Avenue / Great Western Highway intersection.

During peak construction (approximately two months) up to 200 workers and up to 20 heavy vehicles could attend Site per day. Options are being explored with Lithgow City Council to have a single or a number of shuttle bus drop off / pick up locations within Wallerawang which would reduce the number of workers directly accessing the Site. Nevertheless, assuming that all workers arrive at Wallerawang in their own vehicles, this could result in 200 light vehicles movements into the Site in the morning and exiting the Site in the afternoon and 20 heavy vehicle movements spread across the workday in both directions moving through predominantly the Main Street / Castlereagh Highway intersection.

A recent traffic assessment (Arcadis, 2022) confirmed that based on a 2021 traffic survey, background peak hours on the Castlereagh Highway around the Main Street / Castlereagh Highway intersection occurred at 7:45 – 8:45 for the AM peak hour and 15:15 – 16:15 for the PM peak hour. It also concluded that the section of Castlereagh Highway to the south of the Main Street intersection had considerable surplus roadway capacity over the 2022, 2023 and 2024 years. In summary there is expected to be:

- A surplus roadway capacity of 79% in the AM peak hour and 72% in the PM peak hour conditions in 2022
- A surplus roadway capacity of 79% in the AM peak hour and 71% in the PM peak hour conditions in 2023
- A surplus roadway capacity of 78% in the AM peak hour and 70% in the PM peak hour conditions in 2024.

For the intersection of Castlereagh Highway / Main Street, total traffic counts for AM and PM peaks, per hour are presented in **Table 4-14**.

Table 4-14 Total Traffic Counts Per Hour at Castlereagh Highway / Main Street Intersection

Street	AM Peak (Number of vehicles per hour)	PM Peak (Number of vehicles per hour)
Castlereagh Highway	286	397
Main Street	61	88

The TIA for the Project (refer to Appendix I of the EIS) completed midblock capacity assessments for interrupted flow facilities and uninterrupted flow facilities using the *Austroads Guide to Traffic Management – Part 3: Traffic Studies and Analysis Methods*. The theoretical capacity of the Castlereagh Highway and Great Western Highway per available lane was calculated. Based on the results, the mid-block capacity would be in the excess of 2,200 pc per hour per traffic lane for the Castlereagh Highway and 3,100 pc per hour per traffic lane for the Great Western Highway. Noting the Great Western Highway is a 2-lane carriageway in each direction near Wallerawang, the capacity here would be greater. The assessment of Castlereagh Highway and Great Western Highway for both interrupted flows indicate that a conservative peak hour mid-block capacity would be 900 pc per hour and 2,400 respectively, in each direction.

The existing year 2021 traffic volumes, as estimated on the Castlereagh Highway east of Wallerawang town centre near the Site, is estimated between 85 to 352 vehicles during the AM or PM peak hour for

[5] A population distribution analysis was completed as part of the Wallerawang Battery Energy Storage System – Transport Impact Assessment Report (Arcadis, 2022) that supports this conclusion. Found here: https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=EXH-36136549%2120220504T031430.633%20GMT

each direction. For the Great Western Highway existing year 2021 traffic volumes have been estimated between 911 to 2,328 vehicles during the AM or PM peak hour for each direction.

As such, both the Castlereagh Highway and the Great Western Highway have sufficient capacity to accommodate current traffic flows observed on the road. In addition, the Castlereagh Highway/Main Street and Great Western Highway/Barton Avenue intersections provide existing Channelised Right Turn (CHR) and Channelised Left Turn (CHL) treatments. These treatments and the available capacity mean that these intersections are fit for purpose for use by the Project construction traffic, as agreed with TfNSW. Therefore, it was concluded that intersection modelling is not required to assess road network performance. In addition, as the peak hour mid-block capacity of Castlereagh Highway and Great Western Highway (in each direction) is over 2400 pc per hour, and over 3100 pc per hour, respectively, there would be sufficient capacity to accommodate the construction traffic on these roads.

The movement of Project workers from the south and east (and to a lesser extent the west) to Wallerawang is likely to occur along the Great Western Highway and Castlereagh Highway. As demonstrated above there is considerable roadway capacity along the Castlereagh Highway during the AM and PM peak hours and as such this capacity would be available at other times.

The proposed construction hours for the Project are 7.00 am to 6.00 pm Monday to Friday and 8.00 pm to 1.00 pm on Saturdays with no work on Sundays or Public Holidays. On this basis it is likely that workers associated with the Project would be arriving in Wallerawang prior to the Castlereagh Highway AM peak and leaving after the PM peak. The temporary addition of 200 light movements largely outside of these peak hours would be able to be accommodated on the Castlereagh Highway given the roadway capacity identified above. In addition, the movements of 20 heavy vehicles throughout the workday in each direction would add approximately two heavy vehicle movements to the major road network per hour in each direction. It is therefore unlikely that the peak construction traffic from the Project would significantly impact the operational performance of the relevant intersections and major roads. Traffic safety at these intersections would also be unlikely to be impacted given that the Main Street / Castlereagh Highway intersection and the Barton Avenue / Great Western Highway intersection have the highest intersection treatment available with dedicated right hand and left hand turn lanes.

As discussed above, options are being explored with Lithgow City Council to establish one or more locations within Wallerawang for shuttle bus drop off / pick up points for the Project. Potential locations were discussed with Council at a meeting on 11 July 2022 (refer to **Section 3.3.2**). It was agreed that the preferred locations would be in Wallerawang so that the town could benefit from contractors passing through and supporting the local economy. Discussions will continue with Lithgow City Council so that suitable shuttle bus pick up and drop off locations within the town can be identified. Neoen would communicate to all staff that the Main Street parking would not be used for employees being shuttled to site, The shuttle bus locations will be determined in consultation with Lithgow City Council and included in the Traffic Management Plan. Lithgow City Council has been consulted and supports this approach.

Confirmation of OSOM vehicle routes

As detailed in the EIS, OSOM vehicles would be used for the delivery of larger prefabricated Project components such as high voltage transformers and control rooms. Up to eight OSOM vehicles may be required to access the Site during construction. The movement of these vehicles was investigated by Rex J Andrews – Engineered Transportation and a Route Study Report was prepared (2022) and included as Appendix I (b) to the EIS. The conclusions in the Route Assessment Report are based on the successful implementation of the transportation of oversized and overmass elements during the recent decommissioning of the Wallerawang Power Station, as investigated and recommended by Rex J Andrews Engineered Transportation.

Two possible routes for the movement of OSOM were assessed and included in the EIS. These were:

- Port of Newcastle to Wallerawang: 471 km. All proposed Project components would be able to be transported. The route would pass along the following roads: Selwyn Street, George Street, Industrial Drive, Maitland Road, New England Highway, John Renshaw Drive, Hunter Expressway, Golden Highway, Castlereagh Highway, Main Street, Pipers Flat Road, Brays Lane.
- Port Kembla to Wallerawang: 217 km. Loads would be limited to 5 m in height and 80 T in weight. The route would pass along the following roads: Tom Thumb Road, Springhill Road, Masters

Road, Southern Freeway, Mt Ousley Road, Picton-Wilton Road, Hume Highway, M5, M7, M4, Great Western Highway, Castlereagh Highway, Main Street, Pipers Flat Road, Brays Lane.

Both routes are shown on figures provided in the Route Study Report (Appendix I (b) to the EIS).

Both routes were identified as acceptable routes for the OSOM vehicles required for the Project in the Route Study Report with some limitations on the route from Port Kembla. A further review of the routes has confirmed that:

- The proposed oversized / overmass vehicles could safely travel from the Port of Newcastle to the Main Street / Pipers Flat Road intersection with no specific controls except for:
  - Further consultation with the rail authority would be required where the vehicle needs to pass over a rail crossing or rail bridge
  - OSOM vehicles should avoid travelling through Mudgee on schooldays between 7.00 am to 10.00 am and 2.00 pm and 4.30 pm
  - A spotter may be required where the OSOM vehicles move from Market Street onto Douro Street in Mudgee.
- The proposed oversized / overmass vehicles could safely travel from Port Kembla to the Main Street / Pipers Flat Road intersection however:
  - The vehicles would be limited to 5 m in height and 80 T in weight
  - On the Great Western Highway at Mount Victoria, Victoria Pass and around the River Lett crossing additional support from a pilot or the police may be required.
- Certain controls would be required for the movement of the vehicles from the Main Street / Pipers Flat Creek Road intersection to the Site (as detailed in Section 14.4.1 in the EIS and noted in Management and Mitigation Measure T2).

Provided the necessary controls are agreed and implemented prior to the movement of the OSOM vehicles, potential traffic and transport impacts are unlikely.

Measures to mitigate potential traffic and transport impacts would be contained within a Traffic Management Plan (TMP) for the construction phase of the Project. Mitigation and management measures T1 and T2 commit to producing a Construction TMP and present a number of measures that would be included in the plan. Measure T2 has been updated to include a requirement to ensure where the TMP details the measures that would control the movements of OSOM vehicles, that the guidance outlined by TfNSW regarding Over Size and Over Mass Heavy Vehicles and Loads (TfNSW, 2020) is followed.

Demolition of the Wallerawang Power Station

Work on decommissioning the Wallerawang Power Station started in December 2014 (Energy Australia, 2015). The demolition and remediation of Wallerawang Power Station was proposed to occur over two years, beginning in the first quarter of 2021 (EMM, 2020). In 2021, Liberty Industrial were engaged to undertake demolition works at the Wallerawang Power Station. In February 2021, Liberty Industrial prepared a Rehabilitation Management Plan for the Wallerawang Power Station Demolition project (Liberty Industrial, 2021). This document confirms that the demolition of the Wallerawang Power Station would commence in early 2021 and take 2 years to complete.

The Great Western Battery Project was expected to begin construction in the last quarter of 2022, however it is more likely that construction would now commence in late 2023. If construction started towards the end of 2022 there may be potential for construction of the Project to overlap with the end of the demolition and remediation works at Wallerawang Power Station. However, given Wallerawang Power Station project would be in the final remediation phase of the works and would be unlikely to involve the removal of large quantities of demolished materials from the Wallerawang Power Station, it is unlikely a significant amount of construction traffic would be generated during this phase of Wallerawang Power Station demolition project.

A traffic management plan was also prepared for the Wallerawang Power Station demolition that demonstrates Main Street, Wallerawang would only be used for general vehicle movement. All heavy

vehicles that would be transporting demolished materials would enter the Wallerawang Power Station Site from a private access road located directly off the Castlereagh Highway (Liberty Industrial, 2021).

Given the small overlap of construction timing and the difference in proposed construction traffic routes between the two projects, there is limited potential for cumulative construction traffic impacts associated with the demolition of the Wallerawang Power Station. Any potential overlap for construction traffic is expected to be minor and isolated to the intersection of Main Street and the Castlereagh Highway. As discussed above the Castlereagh Highway / Main Street intersection is likely to have capacity to handle the cumulative construction traffic that would be generated by both projects, particularly as neither would be close to peak construction traffic movements by this point.

4.5.2 Issue 2: Access locations

4.5.2.1 Issue

TfNSW noted the following access points to the Site are proposed for construction traffic:

- Castlereagh Highway/Brays Lane (light vehicle access)
- Great Western Highway/Barton Avenue (light and heavy vehicle access)
- Castlereagh Highway/Main Street (OSOM, heavy and light vehicle access).
- TfNSW have recommended that scaled plans are required to demonstrate sight distance is available at the intersection of Castlereagh Highway/Brays Lane, where a design speed of 90 km/h needs to be adopted (refer to Table 3.2 of Austroads Guide to Road Design Part 4A).
- Sight distance diagrams also need to be provided for this intersection using an eye height of 1.1 m and a vehicle height of 1.25 m showing the sight distance available both horizontally and vertically in accordance with Fig 3.2 Austroads Guide to Road Design Part 4A, the plan must demonstrate any landscaping and/or fencing will not compromise sight distance.

4.5.2.2 Response

This issue was discussed at the meeting between Neoen and TfNSW on 6 June 2022 (refer to **Section 3.22**). At this meeting TfNSW noted that the intersection treatments for Castlereagh Highway/Main Street and Great Western Highway/Barton Avenue intersections were appropriate for the proposed construction traffic. TfNSW therefore confirmed that the focus of this comment was on the Castlereagh Highway / Brays Lane intersection as this intersection does not have the same turn treatments as the other intersections. TfNSW were concerned that the number of light vehicle movements proposed during peak construction of the Project could present road safety issues.

Following this meeting Neoen reviewed the proposal to use the Castlereagh Highway / Brays Lane intersection for light vehicle movements to and from the Site. Given the concerns provided by TfNSW, Neoen are no longer proposing to allow this intersection to be used for Project related construction traffic. As such no further assessment of the Castlereagh Highway / Brays Lane intersection has been completed. Management and mitigation measure T2 has been updated to confirm that the Castlereagh Highway / Brays Lane intersection would not be used for Project construction traffic. The old and new proposed traffic routes to the Site are depicted in **Figure 4-10**.

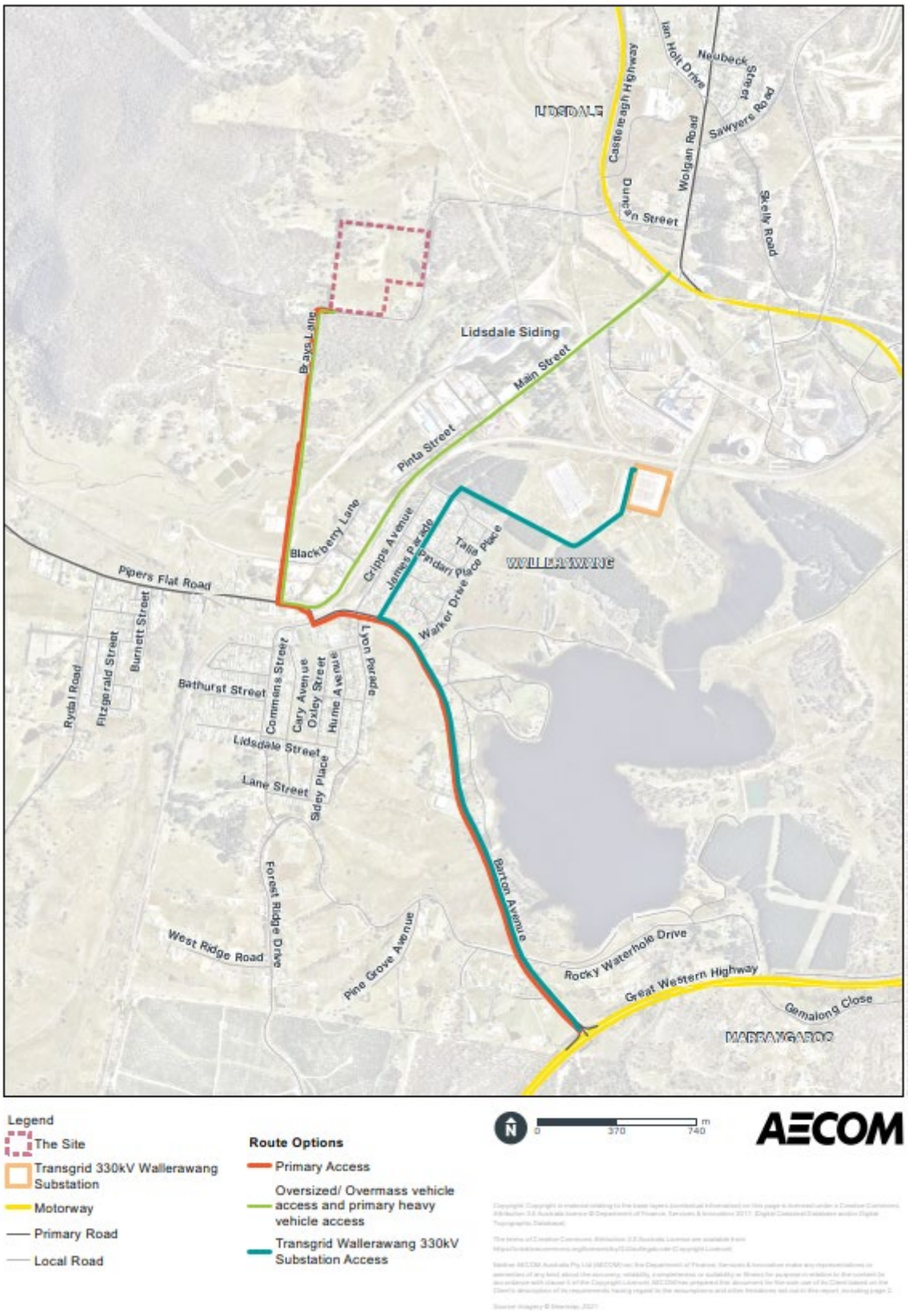


Figure 4-10 Old and new proposed traffic routes to the Site

4.5.3 Issue 3: Traffic analysis

4.5.3.1 Issue

TfNSW noted the construction period for the Project is expected to take about 12 months to complete. Peak construction period (approx. 2 months) is expected to generate up to 50 light vehicles and 20 heavy vehicles per day (140 trips).

TfNSW notes both Castlereagh Highway/Main Street and Great Western Highway/Barton Avenue intersections provide existing Channelised Left-turn (CHL) and Channelised Right-turn (CHR) treatments.

TfNSW raised concern regarding increasing the intensity of traffic at the Brays Lane/Castlereagh Highway intersection due to available sight distance approaching Brays Lane from both the north and south coupled with the existing layout i.e., lane length for through vehicles to pass right turning vehicles.

TfNSW recommend a traffic analysis needs to be undertaken to identify an appropriate treatment for the intersection of the Castlereagh Highway and Brays Lane. The treatment type is to be determined based on the warrants for BA, AU and CH Turn Treatments outlined in Austroads Guide to Road Design (AGTRD) Part 6: Intersections, Interchanges and Crossings Management (Figure 3.25).

As part of this, TfNSW note:

- The analysis needs to be supported with current traffic count data, with turn movement diagrams at the intersection for the AM and PM peak hours separating light and heavy vehicles
- Assumptions for traffic generation should be in accordance with RTA Guide to Traffic Generating Developments and associated updated surveys or appropriate justified
- Traffic distributions to and from the development need to be justified
- Volume plots as per Austroads Guide to Road Design (AGTRD) Part 6: Intersections, Interchanges and Crossings Management Figure 3.25 should be provided to identify the efficacy of the existing turn treatments
- Section 5.1.1 of the EIS suggests using shuttle buses to reduce traffic volumes, TfNSW requires a worst-case scenario to be demonstrated until a commitment is made to using shuttle buses and information is provided on routes, volumes and if they will operate in the peak hours.

4.5.3.2 Response

This issue was discussed at the meeting between Neoen and TfNSW on 6 June 2022. At this meeting TfNSW noted that the intersection treatments for Castlereagh Highway/Main Street and Great Western Highway/Barton Avenue intersections were appropriate for the proposed construction traffic. TfNSW therefore confirmed that the focus of this comment was on the Castlereagh Highway / Brays Lane intersection as this intersection does not have the same turn treatments as the other intersections. TfNSW were concerned that the number of light vehicle movements proposed during peak construction of the Project could present road safety issues.

Following this meeting Neoen reviewed the proposal to use the Castlereagh Highway / Brays Lane intersection for light vehicle movements to and from the Site. Given the concerns provided by TfNSW, Neoen are no longer proposing to allow this intersection to be used for Project related construction traffic. As such no further assessment of the Castlereagh Highway / Brays Lane intersection has been completed. Management and mitigation measure T2 has been updated to confirm that the Castlereagh Highway / Brays Lane intersection would not be used for Project construction traffic.

4.5.4 Issue 4: Strategic design for determined access treatments/upgrades

4.5.4.1 Issue

TfNSW noted that a strategic design for the determined access treatments/upgrades needs to be prepared to clarify the scope of works, demonstrate a compliant design can be constructed within the road reserve and allow the consent authority to consider any environmental impacts of the works. These impacts include traffic and road safety impacts as well as other impacts such noise, flora and fauna, heritage and impact to community.

4.5.4.2 Response

For the reasons provided above, no treatments or upgrades to the existing road conditions at the intersection of Castlereagh Highway/Brays Lane, Great Western Highway/Barton Avenue or Castlereagh Highway/Main Street are proposed to be undertaken as part of the Project.

4.5.5 Issue 5: Contamination of land

4.5.5.1 Issue

TfNSW note that the existing rail corridor may have potential for the presence of trace contaminants from historic operation of rail activities and the potential presence of imported fill which may contain contaminants. TfNSW note that the applicant seeks to provide soil samples prior to where trenching is proposed test for contaminants of potential concern to determine presence and whether contamination levels pose a health risk to construction workers.

TfNSW is currently conducting an environmental assessment to identify contamination on the CRN (Country Rail Network), and at present is not aware of whether there are contaminants found in the rail corridor or on common boundaries.

Recommendations made by TfNSW included:

- Provide a Preliminary Contamination Report during the Submissions Report stage to confirm the presence of any contamination that may be present within the rail corridor
- Contact UGLRL's Third party works team to arrange for access to the rail corridor to undertake investigations via thirdpartyworks@uglregionallinx.com.au.

4.5.5.2 Response

At the meeting between Neoen and TfNSW on 6 June 2022 the conclusions of the contamination assessment within the EIS and the need for a Preliminary Contamination Report was discussed. An overview of the contamination assessment within the EIS was provided and it was agreed that the risk of contaminants in the rail corridor was low and should contaminants of potential concern be present they are likely to be typical of rural rail corridors. As such it was agreed that whilst no investigations are required at this stage, ground investigations would take place prior to the transmission connection being installed. TfNSW confirmed that they did not need to have the Preliminary Contamination Report provided prior to determination of the SSD application but that they would like to have a copy of any contamination investigations that are completed prior to works commencing for their records.

Notwithstanding the above a separate contamination memo has been produced which confirms the conclusions of the contamination assessment provided in the EIS. This memo is provided as **Appendix G** to this Submissions Report.

4.5.6 Issue 6: State Environmental Planning Policy (Transport and Infrastructure) 2021

4.5.6.1 Issue

TfNSW have requested an assessment to address the applicability of Section 2.97 and 2.98 of the *SEPP (Transport and Infrastructure) 2021* to the Project be provided.

4.5.6.2 Response

At the meeting between Neoen and TfNSW on 6 June 2022, TfNSW noted that they needed more information on:

- For Section 2.97: how rail safety would be managed and whether any cranes would be required close to or in the air space above the rail corridor
- For Section 2.98: further information on the excavations required in the rail corridor.

In developing this response, a review of the relevant sections of the *State Environmental Planning Policy (Transport and Infrastructure) 2021* (SEPP (Transport and Infrastructure)) was completed. This review identified that:

- Section 2.97 relates to Development involving access via level crossings
- Section 2.98 relates to Development adjacent to rail corridors

- Section 2.99 relates to Excavation in, above, below or adjacent to rail corridors.

From a review of these sections it is clear that TfNSW are actually requiring an assessment of the Project against Sections 2.98 and 2.99. It is not clear whether this was an error in the TfNSW submission or if this SEPP has been recently updated and the Section references changed. Nevertheless an assessment of the Project against Sections 2.98 and 2.99 is provided below.

Section 2.98 of the SEPP (Transport and Infrastructure) applies to development adjacent to a rail corridor, where the development:

(a) is likely to have an adverse effect on rail safety, or

(b) involves the placing of a metal finish on a structure and the rail corridor concerned is used by electric trains, or

(c) involves the use of a crane in air space above any rail corridor, or

(d) is located within 5 metres of an exposed overhead electricity power line that is used for the purpose of railways or rail infrastructure facilities.

Works would be required in the rail corridor and these works without proper controls may result in an adverse effect on rail safety. The works required in the rail corridor are limited to the installation of the transmission connection between the Site and the Transgrid Wallerawang 330 kV substation. The rail corridor in this location is not electrified and is not used by electric trains. Cranes would not be required in the air space above the rail corridor to install the transmission connection.

Section 2.98 of the SEPP (Transport and Infrastructure) applies to developments where there is penetration of ground depth of at least 2 m below ground level:

(a) within, below or above a rail corridor, or

(b) within 25 m (measured horizontally) of a rail corridor, or

(c) within 25 m (measured horizontally) of the ground directly below a rail corridor, or

(d) within 25 m (measured horizontally) of the ground directly above an underground rail corridor.

Part of the transmission connection for the Project would be located within 25 m of a rail corridor. The transmission connection would be installed using HDD and trenching. **Figure 4-11** shows where HDD and trenching is proposed within 25 m of a rail corridor.

Where the transmission connection is installed using trenching the excavation is proposed to be no more than 1.5 m deep (i.e. no more than 1.5 m below ground surface (bgs). Where the transmission connection is installed using HDD it may be installed deeper than 2 m bgs within 25 m of the rail corridor.

Section 2.98 (3) of SEPP (Transport and Infrastructure) states "*the consent authority must not grant consent to development to which this section applies without the concurrence of the rail authority for the rail corridor to which the development application relates.*"

Section 2.98 (4) of SEPP (Transport and Infrastructure) states "*in deciding whether to provide concurrence, the rail authority must take into account—*

(a) the potential effects of the development (whether alone or cumulatively with other development or proposed development) on—

(i) the safety or structural integrity of existing or proposed rail infrastructure facilities in the rail corridor, and

(ii) the safe and effective operation of existing or proposed rail infrastructure facilities in the rail corridor, and

(b) what measures are proposed, or could reasonably be taken, to avoid or minimise those potential effects."

Figure 4-11 Areas of the transmission line to be constructed within 25m of a rail corridor, showing the construction methodology (trenching and HDD)

The use of HDD techniques could potentially result in changes in the ground which could affect the rail assets above, however this is unlikely given the diameter of the cable to be installed and how the HDD process is completed. Equally the use of the HDD has the potential to damage existing rail infrastructure such as subsurface signal cables if these assets are not identified in advance. To mitigate these potential impacts a number of safeguards have been agreed with UGL Regional Linx (UGLRL).

UGLRL have been appointed by TfNSW to manage the Country Rail Network (CRN) including the section of the rail network where the transmission connection for the Project would be installed. Consultation with UGLRL has been and would continue to be undertaken as the Project progresses. During this consultation, an Approval in Principle (Ref 000720) was agreed to allow for the construction of the transmission connection (the Infrastructure Works) within the relevant part of the rail corridor (the Licence Area). As part of the UGLRL agreement, various safety requirements and conditions were outlined to ensure the safety of the railway corridor during construction and to comply with relevant standards. These revised safeguards are provided in **Appendix B** of the agreement and include:

- Any design and installation works to comply with relevant CRN standards
- Approval of underboring methodology by Principal Track and Civil Engineer, and compliance of underbore design with CRN standards CS 540 and CM 541
- Identification and protection of signal cables located within the Licensed Area
- All Infrastructure Works being undertaken must be completed in accordance with the Network Rules and Procedures
- All Infrastructure Works are to be assessed for the potential to intrude within the danger zone in accordance with Network Rule CNWT300 and Procedures
- Any track possessions which are required to be completed to undertake the Infrastructure Works are scheduled in advance with operations using the possession bid sheets
- Any person entering and/or performing work in the Rail Corridor must hold valid and appropriate competencies for the Infrastructure Works being performed
- Neoen is required to adhere to Environment Protection Licence 13421
- Neoen are to provide the final design, works methodology, environmental report and safety documentation (to include the Safe Work Method Statements, Competency Certificates and Protection Officer details) in relation to any proposed works
- After completion of works, installation indicative signage to be undertaken to show alignment of underbore and any changes in direction according to the CRN standards CS 540 and CM 541
- Upon completion of the Project, Neoen is required to provide electronic ‘as-built’ drawings that clearly delineate the rail corridor and that note GPS coordinates and railway kilometrages upon completion of the Infrastructure Work.

As the Project design progresses these requirements would be reviewed and if necessary updated prior to construction commencing as part of the construction application process with UGLRL.

Implementation of these requirements would ensure that rail safety risks can be minimised and the integrity of the rail infrastructure within and close to the Project Area would not be compromised.

4.5.7 Issue 7: Landowner’s consent

4.5.7.1 Issue

TfNSW have noted that landowner’s consent was to be obtained during EIS exhibition. TfNSW require further information about whether the landowners consent includes lodgement and/or construction works within the rail corridor.

4.5.7.2 Response

Neoen has consulted with TfNSW through their land manager UGL Regional Linx, to acquire consent from the Transport Asset Holding Entity of NSW (TAHE). Landowner’s consent will be provided under separate cover to support the Submissions Report, pursuant to the requirements of the *Environmental Planning and Assessment Regulations 2021*.

4.6 UGL Regional Linx

UGL Regional Linx (UGLRL) have provided a submission in response to the public exhibition of the EIS. All comments raised in the UGLRL submission are summarised below, and addressed respectively.

Comment

UGL Regional Linx (UGLRL) have provided comments on both contamination and heritage within the area relating to the Country Rail Network (CRN). UGLRL have noted that all known contamination sites that are listed on the CRN contaminated land register are located approximately 200 metres to the north and there is no reason to believe these would be disturbed. UGLRL further noted that there has not been a contaminated land investigation completed for the railway corridor itself, therefore they cannot comment on the contamination status or potential risk resulting from the corridor.

UGLRL have noted that they have reviewed the EIS as it relates to the CRN and have noted that Cox's River Underbridge is within 50 m of the Project. This bridge is a state, local and 170 listed item, and it is understood that all works occurring within proximity of this bridge relate to cable installation underground using trenching or underboring.

UGLRL further note that Wallerawang Railway Station is approx. 760 m from the Project. The station is a State, Local and S170 listed item, and works for the Project are located well away from this heritage item.

UGLRL are satisfied with the accompanying SoHI addressing all potential impacts and that an unexpected finds protocol would be established should a heritage item be uncovered.

UGLRL further comment that the noise and vibration report has not identified any adverse vibration impacts upon the Cox's River Underbridge, however, UGLRL asset engineer's may wish to review this.

UGLRL made note that it is their understanding that DPE will undertake a rigorous assessment of the development and, if approved, will implement relevant conditions of consent.

Recommendations made by UGLRL as part of their submission include:

- Given the nature of the Project and the reasonable separation distances from the Project to the above noted heritage items within the CRN, there would be no objections to the development in terms of impacts upon the significance of heritage items within the CRN
- Any correspondence to the consent authority should flag the consent authority's obligation to assess the development against the State Governments 'Development Near Rail Corridors and Busy Roads - Interim Guidelines'.

4.6.1.1 Response

Comments made by UGLRL have been noted.

It is agreed that the Project is not anticipated to result in impacts to the Cox's River Underbridge or Wallerawang Railway Station, as per Section 10.4.1 of the EIS.

Although UGLRL cannot comment on the contamination status of the rail corridor and have commented it would not likely disturbed registered contamination sites, Neoen and TfNSW have agreed that a contamination assessment be produced following determination of the Project to further expand on the likely contamination status of the rail corridor prior to the commencement of work. UGLRL have agreed with this approach, however, following these meetings, DPE have requested further information on the likely contamination of the railway corridor prior to determination. This additional consideration is provided in **Appendix G**.

As outlined in **Appendix A**, in the context of the Project, the proposed transmission connection land use has a low sensitivity in relation to other surrounding land uses in the area. The proposed land use does not promote continuous human occupation, with the exception to periodic maintenance activities. It is likely to be installed and maintained by contractors with experience working in rail corridors who understand how to install cables and other utilities in these areas. On this basis it can be concluded that the rail corridor is a suitable location for the proposed transmission connection. These findings are consistent with the findings of the EIS, including compliance with clause 4.6 of the *State Environmental Planning Policy (Resilience and Hazards) 2021*.

With the implementation of the following additional safeguards and actions, the contamination risks would be appropriately mitigated:

- As agreed with TfNSW, an intrusive investigation would be undertaken prior to the commencement of construction works.
- Precautionary investigations would be undertaken to determine if contaminants are present. Where contamination in soil is above commercial/industrial standard, in situ soil would be removed and disposed of by an appropriately licenced contractor to an appropriately licenced facility. Virgin Excavated Natural Material (VENM) / Excavated Natural Material (ENM) fill would be imported and used for the construction of the Project.
- Soil and Water Management Plan (SWMP) to document the erosion and sediment controls across the Project and in the vicinity of Pipers Creek and Coxs River.
- Documentation of relevant work health and safety (WH&S) standards and controls for the works including the standard use of personnel protective equipment (PPE) to mitigate the risk of being exposed to potentially contaminated materials (such as long clothing).
- An unexpected finds protocol (UFP) as part of the CEMP, which should be used to manage any unexpected contamination which may be encountered during construction works.

4.7 Biodiversity Conservation Science Directorate (BCS)

BCS have provided a submission in response to the public exhibition of the EIS. All issues raised in the BCS submission are summarised below and addressed respectively.

4.7.1 Issue: The definition of the impact resulting from the Project should be made explicit and rationalised within the BDAR

4.7.1.1 Issue

BCS have identified several sections within the Biodiversity Development Assessment Report (BDAR) and Biodiversity Assessment Method Calculator (BAM-C) which have discrepancies with key terms (the subject land and development footprint) identified in section 1.3 of the BDAR report. However, two other development components (construction footprint and development site) were identified by BCS from data supplied to them. BCS have noted it is unclear what the full scope of residual impacts are based on the differing definitions used within the BDAR.

BCS have noted that all activities which would result in surface disturbance to biodiversity values should be defined in section 1.3 of the BDAR and included within the BAM-C calculations. If the final impact on biodiversity values is yet to be determined, a worst-case scenario should be assumed, and a maximum credit obligation should be calculated accordingly.

BCS have also noted that the assessor should note that if areas of impact are changed within the BDAR, this must be consistent within the BAM-C. Changes to the BAM-C can impact minimum survey requirements associated with the project.

Recommendations by BCS include:

- Rationalise the differing impact extents and project definitions within the BDAR and update the BAM-C if necessary.
- Confirm that all development components which will result in surface disturbance to biodiversity values have been addressed in Stage 2 of the BDAR and associated BAM-C calculations.
- If the final impact resulting from the project has yet to be determined assume a worse-case scenario and calculate a maximum credit obligation accordingly.

4.7.1.2 Response

Differing definitions and impact areas within the BDAR and BAM-C have been reconciled and are presented in **Appendix D**. No surface disturbance would occur where the HDD is proposed to install the transmission connection. The launch and collection points and the area of drilling points have been

defined, and these surface disturbance areas have been captured in the updated BDAR and BAM-C (**Appendix D)**.

Where there was uncertainty in the Project footprint a worse-case scenario has been assumed and maximum credit obligations have been calculated accordingly.

4.7.2 Issue: Areas proposed to be underbored should be spatially defined within the BDAR

4.7.2.1 Issue

BCS have noted that there is no figure within the BDAR which shows the areas which would be impacted by horizontal directional drilling and trenching within the proposed transmission line areas. It is noted that this needs to be shown for assessing which vegetation would be disturbed by trenching for accounting within residual impact of development and offset.

BCS further commented that this figure would provide useful reference for the consent authority when preparing conditions of consent.

Recommendations provided by BCS include:

- Clarify if all areas of native vegetation and habitat will be avoided by the use of horizontal directional drilling techniques within the transmission line corridor
- Spatially define the areas of trenching and horizontal directional drilling within a Figure.

4.7.2.2 Response

No surface disturbance would occur where HDD is proposed to install the transmission connection. The launch and collection points of the HDD equipment and the area of drilling points have been defined. These surface disturbance areas have been captured in the updated BDAR and BAM-C (**Appendix D**). **Figure 4-12** shows where the transmission connection would be installed using either HDD or trenching methods.

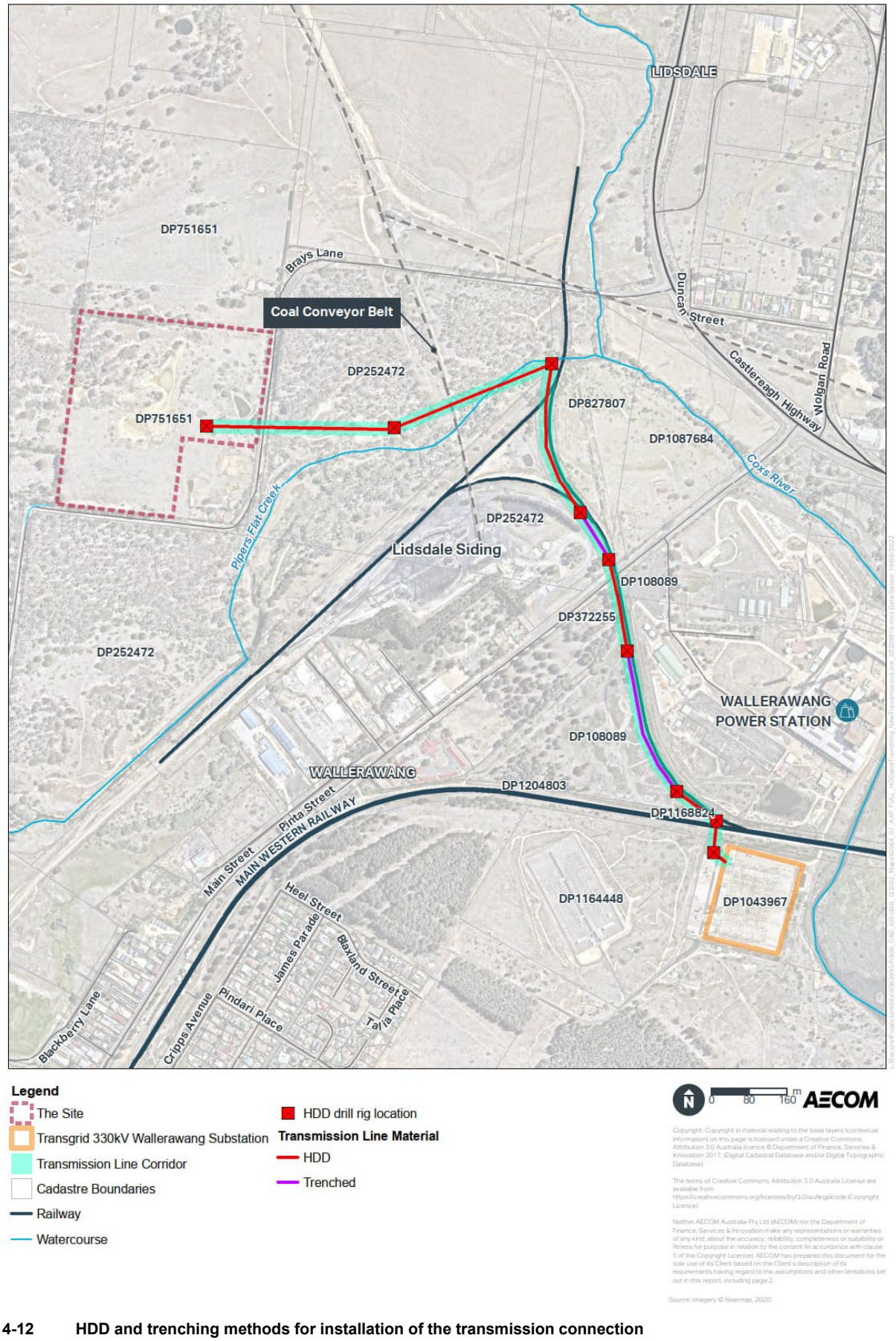


Figure 4-12 HDD and trenching methods for installation of the transmission connection

4.7.3 Issue: Revision of mapping of native vegetation extent

4.7.3.1 Issue

BCS have noted that the native vegetation cover has only been coarsely mapped within the 1500m landscape buffer, potentially missing areas of native vegetation. Additionally, areas of native vegetation extent (grassland) have been excluded from Figure 4 of the BDAR and the landscape vegetation assessment despite these areas being identified within the subjects site's native vegetation extent mapping in Figure 5.

BCS have noted that native vegetation extent identified and mapped within the subject site (inclusive of both woody and non-woody native vegetation) is required to be included within the native vegetation cover polygon on the landscape assessment map and the vegetation percentage cover class assessment (Section 3.2 of the BAM 2020).

If areas of native vegetation extent are changed within the BDAR, this must also be made consistent within the BAM-C.

BCS recommend that finer scale vegetation extent mapping and include both woody and non-woody vegetation within mapping is undertaken.

4.7.3.2 Response

A review of the mapping was undertaken to address this issue and incorporated into the updated BDAR **(Appendix D)**.

4.7.4 Issue: Provision of appropriate spatial locations and identifiers for each plot entered into the BAM-C

4.7.4.1 Issue

BCS have noted inconsistencies within the plot identification and spatial location for all plots entered in the BAM-C as compared to the BDAR, including:

- All plots being assigned a generic identifier rather than being made consistent with the plot identifiers listed in the BDAR
- The spatial location of all plots have been assigned the numbers "123456" as their geographic coordinates, rather than their actual location.

BCS note that the spatial location and identifiers need to be updated in order to complete the review of the BDAR and that identified errors in the calculator are reconciled with the data in the BDAR.

4.7.4.2 Response

There was an error in the BAM import process which resulted in discrepancies between the BAM-C and the BDAR. The BAM-C has been updated to address the above errors (refer to **Appendix D**).

4.7.5 Issue: The exclusion of ecosystem credit species within the BAM-C requires revision

4.7.5.1 Issue

BCS have noted that several ecosystem credit species have been removed from further assessment within Tab 4 of the BAM-C. The removal of these species is not consistent with the assessment requirements set out in Steps 2 and 3 of Section 5 of the BAM.

BCS have noted the following species, which have been excluded as candidates within Tab 4 of the BAM-C, do not have habitat constraints or geographic limitations listed in the Threatened Biodiversity Data Collection (TBDC) and are not considered vagrant:

- Spotted-tailed Quoll
- White-throated Needletail
- Barking Owl (Foraging Habitat)
- Rosenberg's Goanna.

Therefore, BCS propose that if the assessor wishes to exclude these species from the BAM-C, adequate justification must be provided in the BDAR. BCS have noted that using BioNet records (or the absence of) to exclude candidate species is not a valid step outlined in Section 5 of the BAM.

4.7.5.2 Response

A review was undertaken to confirm species that were excluded and included. Further justification has been provided for species that were excluded in the updated BDAR, Appendix 2, table A-1 of the BDAR and the BAM-C (refer to **Appendix D**). These justifications are summarised below.

Spotted-tailed Quoll

Microhabitat such as woody debris is limited in the subject land and dense shrubs/ understorey are lacking across the impact area. Following detailed traverses, no potential den sites were identified during the field assessment. No cliff faces or rocky stream banks are present within the subject land, such features are used in breeding seasons to identify females within the area. The large areas of intact land to the south of the impact site and west of the subject land that is not being impacted, will remain as habitat for this species if present in the locality. The species is likely to forage across the subject land and may occur on occasion but is unlikely to be impacted by the proposed works.

White-throated Needletail

This species migrates to Australia and is often seen from October to April. The White-throated Needletail forages aerially on insects and is more common in coastal areas, however this species may occur on occasion in the subject land. The proposed development will not significantly affect the foraging resources (insects) required by the White-throated Needletail for aerial foraging. The proposed works are not likely to impact on the species as no breeding habitat is present or will be impacted and aerial foraging will not be impacted. The vegetation directly outside the impact area and to the east provides larger patches of intact bushland that will sustain the insect resources, habitat and connectivity required by the White-throated Needletail.

Barking Owl (Foraging Habitat)

Following detailed traverses and careful assessment of existing trees to determine the presence of hollow-bearing trees, no large hollows suitable for breeding for this species were recorded within the subject land. It was noted that areas adjacent to the development footprint contain large hollows, however these are not considered suitable for use by Barking Owl as entrances are vertical, in broken limbs and trunks. Large hollows recorded adjacent to the subject land will not be impacted and are not considered suitable for use due to the vertical position of entrances. The subject land does not contain microhabitats required by this species for foraging such as small arboreal mammals or birds and as such the species is unlikely to utilise the subject land.

Rosenberg's Goanna

Following detailed traverses, the impact area was not found to contain significant habitat features in the form of rock crevices, escarpments or steep slopes or hollow logs. In addition, no termite mounds were identified within the impact area. Therefore there is not likely to be any impact to a crucial component of the Rosenberg's Goanna habitat.

4.7.6 Issue: Exclusion of species credit species within the BAM-C requires revision

4.7.6.1 Issue

BCS have noted several species credit species have been removed from further assessment within Tab 5 the BAM-C based on a lack of suitable habitat being present within the subject land, including:

- Silver-leafed Gum
- Hoary Sunray
- Tarengo Leek Orchid
- Silky Swainson-pea
- Austral Toadflax
- *Veronica blakelyi*

- Eastern Pygmy-possum.

BCS has requested a review to determine if the exclusion of these species is appropriate, i.e. surveys conducted during appropriate survey windows. It was noted that the BAM-C case should then be revised with the appropriate basis for candidate species exclusion applied.

BCS notes that the *Veronica blakelyi* has been excluded despite being recorded directly adjacent to the construction footprint, and the Eastern Pygmy-possum has been excluded despite being assumed present with a species Polygon within the BDAR. Further species which have been excluded from Tab 5 but have been assumed present in the BDAR include:

- Large-eared Pied Bat
- Large Bent-winged Bat
- Purple Copper Butterfly.

4.7.6.2 Response

A review was undertaken to confirm species that were excluded and included. Further justification has been provided for species that were excluded in the updated BDAR, Appendix 2, table A-1 of the BDAR and the BAM-C (refer to **Appendix D**). These justifications are summarised below.

Silver-leafed Gum – targeted survey

This species has been previously recorded on 2 occasions within 10 km of the subject land, with closest record being 2 km from the subject land. Potential habitat for this species in the development footprint is not present, as the species predominantly grows in rocky areas. Whilst suitable habitat was not present within the subject land, targeted surveys undertaken, did not record individuals of Silver-leafed Gum.

Hoary Sunray – targeted survey

Hoary Sunray has been not been previously recorded within 10 km of the subject land. Whilst limited potential habitat for this species in the subject land is present, it was not was identified during targeted flora surveys.

Tarengo Leek Orchid – targeted survey

The Tarengo Leek Orchid has been not been previously recorded within 10 km of the subject land. Whilst limited potential habitat for this species in the subject land is present, it was not was identified during targeted flora surveys.

Silky Swainson-pea – targeted survey

The Silky Swainson-pea has been not been previously recorded within 10 km of the subject land. Whilst limited potential habitat for this species in the subject land is present, the Silky Swainson-pea was not identified during targeted flora surveys.

Austral Toadflax – targeted survey

This species has been previously recorded on 4 occasions within 10 km of the subject land, with closest record being 4.2 km from the subject land. Whilst marginal potential habitat for this species is located with the transmission line corridor within PCT 677 in a moderate condition, the species was not recorded during targeted flora surveys. Targeted surveys were not undertaken within PCT 732 NOG as a result of the low condition and absence of suitable host species i.e. Kangaroo Grass

***Veronica blakelyi* – targeted survey**

The occurrence of *Veronica blakelyi* was a typo in the original BDAR. This was explained during the meeting with BCS. This species has been previously recorded on 7 occasions within 10 km of the subject land, with closest record being approximately 3.2 km from the subject land. Whilst potential habitat for this species in the development footprint is present, no specimens were identified during targeted flora surveys.

Eastern Pygmy-possum - assumed present

The north-west section of the subject land (PCT 732) contains potential low-quality habitat for this species. Habitat is considered low quality due to the presence of hollows, limited understorey shrubby

species and history of grazing of the land. The remainder of the subject land is degraded through exotic weed invasion and does not provide suitable microhabitat features (shrubby understorey with foraging/nesting resources) to support the species. The study area provides marginal habitat due to a low density of hollows and relatively degraded understorey lacking an abundance of foraging resources for this species. Records of this species in the locality occur in Newnes State Forest to the east.

Large Bent-winged Bat – targeted survey

Rocky outcrop and escarpments associated with the Great Dividing Range east of the subject land, occur within 2 kilometres of the development footprint and provide suitable roosting habitat for this species. Given the proximity of the subject land to suitable habitat features it is likely this species occurs on occasion as part of dispersal and foraging movements. This species was recorded during targeted survey. However, the subject land is not within 100 metres of suitable roosting habitat and therefore the proposed works will not impact on breeding habitat for this species (OEH 2018).

Purple Copper Butterfly – assumed present

Impacts to areas containing suitable habitat have been avoided.

4.7.7 Issue: The species polygon extent for the Purple Copper Butterfly is not adequate

4.7.7.1 Issue

BCS have noted that from review of the BDAR, it is unclear how the extent of the Purple Copper Butterfly species polygon has been mapped. It is noted that the species polygon does not align with the location of BAM Plot 3 which detected 20 individuals of *Busaria spinosa subsp. lasiophylla*, nor is the species polygon inclusive of the incidentally recorded individuals of *Busaria spinosa subsp. lasiophylla* recorded within the development footprint.

BCS notes that the Threatened Biodiversity Data Collection (TBDC) defines the habitat constraints for Purple Copper Butterfly as "*Bursaria spinosa* or within 40m of *Bursaria spinosa*". As such, the presence of Busaria and areas within 40m of Busaria should form part of habitat mapping and the species polygon for the Purple Copper Butterfly.

BCS therefore recommend the species polygon for the Purple Copper Butterfly be reviewed to ensure it is consistent with the advice contained with the species TBDC profile.

4.7.7.2 Response

The species polygon for the Purple Copper Butterfly has been reviewed and updated in the BDAR and BAM-C (refer to **Appendix D**). The polygon is now inclusive of a 40 m buffer around areas of *Bursaria spinosa.* Figure 9 presents the new polygons inclusive of the

4.7.8 Issue: The habitat suitability assessment and targeted survey effort for Austral Toadflax is not adequate

4.7.8.1 Issue

BCS have noted that it is unclear why the Vegetation Zone 732-NOG was discounted as suitable habitat for Austral Toadflax, as this vegetation zone has similarities with the TBDC for the Austral Toadlet.

BCS notes that further justification and explanation is required on why Vegetation Zone 732-NOG has been discounted as potential habitat for the Austral Toadlet.

BCS request justification on why the Vegetation Zone 732-NOG could be discounted as potential habitat for Austral Toadflax, such that no targeted survey is necessary, beyond reasonable doubt. Alternatively conduct further targeted survey within this habitat, obtain an expert report or assume presence.

4.7.8.2 Response

Evidence-based justification as to why the Vegetation Zone 732-NOG was discounted as potential habitat for Austral Toadflax has been provided in the updated BDAR and BAM-C (refer to **Appendix D**).

4.7.9 Issue: The direct and indirect impacts on *Veronica blakelyi* should be appropriately assessed, mitigated and offset within the BDAR

4.7.9.1 Issue

BCS have noted that a population of 30 individuals of *Veronica blakelyi* were identified directly adjacent to the outer boundary of the Project's construction footprint.

BCS have noted that the assessor should assess all impacts resulting from the development on the identified population of *Veronica Blakelyi* as stated in Section 8 of the BAM 2020. This includes:

- Direct loss via clearing of habitat or individuals
- Indirect impacts, including:
  - Inadvertent impacts on adjacent habitat or vegetation
  - Reduced viability of adjacent habitat due to edge effects
  - Reduced viability of adjacent habitat due to noise, dust or light spill
  - Transport of weeds and pathogens from the site to adjacent vegetation
  - Trampling of threatened flora species.

BCS request that all impacts resulting from the development on the identified population of *Veronica blakelyi*. All residual impacts, including residual indirect impacts, should be calculated and offset.

4.7.9.2 Response

The occurrence of *Veronica blakelyi* was a typo in the original BDAR. This was explained during the meeting with BCS. This species has been previously recorded on 7 occasions within 10 km of the subject land, with closest record being approximately 3.2 km from the subject land. Whilst potential habitat for this species in the development footprint is present, no specimens were identified during targeted flora surveys. (**Appendix D**).

4.7.10 Issue : Inconsistencies between figures to be rationalised and the BAM-C to be updated if necessary

4.7.10.1 Issue

BCS have noted inconsistencies with the number/ locations of Black Gums located within the subject site, where some figures show a higher amount compared to others.

From BCS review of the BAM-C only two individuals of Black Gum are proposed to be cleared for the project. However, there is additional Black Gums identified within the centre of the proposed construction footprint in some figures. BCS note that inconsistencies between the figures in the BDAR should be updated, if any additional Black Gums are required for clearing the projects residual offset calculations this should also be updated.

BCS request that inconsistencies between figures within the BDAR and update the BAM-C calculations are rectified as necessary.

4.7.10.2 Response

The inconsistencies between figures within the BDAR, and the BAM-C calculations have been reviewed and rectified. These are provided in the updated BDAR and BAM-C (**Appendix D**).

Direct impacts to a total of two individual plants, and 0.31ha of known mapped habitat, are considered to be an acceptable outcome for a Project with impacts spanning such a large area. Again, it should be noted that significant efforts have been undertaken to minimise and avoid impacts to threatened flora over the course of the Project and underboring along the transmission line will avoid the majority of Black Gum habitat identified within the subject land.

4.7.11 Issue: An assessment under SEPP 2021 (Koala Habitat Protection) should be undertaken

4.7.11.1 Issue

BCS has noted that the State Environmental Planning Policy 2021 - Koala Protection (Koala SEPP) is mentioned in section 1.5 of the BDAR as key legislation which applies to the Project, however there is no other instance where this is mentioned or assessed.

Lithgow LGA is listed under schedule 1 of the Koala SEPP, and as such must undertake a Koala Assessment Report prepared according to the five key principles detailed within the Koala SEPP.

BCS recommended a Koala assessment report be prepared according to the requirements of the Koala SEPP.

4.7.11.2 Response

Under Part 3 of the Koala SEPP, a Koala Assessment Report is only required where Council is the determining authority for a project. The Minister is the determining authority for this Project; therefore a Koala Assessment Report is not required. This conclusion was agreed during a meeting held between BCS, Neoen and AECOM on 16 May 2022, and as summarised in **Table 3-2**. The assessment provided in the BDAR is therefore considered appropriate.

4.7.12 Issue: Like-for-like credit report to be appended to the BDAR

4.7.12.1 Issue

BCS notes that Section 9 of the BDAR contains a BAM credit summary report generated from the BAM-C. A credit summary report does not contain the detail necessary to determine the credit trading options available for the project. BSC recommend a like-for-like credit report is also appended to the BDAR, allowing for all relevant parties to trace the like-for-like credit trading options available to satisfy the credit obligation for the Project.

4.7.12.2 Response

A like-for-like credit report has been appended to the updated BDAR (**Appendix D**).

4.8 Department of Planning and Environment – Agriculture

Department of Planning and Environment – Agriculture (DPE Agriculture) have provided a submission in response to the public exhibition of the EIS. All issues raised in the DPE Agriculture submission are summarised below and addressed respectively.

4.8.1 Issue: Rehabilitation of ground cover

4.8.1.1 Issue

DPE Agriculture have recommended rehabilitation of groundcover with local grass species. Advice from a local agronomic specialist such as Local Land Services Office would be able to assist with this.

4.8.1.2 Response

The comment made by DPE Agriculture has been noted. Where rehabilitation of groundcover is required for agricultural purposes, local grass species would be used.

4.9 Department of Planning and Environment – Crown lands

Department of Planning and Environment – Crown lands (DPE Crown Lands) have provided a submission in response to the public exhibition of the EIS. All comments raised in the DPE Crown Lands submission are summarised below and addressed respectively.

Comment

DPE Crown Lands have reviewed the Project EIS and made no comment at this time due to the project not being located on or in the vicinity of Crown lands, roads, or waterways.

4.9.1.1 Response

The comment by DPE Crown Lands has been noted.

4.10 Department of Primary Industries – Fisheries

Department of Primary Industries – Fisheries (DPI Fisheries) have provided a submission in response to the public exhibition of the EIS. All comments raised in the DPI Fisheries submission are summarised below and addressed respectively.

Comment

DPI Fisheries have made comment in support of the Project after review of the EIS. They have made comment that the only *Key Fish Habitat* adjacent to the development is Pipers Flat Creek, however DPI Fisheries is satisfied that the Project will have no discernible impact.

4.10.1.1 Response

Comment by DPI Fisheries has been noted.

4.11 Department of Premier and Cabinet (DPC) - Heritage NSW

Department of Premier and Cabinet - Heritage NSW (DCP Heritage) have provided a submission in response to the public exhibition of the EIS. All comments raised in the DCP Heritage submission are summarised below and addressed respectively.

4.11.1 Comment

DCP Heritage have reviewed the Project EIS and in particular the Aboriginal Heritage Assessment Report (ACHAR) accompanying the EIS. DCP Heritage notes that test excavations have been undertaken prior to submission which provided clear information and guidance in relation to managing any potential impacts to Aboriginal cultural heritage. DCP Heritage further notes that after Neoen notified changes to the site access works along the proposed transmission line corridor, an addendum ACHAR was undertaken which identifies highly disturbed land resulting from historical land use activities. DCP Heritage concurs with the statement that activities would retain negligible potential for Aboriginal objects in surface and subsurface contexts.

DCP Heritage notes and supports that the initial ACHAR proposes measures to mitigate and manage potential impacts on Aboriginal cultural heritage through an Aboriginal Cultural Heritage Management Plan (ACHMP). Key components of the Proposed ACHMP as noted by DCP Heritage include:

- An archaeological salvage program for impacted stone quarry site GWB-STQ1-21, incorporating surface collection and open area salvage
- Protective fencing of artefact scatter SU1a-A5
- Protocols for ongoing consultation with RAPs
- The incorporation of an Aboriginal heritage component into the Project's standard environmental site induction
- An Unexpected Aboriginal Heritage Finds Procedure (UAHFP) covering all Aboriginal objects, including human skeletal remains.

Overall, DCP Heritage supports the proposed ACHMP, with the recommendations above, and has no concerns or comments with the Project moving forward.

4.11.2 Response

Comments by DCP Heritage NSW are noted.

4.12 Heritage Council NSW

Heritage Council NSW have provided a submission in response to the public exhibition of the EIS. All comments raised in the Heritage Council NSW are summarised below and addressed respectively.

Comment

Heritage Council NSW has reviewed the EIS and State Heritage Register (SHR). They have noted that the site does not contain any know historical archaeological relics, is not in the immediate vicinity of any SHR items and is not listed on the SHR register. No further comments from Heritage Council NSW are required.

4.12.1.1 Response

The comments made by Heritage Council NSW are noted.

4.13 NSW Department of Regional NSW – Mining, Exploration and Geoscience (MEG)

MEG have provided a submission in response to the public exhibition of the EIS. All comments raised in the MEG are summarised below and addressed respectively.

Comment

MEG have reviewed the Project EIS and have identified no concerns or issues as there is no mineral or extractive industry related with Project works.

4.13.1.1 Response

Comments made by MEG have been noted.

4.14 Fire and Rescue NSW

Fire and Rescue NSW (FRNSW) have reviewed the Project EIS and Preliminary Hazard Analysis (PHA) and have noted that based on the previous experience with BESS facilities and the fire hazards they pose, additional fire safety and management measures are required. The comments made by FRNSW are noted, and respective responses are recorded below.

Comment

FRNSW provided the following recommendations:

- That a comprehensive Fire Safety Study (FSS) is developed. The FSS is to be developed in accordance with the requirements of Hazardous Industry Planning Advisory Paper (HIPAP) No.2 and is to meet the requirements of FRNSW
- That the development of the FSS considers the operational capability of local fire agencies and the need for the facility to achieve an adequate level of on-site fire and life safety independence
- That the development of a FSS be a condition of consent
- That a comprehensive ERP (Emergency Response Plan) is developed for the site in accordance with HIPAP No.1
- That an Emergency Services Information Package (ESIP) be prepared in accordance with FRNSW fire safety guideline – Emergency services information package and tactical fire plans.

4.14.1.1 Response

The comment made by FRNSW has been noted and Neoen agrees that FSS, ERP and ESIP would be prepared prior to construction of the Project commencing and that these requirements would form conditions of consent.

4.15 NSW Rural Fire Service

NSW Rural Fire Service have provided a submission in response to the public exhibition of the EIS. All issues raised in the NSW Rural Fire Service are summarised and addressed below.

4.15.1 Issue

- The development must comply with the Bushfire Threat Assessment prepared by Blackash Bushfire Pty Ltd, ref. J2550, version 1.2, dated 7 December 2021, including the provision for radiant heat shields as provided by the proposed acoustic barriers (noise walls).
- A Fire Safety Study (FSS) must be prepared to the satisfaction of the hazards division of the Department of Planning and Environment. The FSS must address the Hazardous Industry Planning and Assessment Papers and all credible fire hazards (including grass/bush fire) and the associated fire prevention and mitigation measures for the development.
- A Fire Management Plan (FMP) must be prepared in consultation with the NSW RFS Chifley/Lithgow Fire Control Centre (FCC). The FMP must include:
    - Property Incident Plan (PIP)
    - 24-hour emergency contact details including alternative telephone contact
    - Site infrastructure plan
    - Firefighting water supply plan
    - Site access and internal road plan
    - Implementation of Asset Protection Zones (APZ) and their continued maintenance
    - Location of hazards (Physical, Chemical and Electrical) that will impact on firefighting operations and procedures to manage identified hazards during firefighting operations
    - The need for involvement of the district and local brigades in an onsite induction and instruction of the project's emergency response plan
    - Any additional matters as required by the Chifley/Lithgow FCC (FMP review and updates)
    - Any new Class 10b structures as defined per the National Construction Code must be non-combustible.

4.15.2 Response

The comments by NSW Rural Fire Service are noted and Neoen agrees that FSS and ERP would be prepared prior to construction of the Project commencing and that these requirements would form conditions of consent.

It is also agreed that a FMP would be developed in consultation with the NSW Rural Fire Service Chifley / Lithgow Fire Control Centre, and would cover all provisions set out within the comment in **Section 4.15.1**.

The Project would have all essential and required mitigation plans and measures to ensure that the Class 10b BESS facility is not combustible. This includes:

- Installation of fire suppressants within the facility
- BESS and transformer venting
- Secondary detection of smoke and heat
- Battery Management System for safety shutdowns for in the event heat limits are exceeded.

4.16 Transgrid

Transgrid have provided a submission in response to the public exhibition of the EIS. All issues raised in the Transgrid submission are summarised and addressed below.

4.16.1 Issue: Connection processes agreement

4.16.1.1 Issue

As this is not a customer project yet, Transgrid have not received a connection enquiry and a Connection Processes Agreement (CPA) is not yet executed. The proponent will need to engage Transgrid via executing a CPA to finalise the connection to Transgrid's network

4.16.1.2 Response

Neoen would engage Transgrid through the connection enquiry process to execute a CPA following determination of the SSD application for the Project.

4.16.2 Issue: EIS inclusions

4.16.2.1 Issue

Transgrid notes that there is a need to include all connection assets for consideration, including the new transmission line cut into the existing transmission line, new transmission line, new substations and any new access roads for the new infrastructure assets.

4.16.2.2 Response

The proposed onsite substation, proposed transmission connection, its alignment, and it's connection to the Transgrid Wallerawang 300 kV substation is shown in **Figure 1-2**. No new access roads would be required for the construction and maintenance of proposed transmission connection. The new transmission line is not proposed to cut into an existing transmission line. A description of the connection assets and infrastructure required to connect to the substation would be provided in more detail as part of the connection enquiry process to execute a CPA following determination of the SSD application for the Project.

Issue

Transgrid notes that Lumea have requested Landowner consent to be provided by Electricity Transmission Ministerial Holding Corporation (ETMHC) and awaiting further correspondence by PM Tim Barrass since November 2021.

Transgrid has noted they will provide further comments/ review as part of the CPA process (including undertaking a due diligence review of the EIS/ environmental approval).

4.16.2.3 Response

The comments by Transgrid have been noted. The landowners consent from Transgrid has been provided under a separate cover.

4.17 Lithgow City Council (LCC)

LCC have provided a submission in response to the public exhibition of the EIS. All issues raised in the LCC submission are summarised and addressed below.

4.17.1 Issue: Structural safety of culverts on Brays Lane

4.17.1.1 Issue

LCC noted that the Traffic Impact Assessment Report for the Project EIS outlines that Project construction would require the use of Brays Lane for heavy vehicle access. Concern has been expressed that the culverts on Brays Lane are currently unsafe for use for additional heavy vehicles.

LCC require that a qualified structural engineer certify the safety of the bridges prior to the use due to perfricated elements to be delivered to the site, such as 180 tonnes transformers and 60 tonnes control rooms.

Further requirements from LCC include:

- Traffic control for oversized vehicles on Brays Lane
- Immediate repairs to the pavement of Brays Lane which may be damaged resulting from vehicle usage

- $50,000 security bond conditioned on any approval to cover damages to proposed local haulage route during construction.
- The following additional management plans are to be submitted to LCC prior to commencement of work:
  - Construction and Operational Traffic Management Plan
  - Construction Environmental Management Plan (CEMP)
  - Construction Waste Management Plan
  - Erosion and Sediment Control Plan
  - Landscape Plan.
- LCC require a number of measures to apply to the Project during construction including signage, toilet facilities, protection of adjacent areas, erosion and sediment controls, construction hours, site maintenance, unexpected find procedures, dust abatement, engineering requirements which need to be considered within the management plans.
- A Subdivision Certificate Application is to be lodged with Council and submitted via the NSW Planning Portal.
- An Occupation Certificate must be obtained prior to the use or occupation of the approved development after an inspection by the Principal Certifying Authority.

LCC also commented that there would be no objection to the Project should recommendations be satisfied.

4.17.1.2 Response

Consultation with LCC, AECOM and Neoen occurred on 16 May 2022, where the issues submitted by LCC were discussed, and the approach for solving the issues was agreed upon. During the meeting Neoen confirmed that the structures are not permanent and would only be moved into place to allow for the passage of OSOM vehicles. This process would be captured in the Traffic Management Plan.

Following the meeting on 16 May 2022, AECOM provided design drawings to LCC for review, containing detailed specifications of the bridging beams. LCC provided AECOM and Neoen with photos of the current condition of the Brays Lane culverts.

AECOM conducted a review of the proposed bridging beam surcharge influence on the existing Brays Lane culverts. This review was provided to council on 25 July 2022. AECOM advised that in concept, for the proposed design approach to use two bridging beams at the two culverts along Brays Lane to support the weight of the OSOM vehicles, there is no adverse impacts on the existing culverts up to a culvert depth of 2.65m from the existing road surface level.

If it is determined that the existing culverts are deeper than 2.65m from existing road surface level AECOM recommend conducting a more detailed review of the Brays Lane culverts. This will require obtaining the structural design drawings for the Brays Lane culverts from Sydney Water and assessing the structural integrity of the existing culverts under the influence of the surcharge of the proposed bridging beam and OSOM vehicles.

Additionally, Neoen have agreed to provide a $50,000 security bond to cover any damages to Brays Lane.

The following management plans would be developed following detailed design and would include the all relevant measures LCC provided in their submission:

- Construction and Operational Traffic Management Plan
- Construction Environmental Management Plan (CEMP)
- Construction Waste Management Plan
- Erosion and Sediment Control Plan
- Landscape Plan.

The above plans would contain details of construction including signage, toilet facilities, protection of adjacent areas, erosion and sediment controls, construction hours, site maintenance, unexpected find procedures, dust abatement, and engineering requirements.

The following certificates would be obtained following determination of the SSD application for the Project:

- A Subdivision Certificate
- An Occupation Certificate.

4.18 Community Submissions

Two community submissions were received during the EIS public exhibition period. They both included objections, with their main concerns summarised and addressed below.

4.18.1 Issue 1: Justification of location

4.18.1.1 Issue

The community note there is insufficient justification as to why the Project has been chosen to be located on rural land rather than industrial land.

4.18.1.2 Response

The location of the Project was justified in the Land Use Risk Assessment provided as Appendix J of the EIS. Under the SEPP Transport and Infrastructure and Lithgow LEP, the Project is permissible within the land use zone is classed as RU1 – Primary Production. The surrounding character of the local area is a mixture of agricultural, residential, industrial, electricity generating, and extractive industry (mining) uses set in a gently undulating topography. This mixed character is reflected in the ad-hoc presence of open cut mines, power stations, coal loading infrastructure (including a vast network of conveyer belts across the landscape), a complex of large transmission gantries and cabling, open rural land, rural residential housing, medium density residential housing, bushland and commercial forestry. The Project would introduce new electricity generating works into this complex, mixed landscape.

Given the existing mixed uses in the local area, including industrial uses, the Project was considered justified in the proposed location as it was unlikely to impact the mixed regional landscape (due to the presence of various land uses and screening around the Site), the land was available for the development, it was permissible it its location from a planning policy perspective, and also avoided a number of other potential environmental impacts present in other locations.

4.18.2 Issue 2: Previous information misleading to what has been put on exhibition

4.18.2.1 Issue

The community note that the Project on exhibition is not what was originally proposed through community information booklets, and find the information originally supplied to the community misleading.

4.18.2.2 Response

The comment made by the community members was noted. As the Project progressed and environmental impacts were assessed, design changes were required to minimise environmental impacts as far as was reasonably practicable. Other than the information booklets distributed across the Wallerawang community, there was various other databases for information to be accessed regarding the Project as the design concept evolved before exhibition. Different methods to access Project information included:

- A webpage located at: www.greatwesternbattery.com.au
- A public community drop in event held on 3 February 2021 in Wallerawang
- A public Q&A event was hosted in Lithgow on the 10 May 2021
- A public event was also held on the 8 December 2021 in cooperation with the Lithgow Community Power Project association. It was hosted in Wallerawang and was advertised in the local paper.

Further to this, identified sensitive receivers were contacted via phone calls and letters. All of these platforms provided updated available information, and addressed any issues raised, as the Project was developed prior to EIS lodgement.

4.18.3 Issue 3: Noise wall safety and visual amenity safeguards

4.18.3.1 Issue

The community note that the noise walls were not mentioned originally and would be visible from their driveway/back yard. There is further concern that the wall would pose further potential for explosions and fire as no other sites have walls surrounding them.

4.18.3.2 Response

Reasonable and feasible acoustic design measures were considered throughout the design process to mitigate potential noise impacts. These measures were informed by the outcomes of the operational noise modelling which was undertaken to test the efficacy of the proposed noise management measures. As the EIS identified, it is unlikely the existing landscape would be impacted by the Project. However, there would likely be visual impacts to three receivers, where impacts were classed as moderate to low.

The noise wall would not likely pose additional threat to fire ignition or explosions as these structures are largely inert. Indeed these structures can enhance the separation of the battery enclosures and provide a barrier from external threats.

Appropriate standards and codes require BESS enclosures and transformers to appropriate controls to reduce the risk of thermal runaway or ignitions occurring. The Project has been subject to a detailed Preliminary Hazards Analysis as part of the EIS (refer to Appendix K of the EIS). Additional analysis would be required should the Project be granted development consent prior to construction commencing. Management plans to mitigate risks associated with fire ignition caused by site operations are also addressed in **Section 4.14** and **Section 4.14**.

The following would be further considered as part of the detailed design of the Project:

- Refinement in the design and layout which may assist in the mitigation of bulk and height of proposed structures
- A review of materials and colour finishes for selected components in keeping with the surrounding landscape including the use of non-reflective finishes to structures
- A review of night lighting that minimises off-site impacts of Project related lighting and ensures that external lighting:
    - is installed as low intensity lighting (except where required for safety or emergency purposes):
    - does not shine above the horizontal;
    - complies with Australian/New Zealand Standard AS/NZS 4282:2019 – Control of Obtrusive Effects of Outdoor Lighting, and the Dark Sky Planning Guidelines (DPE 2018) or the latest versions.

4.18.4 Issue 4: Noise and visual amenity

4.18.4.1 Issue

The community note that they should not have to plant vegetation around their property to mitigate noise or view impacts resulting from the Project.

4.18.4.2 Response

As identified in the EIS, there would likely be visual impacts to three receivers, and some noise impact to five. Noise generated by construction would be temporary and associated with construction traffic movements, enabling works, civil, structural, mechanical, electrical works and commissioning and demobilisation. During operation, noise impact would be generated by electrical plant associated with the BESS, such as inverters and transformers.

As outlined in the NVIA (refer to **Section 4.4.3**), the noise management levels (NML) are only likely to be marginally exceeded at residential receivers, reasonable and feasible noise mitigation measures and

work practices would be implemented. Treatment of the three residential receivers worst affected properties would be implemented in line with the Noise Policy or Industry (EPA, 2017) to address residual impacts. Vegetation screening, landscaping and construction of a noise wall are key components of the Project which address noise and visual amenity within the Project design. Details of landscaping proposed for the Site are provided in **Section 4.1**.

Safeguards and mitigation measures which would be implemented include:

- Preparation of a Construction Noise Management Plan that specifies:
  - Appropriate plant and equipment would be selected for each task to minimise the noise contributions
  - Turn off plant that is not being used where practicable ensure plant is regularly maintained, and repair or replace equipment that becomes more noisy
  - Noisier activities to be scheduled during less noise sensitive periods
  - Use non-tonal reversing alarms where practicable
  - Wherever feasible, turning circles would be created at the end points of vehicle work legs, which would allow trucks to turn and avoid the need for reversing
  - Emphasis would be placed during driver training and site induction sessions on the potential adverse impact of reversing alarms and the need to minimise their use
  - Consult with sensitive receivers that have been identified as likely to experience noise levels exceeding the noise management levels for the Project prior to, during and after construction.
- Ongoing detailed design would continue to seek opportunities to further reduce noise impact at the three residential receivers. If required following detailed design, treatment of the three residential receivers worst affected properties would be carried out in line with the Noise Policy for Industry (EPA, 2017) to address exceedances.
- Treatment could comprise the provision of mechanical ventilation and/or comfort conditioning systems.
- This would allow windows to be closed without compromising internal air quality/amenity. As the exceedance of the trigger levels is both during the evening and night-time periods, the treatment would apply to bedrooms and living rooms. Treatment would be installed before the Project becomes operational.

5.0 Updated project justification

This Submissions Report addresses the requirement to consider and respond to all submissions received during the exhibition of the EIS. It also provides minor clarifications/additions to the assessment of the Project. A refinement to the Project as described in the EIS (AECOM, 2021) is required following review of the submissions. This refinement has been considered in accordance with the criteria outlined in section 37 of the EP&A Regulations and Appendix D of the SSD guidelines. An updated description of the Project has been included in **Appendix A** which has built of the Project Description provided in the EIS and included the project refinements and relevant clarifications presented in this Submissions Report.

Overall, the EIS (AECOM, 2021) and this Submissions Report have concluded that the Project should proceed as it would:

- Be located in close proximity to key power utility infrastructure and identified future growth zones with regards to investment in renewable energy infrastructure. In this location, the Project would deliver critical energy infrastructure that would support the uptake of renewable generation in NSW, to help meet the objectives of the NSW Government's Electricity Strategy for the region
- Be located on a site that when compared to other options, presents environmental impacts that are equal to or less than other available options in the surrounding area
- Provide for the advantageous, orderly and economic use of land in a landscape that has a history of power generation and transmission alongside various rural and industrial land uses
- Meet the objectives of the Project
- Satisfy the principles of ESD as described in the EP&A Regulation.

In addition, the Project's environmental performance during construction would be demonstrated by implementing the CEMP (and associated sub-plans). These plans would be designed to comply with relevant legislation and conditions of consent. They would include a range of mitigation measures developed following the environmental assessment documented in the EIS and additional measures presented in this Submissions Report. Environmental performance during operation would be demonstrated by implementing the operational measures specified. The Project would result in several positive or beneficial environmental impacts with regards to surface water quality and flooding, socio economics, and air quality.

Taking into account the manageability of the identified impacts, the benefits of the Project would outweigh the potential impacts and the Project is considered to be in the public interest. Based on the findings detailed within the EIS and this Submissions Report, the Project is considered to be justified and is recommended to proceed subject to consent.

6.0 References

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Appendix A

Updated Project Description

Appendix A Updated Project Description

Neoen is proposing to use horizontal directional drilling (HDD) to install part of the transmission connection and had committed to using this approach to install the connection between the Site and the northern end of the rail corridor to avoid potential impacts to biodiversity values (refer to **Figure 4-1**). The distance between the Site and the northern end of the rail corridor is approximately 650 m (refer to **Figure 1-2**).

Following exhibition of the EIS, WaterNSW informed Neoen that the proposed transmission connection for the Project would cross an existing underground water pipeline (the Fish River Pipeline). Neoen consulted with WaterNSW to understand the separation distances and construction methods required to avoid impacting the Fish River Pipeline. The recommended separation distances mean that the transmission connection would need to make sharper turns underground than originally considered. The separation distances were discussed with the cabling contractors, and it was agreed that whilst the HDD methodology could still be used to cross from the Site to the northern end of the rail corridor, an additional entry/exit pit along this part of the alignment is likely to be required to account for the required separation distances and the turns required to install the transmission connection. The additional drill rig location means that the cable pulls between the pit locations are possible to complete.

Neoen has completed a review of the land between the Site and the northern end of the rail corridor and identified a suitable location for the additional drill rig location that would avoid as far as practicable additional environmental impacts. The location of the additional pit is shown on **Figure 4-1**.

The works relating to the use of the additional pit include:

7. Use of an existing unsealed vehicle track off Brays Lane to the proposed additional pit location (approximately 280 m in length)
8. Excavation down to approximately 1 m below natural ground to accommodate a prefabricated concrete cable joining pit
9. Installation of the joining pit (2.5 m x 9 m) and works required to join underground cables terminating within it
10. Establish a temporary equipment laydown area of 15 m x 12 m
11. Installation of a temporary drill rig of 15 m x 8 m
12. Rehabilitation of the hardstand and laydown area to allow it to return to close to its existing condition once construction is completed.

The refined alignment is depicted in **Figure A-1 in comparison to the original transmission alignment**. The refined areas of the transmission line which will use trenching and HDD methods is depicted in figure **Figure A-2.**

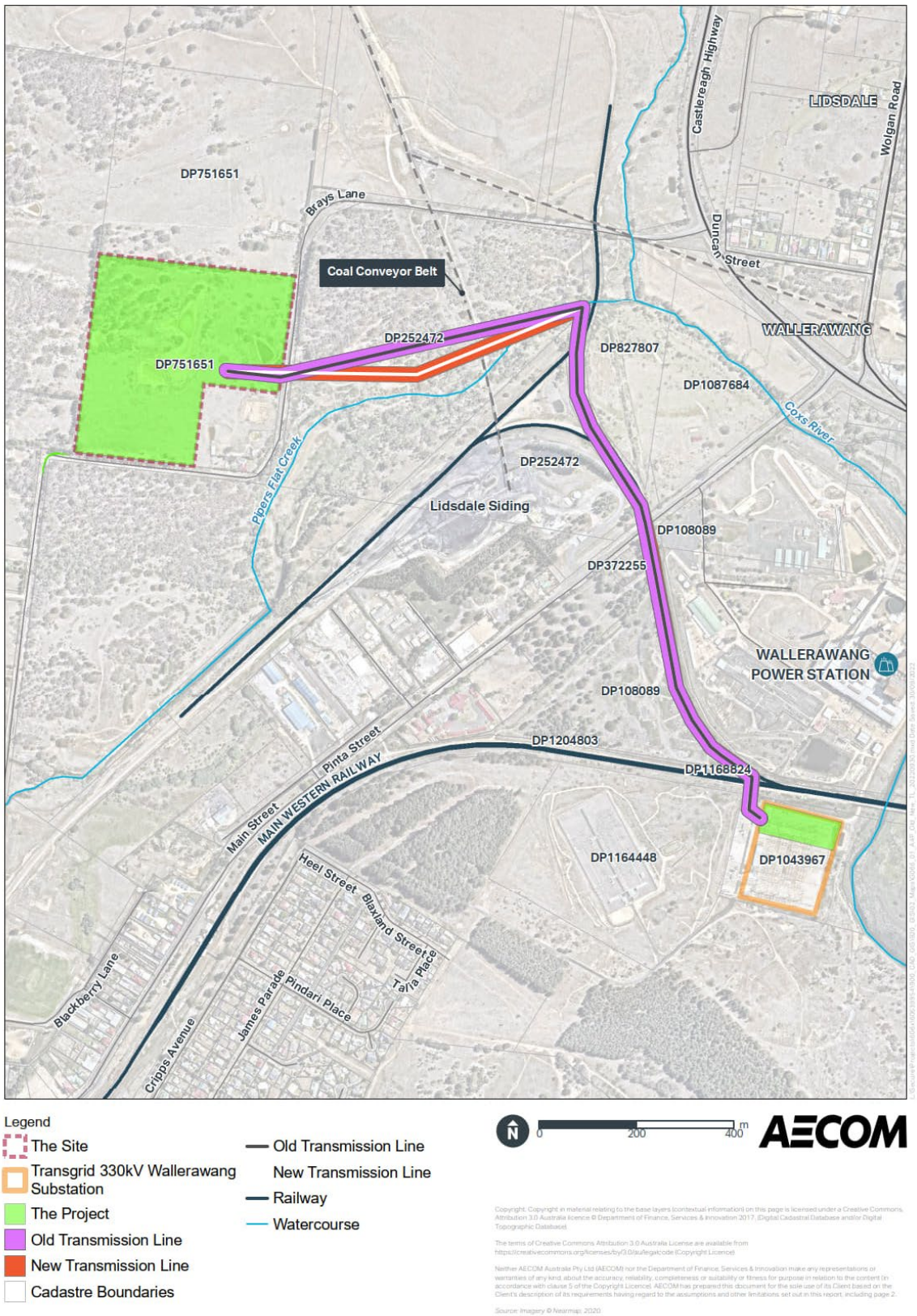

Figure A-1 Comparison between the original alignment and the project refinement

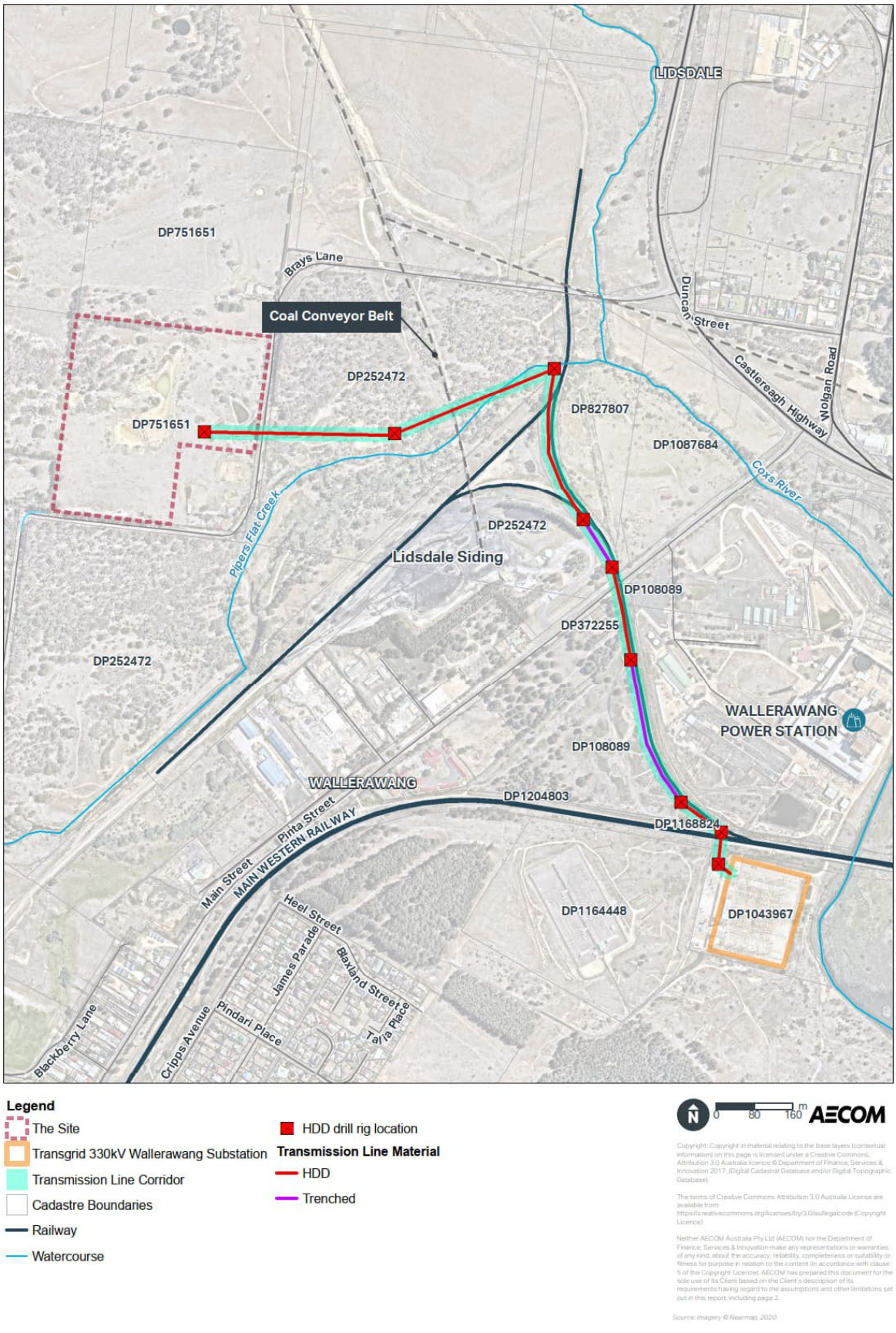

Figure A-2 Proposed location of trenching and HDD methods of installing the new transmission line

Updated landscape plan

A conceptual landscape plan is provided as **Appendix F**. The purpose of the landscape planting is to minimise the visual impact that the BESS would have on the surrounding residential receivers. The landscaped areas would assist in screening the 10 metre high noise walls within the Site, in order to mitigate sightlines from the south and east. Bioretention planting on the north of the Site would maximise pollutant removal whilst grass swales are introduced to the west of the BESS.

The proposed planting treatment draws upon the existing planting palette within the township and the wider Lithgow City Council region. Trees and shrubs that are native to the area would provide the appropriate heights and character to lessen the visual impact of the BESS.

The tree selection for site screening from the east includes *Eucalyptus blakelyi*, a hardy native tree that has a moderate to fast growth of up to 20 m tall. *Acacia obtusifolia* is a fast growing, bushy native tree that would assist in the screening of the noise walls and will grow up to 15 m. *Banksia integrifolia* is another hardy native tree growing at a moderate pace in full sun that will reach up to 15 m. Further emphasis on screening has been placed on the eastern boundary with the introduction of a large shrub planting mix. Southern and eastern large shrub planting has maximum maturity heights of up to 10 m. This combination of taller trees, shrubs and dense shrubs will help to mitigate the visual impact.

Due to the hardy nature of all proposed planting species, the landscape maintenance would be low, would not require a great deal of water once established and would grow quickly to minimise the potential for weeds. Species have also been chosen in accordance with their longevity in this environment. Planting would be managed in line with Asset Protection Zone requirements to reduce bushfire risks.

Addition of sliding doors to the noise walls

The openings in the noise walls, which are required for maintenance access would be sliding doors, and would be acoustically similar to a continuous wall. An updated figure reflecting this situation is shown below in **Figure 6-3.**

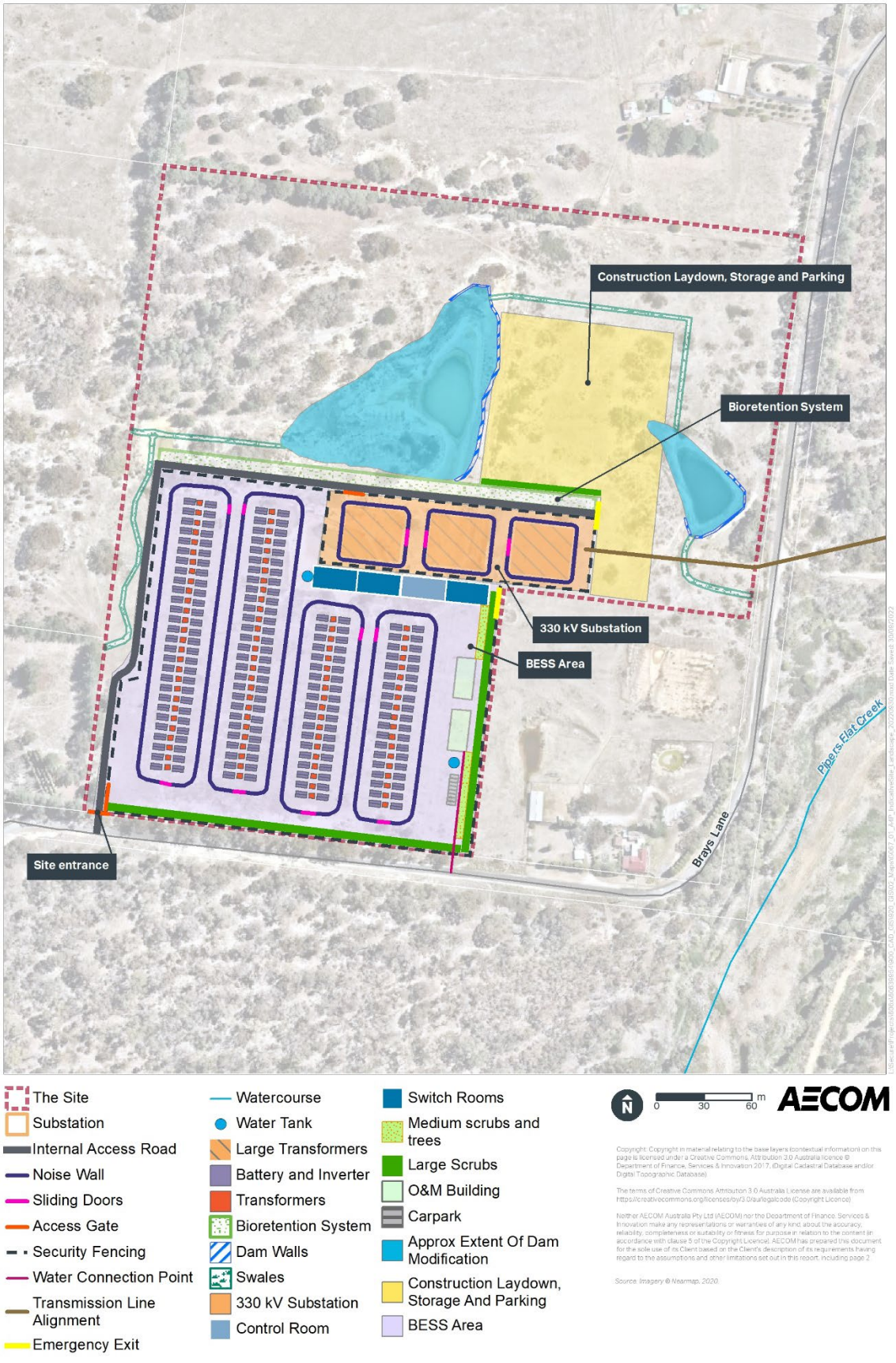

Figure A-3 Indicative Layout of the Site

Key features of the Project are summarised in **Table A-1**. These features comprise the updated proposed development for which development consent is sought under this State Significant Development Application (SSDA).

Table A-1 Key features of the Project

Project	Great Western Battery
Key features of the Project	
Key features	• Construction and operation of a BESS with a capacity of approximately 500 MW and 1000 MWh • Connection of the BESS via a new underground transmission line (up to 330 kV) to the existing Transgrid 330 kV substation at Wallerawang.
Proposed development	The Project would generally involve the following components: • Site establishment, including installation of fencing, environmental controls, grading and other civil works • Rearrangement of existing dams on the Site to comprise two dams, with associated dam walls and spillways • Construction of stormwater and flooding controls including a bioretention basin, and swales that would divert water towards the two dams and ultimately, convey water from the Site • Establishment of a new driveway located at the southern boundary of the Site, providing access to the Site from Brays Lane • Installation, commissioning, and operation of a large-scale BESS including battery enclosures, inverters, and transformers • Construction of new 330/33 kV substation on the Site (including outdoor switchgear (up to 330 kV) and transformers) • Construction of 10 m high noise walls around each battery row and around each transformer within the new 330/33 kV substation • Inclusion of a 10 m buffer (or Asset Protection Zone (APZ)) around all required infrastructure. This buffer area would comprise vegetation in accordance with appropriate APZ guidelines • Installation of a new underground transmission line from the BESS to the existing Transgrid Wallerawang 330 kV substation. This would be constructed using trenching and horizontal directional drilling (HDD) methods (**Figure 4-1**). HDD would be utilised where required to avoid areas of environmental sensitivity associated with waterways, biodiversity and Aboriginal heritage, as well as railway crossings. The transmission connection would be located approximately 1.5 m underground unless constraints dictated otherwise. • Connection of the new transmission line with the existing Transgrid Wallerawang 330 kV substation switchyard alongside minor upgrades to the switchyard • Construction of two single-story permanent operations and management (O&M) buildings • Construction of one control room and three switch rooms • Establishment of a new driveway and access road (up to 10 m wide), located at the south-western boundary of the Site, providing access to the Site from Brays Lane • Construction of a permanent car parking area with spaces for up to eight light vehicles • Installation of lighting, security fencing and security devices around the perimeter of the BESS area and 330/33 kV substation on the Site. • Installation of two 45 kL metal water tanks • Establishment of landscaping and screening vegetation • Provision of fire alert equipment

Project	Great Western Battery
	• A 400 kilovolt ampere (kVA) diesel generator with a 24 hour tank capacity would be stored at the Site for use during operation or use in case of an emergency • Vegetation trimming of trees located on Brays Lane, at the Site entrance. Any vegetation trimming would be limited to that required to provide egress for oversized vehicles during construction • Subdivision of Lot 4 DP 751651 to separate the existing rural residential use of the Lot from the proposed BESS
Project layout	Refer to **Figure 1-3**.
Site description	• The location of the Site is at 173 Brays Lane, Wallerawang, 2845, NSW. The Project would only occupy a portion of the total area of the Site. • The Transgrid Wallerawang 330 kV substation located at James Parade, Wallerawang (Lot 91 DP 1043967). • The new transmission line would connect the BESS at the Site to the Wallerawang 330 kV substation. In addition to the Site and the Wallerawang 330 kV substation, this new transmission line would cross the following lots: - Lot 8 and Lot 9 DP 252472 - Lot 2 DP 108089 - Lot 1 DP 108089 - Lot 10 DP 1168824 - Lot 1115 DP 1204803.
Access	Access to the Site would be via a new entrance on Brays Lane. During operation, access to Brays Lane: • from the north would be via the Castlereagh Highway / Brays Lane intersection • from the south would be via Pipers Flat Road and either: - Main Street and on to the Castelreagh Highway; or - Barton Avenue and on to the Great Western Highway. During construction, access to Brays Lane would be via: • Pipers Flat Road, Main Street and the Castlereagh Highway for light vehicles, heavy vehicles and oversized/overmass (OSOM) vehicles • Pipers Flat Road, Barton Avenue and Great Western Highway for light vehicles and heavy vehicles. During construction no access to Brays Lane from the Brays Lane / Castlereagh Highway intersection would be permitted for construction related vehicles. The new transmission line would be accessed via Brays Lane and / or Main Street, Wallerawang. The Transgrid Wallerawang 330 kV substation would be accessed via James Parade.
Grid connection	• An underground 330 kV transmission connection from the Site to the Transgrid Wallerawang 330 kV substation (approximately 1.5 km) would be constructed using a combination of trenching and underboring construction methods (refer to **Figure 4-1**) • Within the substation perimeter, the transmission connection would come above ground to connect to the substation switchyard.
Construction	
Construction activities	Construction works would involve: • Enabling works and prefabrication

Project	Great Western Battery
	• Civil, structural, mechanical and electrical works • Installation of transmission line • Commissioning • Finishes and demobilisation A construction laydown, stockpiling and parking area would also be provided on the Site.
Plant and equipment	A range of plant and equipment would be used during construction. The final equipment and plant requirements would be determined by the construction contractor. Indicative plant and equipment have been broadly categorised into the following activities: • Enabling works and prefabrication - Front end loaders - Dump trucks - Road trucks to deliver materials, plant, equipment and pre-fabricated elements of the Project - Water Trucks - Excavators - Graders - Compactors - Light vehicles • Civil, structural, mechanical and electrical works: - Front end loaders - Bobcat - Dump trucks - Road trucks - Excavators - Graders - Scrapers - Compactors - Water trucks - Hydro Vacuum Excavator - Concrete trucks and pumps - Elevated work platforms - Cranes - Concrete saws and grinders - Compacters and rollers - Scrapers - Backhoe - Generators (where connection to existing utilities is not available) - Light vehicles, heavy rigid and articulated trucks (including multi trailer) low loaders • Installation of transmission line: - Directional drilling rig truck and associated infrastructure (i.e. drilling fluid recovery and recycling unit) - Pump/s for dewatering - Hydro Vacuum Excavator - Telehandlers - Water Trucks - Excavators/backhoe - Graders - Compactors - Light vehicles - Excavators - Concrete saws and grinders - Crane Truck

Project	Great Western Battery
	- Tipper Truck - Cable installation kit: Rollers, crawlers, cable winches, synthetic draw ropes - Concrete supply • Commissioning: - Elevated work platforms - Cranes - Generators (where connection to existing utilities is not available) - Light vehicles • Finishes and demobilisation: - Heavy vehicles - Water trucks - Backhoe - Compactors - Light vehicles
Construction duration	• Construction of the Project will take approximately 12 months to complete
Construction workforce	• Up to 200 construction workers would be required at the busiest peak of construction for a period of about two months • Outside of this peak time, an average of about 50 workers a day would be required • These workers would be preferentially sourced locally where appropriate skill sets are economically available.
Construction hours	The construction activities would be primarily carried out during standard construction hours, as defined by the NSW Environment Protection Authority's (EPA) *Draft Construction Noise Guideline* (2020), being: • 7am to 6pm, Monday to Friday • 8am to 1pm, Saturdays • No work on Sundays or public holidays. While it is anticipated that work would primarily take place during standard construction hours, some works may be required to be undertaken outside of standard hours. Where this would be required, this would occur Monday to Saturday, 6am to 6pm. Where work outside of standard hours may be required, the noisiest works would be scheduled to occur during standard hours listed above.
Construction traffic volumes	On average, construction of the Project would require up to 50 light vehicles, and 20 heavy vehicles per day. During the two months that would comprise the peak construction period, up to 200 light vehicle and 20 heavy vehicle movements in the morning and afternoon could be required. The use of shuttle buses has been proposed to reduce light vehicle movements to the Site. This is discussed further in **Section 4.5.3**. OSOM vehicles are expected to be required to deliver large pre-fabricated elements for the construction of the Project. This is likely to include eight (8) oversized vehicles to transport the crane, transformers, switch rooms and control room to the Site. The transformers are expected to weigh between 140 to 180 tonne (T) each. The switch rooms would be about 23 m long x 4.5 m wide x 4 m high and would weigh about 60 T.

Project	Great Western Battery
Operation	
Operational life expectancy	The Project has an initial design life of 20 years. There is potential to extend the life beyond 20 years, in which case components are anticipated to be replaced or upgraded as required.
Operational workforce	• The Project would be an unmanned facility that is managed remotely • Between five to six employees would be required to attend the Site periodically for maintenance activities.
Operation maintenance equipment	• Light vehicles • Lawn mowers • Assorted hand-held power-tools • Pressure washers.
Security	• Up to a 2.7-metre-high security fence would be constructed around the perimeter of the BESS • All access to the BESS would be controlled through an access point off Brays Lane • Areas within the Site not required for the operation of the BESS would be rehabilitated to as close to its existing condition as practical. This remaining land would be fenced with stock fencing or similar.
Typical operating scenario	• The BESS is expected to operate on a 24 hour per day, seven days per week basis • The BESS is expected to undergo approximately one charge and discharge cycle per day, averaging 365 full cycles per year.
Services and infrastructure	Existing services and utility infrastructure in the nearby vicinity would be extended, adapted and augmented to meet the demands of the Project. This would include a connection to the existing potable water supply and the existing 11 kV electricity line, located within Brays Lane. This connection would be made within Brays Lane (as shown on **Figure 1-3)** and would travel underground (using a trenching method) to connect with the new O&M building on the Site. A water holding tank would be installed in the vicinity of the new O&M building to collect wastewater generated during the operation of the Project (from worker facilities). During operation, the water holding tank would be periodically collected by a licenced operator, and wastewater would be appropriately disposed of offsite.
Decommissioning	
Decommissioning	The BESS is intended to have an operational life of up to 20 years and, depending on the selected technology components, may be replaced and/or upgraded to extend this timeframe. Following the end of economic life, above ground components would be removed and re-purposed where possible and land rehabilitated to achieve existing conditions as far as is reasonably practicable, if and as required, in accordance with applicable Federal, State, and Local legislative permits, approvals and regulatory requirements at the time.

Appendix B

Mitigation measures

Appendix B Mitigation Measures

Management and mitigation measures

Management and mitigation measures that would be implemented for the Project to address potential environmental and social impacts are listed in **Table B-1**.

These measures may be further amended following review of the draft conditions of consent to ensure they are consistent with potential future requirements relating to the development consent. Consistency changes at this point will be discussed and agreed with DPE.

Where additions have been made to the mitigation measures in light of the submissions received, they are shown in bold.

Table B-1 Management and mitigation measures

ID	Management and mitigation measure	Timing
General		
G1	Neoen would prepare and implement a CEMP and sub-plans for the Project, which include the measures outlined in this table, relevant conditions of consent and the relevant requirements of other approvals.	Construction
G2	Neoen would appoint an Environmental Management Representative to monitor the implementation of all environmental management measures. The EMR would ensure that conditions of consent and management and mitigation measures are being met or effectively applied during construction and that the work is being carried out in accordance with the CEMP and other relevant requirements.	Construction
G3	Community engagement would be maintained throughout the construction of the Project. A specific email address, dedicated phone number and online forum would be set up to receive and address questions, comments and concerns from the community.	Construction
G4	**A Fish River Pipeline Management Plan (FRPMP) would be produced as part of the Construction Environmental Management Plan (CEMP). This plan would be produced in consultation with WaterNSW and would be based on the outcomes of non-destructive investigations.**	**Prior to construction**
G5	**The Fish River Pipeline Management Plan (FRPMP) would include the following mitigation measures** • **All excavation work would be completed with reference to the Work Health and Safety (Excavation Work) Code of Practice by Safe Work Australia** • **All works would be undertaken in accordance with Australian Standard (AS3798:1996) Guidelines on earthworks for commercial and residential developments** • **Unobstructed access would be provided to inspection points, values and scour lines to allow ongoing maintenance by Water NSW**	**Prior to construction**

ID	Management and mitigation measure	Timing
	• If required, geotechnical investigations should be undertaken in accordance with the following relevant guidelines and standards: - Australian Standard 1726 Geotechnical Site Investigations - Australian Standard 1289 Methods of Testing Soils for Engineering Purposes. • The HDD drill rigs and the associated excavations would not be located within 5 m of the surface location of the Fish River Water Supply Pipeline. • The transmission connection would be installed at least 4 metres below the Fish River Water Supply Pipeline unless agreed otherwise with WaterNSW. • Unless otherwise agreed with WaterNSW, the installation of the transmission connection must not trigger the maximum allowable limits set within the German Standard DIN 4150 – Part 3 - Structural Vibration Part 3: Effects of vibration in structures, when measured at the Fish River Water Supply Pipeline or another agreed location. Evidence of compliance with this measure would be documented within the FRPMP. • If required, a vibration monitoring program or procedure would be developed and included within the FRPMP. As and where needed, this would include vibration monitoring requirements before and during drilling works at relevant transmission connection / pipeline intersection locations.	
G6	In line with the requirements of the Warragamba Guideline, the FRPMP would: • Demonstrate how the Project would not present a safety risk to Water NSW personnel and would avoid damage to the Fish River Water Supply Pipeline and related infrastructure, including but not limited to risk from: - Earth Potential Rise (EPR) and step and touch potentials being above acceptable limits - Load current and Fault current Low Frequency Induction (LFI) - Capacitive coupling during storage, handling, and construction of pipeline - A.C. and D.C. Traction systems - Accidental contact of pipelines with other electrical systems such electrical distribution or traction systems. • Confirm how the Project would not increase stray currents and where risk is identified, complete testing: - Prior to construction and energisation - Post construction and energisation - Under normal operational load conditions.	Prior to construction

ID	Management and mitigation measure	Timing
	• **Demonstrate how the requirements of AS/NZS4853 Electrical Hazards on Metallic Pipelines standard, would be addressed (where applicable)** • **Demonstrate how the requirements of AS 2832.1 Cathodic Protection of Metals, Part 1: Pipes and Cables standard, would be addressed (where applicable)** • **Confirm how future excavation and construction work planned by Water NSW would not be impeded by earthing grids of electrical infrastructure potentially related to the Project.** • **Include a notification requirement to inform Water NSW of any new or altered electrical conditions within 1 km of Fish River Water Supply Pipeline related to the Project.**	
G7	**Neoen would provide the final works as executed plans for the transmission corridor once the installation and commissioning of the transmission connection is complete**	**Post-construction**
Biodiversity		
B1	A Biodiversity Management Plan would be prepared for the Project. This plan would include management and monitoring measures to be implemented to mitigate potential biodiversity impacts which could occur during construction. The following measures would be included in the plan: Appropriate exclusion fencing would be installed to the boundary of the retained vegetation and any construction areas where there is some potential for accidental encroachment. This would include appropriate signage such as 'No Go Zone' or 'Environmental Protection Area' to protect areas of biodiversity value. No Go Zones or similar would be identified in site inductions and communicated to all construction personnel. Internal fencing / barricades are to be used to establish Tree Protection Zones (TPZs) around retained individual native trees (ie biodiversity values that are not part of existing 'No Go Zones') in accordance with the Standards Australia Committee (2009). All construction site perimeter fencing is to be of a design that excludes terrestrial fauna, so as to minimise the risk of Koala ingress to the construction site. All material stockpiles, vehicle parking and machinery storage should be located within the areas proposed for clearing, and not in areas of native vegetation that are to be retained. Weed and pathogen management measures including weed hygiene protocols for personnel, machinery and construction materials entering and exiting construction	Pre-construction

ID	Management and mitigation measure	Timing
	areas to minimise risk of weed and pathogen introduction and spread.	
B2	All vegetation is to be inspected immediately prior to removal, by a qualified ecologist, to confirm absence of resident fauna.	Construction
B3	Measures to minimise light pollution impacts (adapted from Part 4 (good lighting design principles) of the Dark Sky Planning Guideline (DPE 2016)), would be implemented as appropriate. The following measures would be considered: Installing light fitting shields with an opaque cover, mounted horizontally across the top of the lighting module to allow only the downward projection of light Directing lights downwards and avoid reflecting light skywards Utilising low beam angles that are close to vertical where possible to minimise light glare. Security lighting within the construction site would be minimised and is to be oriented such that light spill beyond the subject land and in to patches of retained vegetation is minimised.	Construction, operation
B4	Dam dewatering is to be undertaken during the dam works to ensure that fauna within the dams is salvaged and relocated by an appropriately experienced ecologist (an ecologist would only be required on site when dam water levels are below 1/3 capacity).	Construction
B5	Selection and retention of suitable logs (>10 centimetres diameter only) and hollows for placement within retained native vegetation adjoining the subject land.	Construction
B6	Where appropriate native vegetation cleared from the subject land would be mulched for re-use on the Site to stabilise bare ground.	Construction
B7	Offsetting requirements of this Project would be met as determined by the BAM Calculator following detailed design.	Detailed design
B8	**Where rehabilitation of groundcover is required for agricultural purposes, local grass species would be used**	**Construction**
Aboriginal heritage		
AH1	An Aboriginal Cultural Heritage Management Plan (ACHMP) would be prepared for the Project. This would guide the management of Aboriginal cultural heritage within the Project area for the duration of the Project. The ACHMP would be subject to periodic review to ensure that all management policies are being adhered to and are working effectively.	Detailed design

ID	Management and mitigation measure	Timing
AH2	An archaeological salvage program incorporating surface collection and manual open area excavation would be conducted for the stone quarry site, GWB-STQ1-21. Salvage activities within GWB-STQ1-21 would be undertaken in accordance with the salvage methodology provided in **Appendix M** of the ACHAR	Prior to construction
AH3	High-visibility fencing should be installed along the boundary of the SU1a-A5 site and be actively maintained throughout the construction phase of the Project. The location of SU1a-A5 should be clearly defined within the CEMP and any associated plans as an 'environmental no go zone'. Should Neoen and/or its contractors require use of the vehicle track within SU1a-A5, alternative access arrangements should be investigated and detailed in the ACHMP	Prior to construction
AH4	An Unexpected Aboriginal Heritage Finds Procedure (UAHFP) would be included in the ACHMP to cover the unanticipated discovery, at any point outside of the GWB-STQ1-21 salvage program, of an actual or potential Aboriginal heritage item for which Neoen does not have an existing management process in place. The procedure should cover all Aboriginal objects (as defined by the NPW Act), including human skeletal remains.	Detailed design
AH5	Provisions regarding appropriate consultation protocols with RAPs should be incorporated into the ACHMP. Contact details and preferred contact methods for each RAP, as well as other relevant stakeholders, should be specified.	Construction
AH6	The Project's standard environmental site induction would include an Aboriginal heritage component. At a minimum, this would outline current protocols and responsibilities with respect to the management of Aboriginal cultural heritage within the Project Area (including the unexpected finds protocol) and provide an overview of the diagnostic features of potential Aboriginal sites and objects	Construction
AH7	Any Aboriginal archaeological works carried out under the ACHMP for the Project would be prepared to a standard comparable to that required by the Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW. Printed and/or digital copies of any associated reports should be made available to RAPs upon request.	Construction
AH8	The proposed transmission line would be installed beneath artefact scatter SU1a-A5 using underboring (the method of Horizontal Directional Drilling would likely be used). The launch pit, receiving pit and any associated works or activities related to these 'pits' would be located outside of the SU1a-A5 site.	Construction

ID	Management and mitigation measure	Timing
AH9	The Addendum ACHAR study area would be subject to a visual inspection prior to the commencement of ground disturbing works within this area. The inspection should be undertaken by a field team consisting of a qualified archaeologist and minimum of one RAP field representative.	Construction
AH10	Any Aboriginal objects identified during the visual inspection referenced in AH9 would be subject to surface collection as part of the archaeological salvage program for impacted stone quarry site GWB-STQ1-21 (45-1-2853). Any such objects would be considered to comprise part of GWB-STQ1-21. If required, the boundary for GWB-STQ1-21 should be revised and updated in the Aboriginal Heritage Information Management System (AHIMS) database.	Construction
AH11	Contractors engaged to complete the proposed works should be made aware of the nature and location of previously recorded Aboriginal sites GWB-STQ1-21 (45-1-2853) and Brays Lane AS1 (45-1-2799), both of which are located in the immediate vicinity of the Addendum ACHAR study area.	Construction
AH12	An 'environmental no go zone' would be clearly defined within the CEMP and associated plans over the area identified by Biosis (2017) as Brays Lane AS1 (45-1-2799) shown on Figure 9-1 in the EIS.	Construction
AH13	**All light and heavy vehicle movements within the bounds of previously recorded artefact scatter SU1a-A5 (45-1-2716) should be restricted to the existing vehicle track that is present within this portion of the study area. An access corridor centred on the existing track and taking into account the maximum width of the vehicles required for the HDD installation process should be demarcated** **using high visibility fencing. Fencing should be installed prior to works commencing and remain in place until works are completed. All fencing works should be undertaken by, or under the supervision of, a qualified Aboriginal heritage specialist and minimum of one RAP representative. Sections of SU1a-A5 outside of the recommended access corridor should be clearly defined in the Project's CEMP as 'no-go' zones.**	**Prior to construction and construction**

ID	Management and mitigation measure	Timing
AH14	**To ensure no inadvertent impacts during construction, newly recorded isolated artefact 'GWB-IA1-22' should be protected via high visibility fencing. Fencing should be installed prior to works commencing and remain in place until works are completed. All fencing works should be undertaken by, or under the supervision of, a qualified Aboriginal heritage specialist and minimum of one RAP representative. The location of GWB-IA1-22 should be clearly defined in the Project's CEMP as a 'no go zone'.**	**Prior to construction**
AH15	**Proposed management measures for SU1a-A5 and GWB-IA1-22 should be included in the Project's Aboriginal Cultural Heritage Management Plan (ACHMP).**	**Prior to construction**
AH16	**Should any confirmed or suspected Aboriginal objects be identified within the Addendum ACHAR study area during construction, the Unexpected Aboriginal Heritage Finds Procedure (UAHFP) detailed in the ACHMP should be followed.**	**Construction**
AH17	**All contractors engaged to complete the proposed works within the Addendum ACHAR study area should be made aware of the nature and location of SU1a-A5 and GWB-IA1-22, as well as their associated 'no-go' zones.**	**Prior to construction and construction**
Non Aboriginal heritage		
HH1	The CEMP would include a stop works procedure for unexpected finds in the unlikely event that intact archaeological relics or deposits are encountered.	Construction
HH2 (This is also provided in measure NV14)	To avoid damage occurring, where feasible high vibratory construction methods would not be used within 50 m of St John the Evangelical Church. Should high vibratory methods be used within 50 m of the church, these will not proceed within the minimum working distances unless a permanent vibration monitoring system is installed around 1m, from the building footprint, to warn operators (e.g. via flashing light, audible alarm, SMS) when vibration levels are approaching the peak particle velocity objective.	Construction
Surface water, flooding and water use		
SW1	A Soil and Water Management Plan (SWMP) would be prepared for the Project in accordance with the requirements and principles of the Managing Urban Stormwater – Soils and Construction, Volume 1 (the Blue Book) (Landcom 2004), Volume 2A (DECC1 2008 a) and Volume 2D (DECCW 2008b). This plan would include management and monitoring measures to be implemented to mitigate the potential surface water quality	Pre-construction

ID	Management and mitigation measure	Timing
	impacts which could occur during construction. This plan would outline: • The objectives of the SWMP • Performance criteria and key performance indicators to measure the success of plan • Legislative requirements including reference to relevant conditions of consent and management and mitigation measures • A summary of the activities that are likely to cause impacts related to soil and water and the potential impacts identified in the SSD application documentation • A summary of the proposed approach to managing potential impacts • A list of the measures that would be implemented to meet the legislative requirements and the performance criteria alongside information on who is responsible for each measure and the frequency and/or timing that applies to each measure • An outline of the monitoring requirements that would be implemented to meet the legislative requirements and the performance criteria alongside information on who is responsible for monitoring and the frequency and/or timing that applies • Information on reporting requirements and the approach to corrective actions. The principal performance criteria for the Project during construction would be to ensure that surface water flows leaving the Site or worksites along the transmission line corridor have a neutral of beneficial effect on the water quality of Pipers Flat Creek and/or Coxs River.	
SW2	Where existing drainage lines are to be impacted during construction, an alternate (diversion) path, of equal capacity, would be established at the start of the construction works.	Construction
SW3	Areas established within the Project Area for stockpiling would be planned, operated, and decommissioned in accordance with the RTA Stockpile Site Management Guideline 2011 and the Blue Book (Landcom, 2004).	Construction
SW4	The rehabilitation of disturbed areas would be undertaken progressively as construction stages are completed, and in accordance with the Blue Book (Landcom, 2004).	Construction
SW5	Following the installation of the transmission line, all trenched areas would be backfilled, grassed areas would be re-established in accordance with the Blue Book (Landcom, 2004).	Construction

ID	Management and mitigation measure	Timing
SW6	Following the completion of the construction work, the construction laydown area would be broadly returned to the pre-development conditions in accordance with the Blue Book (Landcom, 2004). Any channels installed to divert flows around the laydown area during the construction phase would be removed and a vegetated swale would be established to broadly follow the natural contours of the land between Dam 4 and the Dam 5 spillway following the completion of construction.	Constructed
SW7	Consistent with the SWMP, control measures would be implemented to minimise risks associated with erosion and sedimentation and entry of materials to drainage lines and waterways. Controls that would be considered, include: Identification of upslope run-on waters from undisturbed areas of catchment and diversion of these around un-stabilised areas of the Site Sediment management devices, such as fencing, hay bales or sandbags, coir logs and graded or lined earth or sandbag diversion bunds and banks Measures to divert, capture and/or filter water prior to discharge, such as drainage diversion channels and sediment sumps or traps Scour protection and energy dissipaters at locations of high erosion risk Installation of measures at key work entry and exit points to minimise movement of material onto adjoining roads, such as rumble grids or wheel wash bays, or regular sweeping Location and storage of construction materials, fuels, and chemicals, including controls where possible would be managed in accordance with Managing urban stormwater: soils and construction (the Blue Book). Controls may include: Cover before significant weather events Bunds Diversion of offsite flows away from storage Stabilised laydowns Storage clear of frequently flooded low-lying areas Stabilisation of the surface of batters and drains, including temporary works and diversions.	Construction

ID	Management and mitigation measure	Timing
SW8	A Spill Management Procedure would be prepared and implemented during construction. This procedure would form part of the CEMP (or one of its subplans). The Spill Management Procedure would address, but not necessarily be limited to: • Management of chemicals and potentially polluting materials • Specialist containment, security and bunding requirements • Maintenance of plant and equipment • Emergency management, including notification, response, and clean-up procedures • Spill kits would be located close to locations where chemicals, fuels, oils etc. are stored.	Construction
SW9	Discharge of potentially contaminated runoff, originating from the construction site, would not occur without prior treatment or testing, and/or necessary approvals. Surface water would be managed in accordance with the Blue Book (Landcom, 2004). If potentially contaminated water cannot be treated onsite, then it would be collected, tested and disposed offsite at an appropriately licensed facility.	Construction
SW10	Regular monitoring of weather and rainfall conditions would be conducted to identify severe weather warnings and potential flood conditions for the Project Area. Procedures would be included in the CEMP to cease work and secure equipment to ensure safety of workers prior to and during potential flood conditions.	Construction
SW11	The stormwater and drainage design for the Site would be finalised at detailed design. Water sensitive urban design (WSUD) measures would be incorporated into the drainage design to treat surface water before discharging to the receiving waterway. Stormwater treatment devices would be used to ensure a Neutral or Beneficial Effect (NorBE) on runoff water quality. A bioretention system is proposed, but other options may be considered provided that an equivalent or better performance outcome can be achieved. If a bioretention system is to be installed, the following measures would be undertaken prior to and during construction of the bioretention basin: • The design and construction of the bioretention basin would be overseen by a person with previous experience in the construction and successful operation of these systems • Drainage systems, filtration media and vegetation would be installed in line with agreed designs • Erosion and sediment control measures would be in place during the construction phase of the Project to ensure that the bioretention systems are protected from high sediment loads • The bioretention system would be brought online at the end of the construction phase once major	Design, operation

ID	Management and mitigation measure	Timing
	earthworks at the Site are complete to minimise the risk of clogging from sediments • Vegetation would be selected based on local climate and rainfall regime.	
SW12	The proposed dam modifications would be designed in accordance with any relevant guidelines, standards, and assessment and certification requirements (which may include; Dam Safety NSW guidelines (Dam Safety NSW 2021), *Dam Safety Act 2015* (NSW Government 2019) and *Dams Safety Regulation 2019 (NSW Government 2020)*) to help ensure that: • The dams meet relevant design and safety standards • Embankments are stable and unlikely to fail • Each dam has a designated and suitably designed spillway. • An appropriate maintenance and inspection plan is in place.	Design, operation
SW13	The Site drainage would be designed to drain the BESS area to the proposed Dam 5. Dam 5 would provide attenuation for increases in peak flows that result from the Project.	Design, operation
SW14	The ground surface of the BESS area would be set at a level above the 1 % AEP flood event so that the infrastructure would not be impacted by regional flooding. The office buildings, inverters, transformers and batteries would be elevated above surface level on concrete pads to protect them from potential local flooding impacts.	Design, operation
SW15	Operational maintenance requirements for bioretention systems would include: • Monitoring for scour and erosion • Monitoring for and regular removal of accumulated litter, fine sediment, pests and debris • Weed removal and plant re-establishment to maintain high nutrient removal efficiency • Monitoring overflow pits for structural integrity and blockage • If clogging or contamination is observed, replacement of vegetation and the filter media layer may be required. • **Monitoring would be undertaken four times per year, and after significant rainfall.** • **Monitoring and maintenance would be undertaken by personnel knowledgeable in the function of stormwater treatment systems and experienced in bush regeneration**	Operation
SW16	Where feasible, runoff would be collected from buildings into rainwater tanks at the Site and used during operation as needed.	Operation
SW17	Wastewater collected onsite would be periodically removed by a licensed waste contractor.	Construction, operation

ID	Management and mitigation measure	Timing
SW18	**Proprietary products used for stormwater treatment would be installed and maintained in accordance with the manufacturer's recommendations.**	**Construction and Operation**
SW19	**Opportunities to reduce the area required for the bioretention basin whilst still maintaining compliance against NorBe requirements would be investigated during detailed design.**	**Prior to construction**
SW20	**A wastewater management report would be prepared during detailed design, which would confirm the design and supplier of the proposed holding tank and pump-out system and the respective operation and maintenance requirements.**	**Detailed design**
Geology, soils, contamination and groundwater		
SGC1	A Soil and Water Management Plan (SWMP) would be produced which would include measures to manage potential impacts related to soils, surface water flows and contamination risks. This SWMP would include: Measures to manage erosion and stormwater including a specific Erosion and Sediment Control Plan (ESCP) for the construction works at the Site to show where specific controls will be employed and to help ensure that erosion is minimised and nearby watercourses are protected Stockpile management procedures for segregating spoil and preventing cross-contamination of clean spoil (virgin excavated natural material or excavated natural material) with potentially contaminated soil Measures for stockpiles and storage areas to be located near the upstream (eastern) end of the Site, to prevent any loose materials being washed away into the downstream drainage system Procedures for handling and storing spoil, including potentially or known contaminated soil/fill in accordance with the POEO Act, and protocols for waste classification and tracking for off-site disposal Measures to manage the unexpected interception of groundwater during construction Measures to manage unexpected contamination finds during construction Emergency response measures including clean-up and reporting procedures. Measures within the SWMP and ESCP would be developed in line with the 'Blue Book' Managing Urban Stormwater: Soils and Construction Guidelines (Landcom, 2004). The ESCP would be designed to ensure that surface water flows leaving the Site would have a neutral of beneficial effect on the water quality of Pipers Flat Creek.	Construction

ID	Management and mitigation measure	Timing
	Documentation of relevant work health and safety (WH&S) standards and controls for the works including the standard use of personnel protective equipment (PPE) to mitigate the risk of being exposed to potentially contaminated materials (such as long clothing). **An unexpected finds protocol (UFP) as part of the CEMP, which should be used to manage any unexpected contamination which may be encountered during construction works.**	
SGC2	Where soil or ground is to be left exposed for more than 3 days, a soil binder would be used to help prevent water and wind induced erosion. Binders or covers would be used on soil stockpiles where these stockpiles are to be in situ for more than 24 hours.	Construction
SGC3	Bare ground and exposed soils across the Site would be rehabilitated and returned to its pre-development condition or would be landscaped. A Landscaping Plan would be developed for the Site to show the types of species that would be planted following construction of the Project. Where suitable native and endemic species would be used to Site.	Construction
SGC4	The following measures would be included as part of the SWMP to mitigate potential impacts to groundwater: Impermeable barriers would be placed between the source(s) of contamination (e.g. contaminated soil stockpiles or certain construction materials) and the natural ground Potentially contaminating substances such as chemicals, fuels, oils and caustic (drilling mud additive) will be handled and stored in accordance with relevant Australia Standards and the NSW EPA's Storing and Handling of Liquids: Environmental Protection – Participants Handbook (DECC, 2007).	Construction
SGC5	Waste created during construction and operation would be classified in accordance with the NSW EPA (2014) *Waste Classification Guidelines,* appropriate segregated, contained and disposed at an appropriately licenced waste facility.	Construction, operation
SGC6	A spill response plan would be developed for the construction and operational phases of the Project. Spill kits would be located close to locations where chemicals, fuels, oils etc. are stored.	Construction, operation
SGC7	A Drilling Fluid Management Plan would be produced to guide the environmental management of the underboring work. The drilling would be undertaken by a drilling engineer who is appropriately trained and experienced.	Construction

ID	Management and mitigation measure	Timing
	In the event that construction works intercept groundwater, the make-up of the drilling fluid would be determined by an appropriately qualified drilling fluid engineer, based on local groundwater and soil geochemistry so that it forms a suitable wall cake to minimising fluid loss and exchange with local groundwater. Inert or non-contaminating additives for drilling fluids would be used. Drilling fluid additives used would be certified for use in potable aquifers (certified to American National standards Institute (ANSI)/NSF International (NSF) STD 60 Certified well Drilling Aids and well Sealants). The drilling fluid additives would be closely monitored by the drilling fluid engineer and driller so that it remains chemically stable and volumetrically balanced with the progression of the hole and, if necessary, modified to maintain stability and minimise interaction with the groundwater.	
SGC8	Prior to construction commencing, soil samples would be collected where trenching is proposed and tested for contaminants of potential concern to determine presence and whether contamination levels pose a health risk to construction workers. Soil samples should be taken in accordance with the NSW EPA (1995) *Sampling Design Guidelines.* Where contaminated soils or fill are present and do not meet commercial and industrial standards, this material would be excavated, stored on an impermeable surface and covered or contained, tested to confirm its waste classification, and disposed offsite to an appropriately licenced facility. Where backfill is required, material of at least a commercial / industrial standard would be used.	Design
SGC10	Where water is removed from excavations that are likely to be contaminated, it will be collected, contained, tested and disposed offsite to an appropriately licenced facility.	Construction
SGC11	The approach to managing contaminated soils, fill or groundwater would be detailed in the SWMP for the Project. Areas along the transmission line corridor where trenching is proposed would be identified, if these areas are contaminated and could pose a risk to human health or ecological receptors, measures required to manage these risks will be identified.	Construction
SGC12	The diesel at the Site would be stored in line with NSW EPA's Storing and Handling of Liquids: Environmental Protection – Participants Handbook (DECC, 2007). It would be stored on an impermeable surface in a bunded area where a potential leak or spill can be contained and would not enter the Site's stormwater management	Operation

ID	Management and mitigation measure	Timing
	system. The bund would be able to contain 110% of the volume of the diesel stored at the Site.	
SGC13	The transformers at the Site would be designed in line with the relevant Australian Standards for power transformers. The transformers at the Site would be designed in line with the appropriate Australian Standards and located within impermeable bunds which are designed to contain 110% of the volume of the oil in the transformer.	Operation
Noise and vibration		
NV1	A Construction Noise and Vibration Management Plan would be prepared for the Project. This plan would include management and monitoring measures to be implemented to mitigate and manage noise and vibration impacts which could occur during construction. This plan would outline: • The objectives of the CNVMP • Performance criteria and key performance indicators to measure the success of plan • Legislative requirements including reference to relevant conditions of consent and management and mitigation measures • Identification of nearby sensitive receivers • Description of approved construction hours • Description and identification of all construction activities, including work areas, equipment and duration • A summary of the activities that are likely to cause impacts related to noise and vibration and the potential impacts identified in the SSD application documentation (including the EIS) • A list of the measures that would be implemented to minimise noise and vibration impacts including performance criteria alongside information on who is responsible for each measure, and the frequency and/or timing that applies to each measure would also be detailed • A complaint handling process • An outline of the noise and vibration monitoring requirements • Overview of community consultation required for identified high impact works.	Pre-construction
NV2	A noise monitoring program would be implemented for the duration of the construction works and would focus on the use of high noise generating plant (e.g. jack hammering, rock breaking).	Construction
NV3	During construction, sensitive receivers that may be affected by noise impacts from the Project would be notified (by letterbox drop or equivalent) 7 days in advance of works that may affect their property.	Construction

ID	Management and mitigation measure	Timing
	The proponent would set up and operate a Project website, project infoline, community complaints and enquiries hotline during construction. Community and stakeholder meetings would be undertaken as required.	
NV4	All construction works would receive an induction prior to commencing work that would include information on measures and approaches to reduce noise during works. Measures to be discussed as part of this induction and to be employed during the construction works include: • No swearing or unnecessary shouting or loud stereos/radios on Site. • No dropping of materials from height, throwing of metal items and slamming of doors. • Where practicable avoid simultaneous operation of noisy plant within discernible range of a sensitive receiver. • Where practicable, identifying opportunities to maximise the distance between noisy plant and adjacent sensitive receivers • Shutting down or throttling down plant used intermittently • Turning off plant and vehicles when not in use • Where practicable, directing noise-emitting plant away from sensitive receivers.	Construction
NV5	Vibration intensive work would not proceed within the minimum working distances unless a permanent vibration monitoring system is installed approximately a metre from the building footprint, to warn operators (via flashing light, audible alarm, SMS) when vibration levels are approaching the peak particle velocity objective.	Construction
NV6	Construction would be carried out during the standard daytime working hours as defined by the ICNG unless: • Otherwise agreed to by DPE under an approved out-of-hours work protocol, or • The works are low noise generating works that can be demonstrated to meet NMLs	Construction
NV7	Quieter and less vibration emitting construction methods would be identified during detailed design and employed if feasible and reasonable.	Construction
NV8	Equipment would be regularly inspected and maintained to help ensure it is in good working order.	Construction
NV9	The noise levels of plant and equipment would have operating sound power or sound pressure levels that would meet the predicted noise levels.	Construction
NV10	Noise emissions should be considered as part of the selection process for construction equipment and plant.	Construction

ID	Management and mitigation measure	Timing
NV11	Non-tonal reversing beepers (or an equivalent mechanism) would be fitted and used on construction vehicles and mobile plant regularly used within the Project Area where practical during standard hours and at all times outside standard hours.	Construction
NV12	Where practicable: • Loading and unloading of materials/deliveries would occur as far as possible from sensitive receivers • Delivery vehicles to be fitted with straps rather than chains for unloading. • Vehicle movements would be scheduled during less sensitive times	Construction
NV13	All equipment would be maintained and operated in an efficient manner, in accordance with manufacturer's specifications, to reduce the potential for adverse noise and vibration impacts.	Construction
NV14 (This is also provided in measure HH2)	To avoid structural damage occurring, if feasible high vibratory construction methods would not be used within 50 m of St John the Evangelical Church. Should high vibratory methods be required within 50 m of the church, these works would not proceed within the minimum working distances unless a permanent vibration monitoring system is installed around one metre from the building footprint, to warn operators (e.g. via flashing light, audible alarm, SMS) when vibration levels are approaching the peak particle velocity objective.	Construction
NV15	Ongoing detailed design would continue to seek opportunities to further reduce the noise impact at the three residential receivers (137 (R3), 173 (R2) and 233 (R1) Brays Lane). If required following detailed design, treatments at these three properties would be discussed with the property owners and would comprise the provision of mechanical ventilation and/or comfort conditioning systems in line with the NPfI (NSW EPA, 2017) to address residual impacts.	Pre-construction
Transport and access		
T1	A Construction Traffic Management Plan (TMP) would be prepared, in consultation with LCC and other relevant stakeholders. The TMP would include: • Details of the transport route to be used for all development-related traffic • Details of the temporary onsite construction car park • Details of the measures that would be implemented to minimise traffic impacts during construction including: - Temporary traffic controls, including detours, signage etc. - Notifying the local community along Brays Lane about development-related traffic impacts - Procedures for receiving and addressing complaints from the community about development-related traffic	Construction

ID	Management and mitigation measure	Timing
	- Minimising potential for conflict with other road users as far as practicable, including preventing queuing on the public road network.	
T2	The TMP would include the following measures: • Vehicle access to and from the Site would be designed and managed to minimise safety risk to pedestrians, cyclists and motorists and to provide that construction vehicles can safely enter the Site. All trucks would enter and exit the Site in a forward direction where this is feasible. Truck deliveries would be scheduled to arrive at Site outside of peak periods, where this is feasible, to minimise traffic impacts on the surrounding network during the peak periods • **Castlereagh Highway / Brays Lane intersection would not be used for Project construction traffic** • Near the Site access, appropriate signage, line marking and/or traffic control measures would be used to direct and guide pedestrians, cyclists and motorists past the Site during high usage times. • Construction workers accessing the Site will be provided with information on driving conditions along Brays Lane. • No construction worker parking along Brays Lane would be allowed. • Where parking on the Site would be exceeded, additional measures to reduce parking demand (e.g. shuttle buses) would be implemented. Overflow parking for workers would be provided at a location that would be determined in consultation with LCC. The selection of this site would seek to minimise local parking impacts to the community. • No temporary diversions are proposed to accommodate the construction of the Project. However, if required, the potential locations of temporary diversions would need to be identified in the TMP. Road Occupancy Licence (ROL) and Traffic Control Plans (TCP) would be prepared, as required. • Spotters would be used to guide oversized / over mass loads as required (as per recommendations detailed in Appendix 1 (b) Route Study) and vegetation trimming on Brays Lane would be carried out to allow for safe egress. • Brays Lane - A crescent shaped, 240 square metre area located at the corner of Brays Lane directly opposite the site entrance would be cleared and compacted gravel or road base would be provided to allow for oversize / overmass vehicles to turn this corner during construction .This area would be rehabilitated and revegetated following construction. • If the culverts on Brays Lane are determined to not be suitable for the weight of heavier loads, temporary bridging beams would be used. The installation of temporary bridging beams or another suitable	Construction

ID	Management and mitigation measure	Timing
	measure would be undertaken in consultation and with the approval with LCC under the Roads Act 1993 and would be removed as soon as practical. Reference to or inclusion of the approach to consulting with the residents and business owners along Brays Lane prior to oversized vehicles movements occurring. This consultation would occur at least 14 days prior to these movements occurring. **Where the TMP specifies management measures relating to oversize and over mass heavy vehicles, these would be in accordance with the guidance outlined by TfNSW regarding *Over Size and Over Mass Heavy Vehicles and Loads* (TfNSW, 2020).**	
Land use		
LU1	Affected landowners/occupants will be provided with advance notification of project construction schedules and changes to access arrangements or any short-term traffic disruptions.	Construction
LU2	Rehabilitation of the Site to its pre-development condition as best practicable following decommissioning. A rehabilitation plan would be discussed with LCC and agreed prior to the undertaking of decommissioning works.	Decommissioning
LU3	Where works are to be carried out in close proximity to utilities, consultation will be undertaken with the relevant utility provider to determine safety and network integrity requirements.	Construction
Hazards and risk		
HR1	Hazards and risk would be minimised in line with the following measures (including measures HR2 to HR25) unless a subsequent hazard and risk assessment agreed with DPE confirms that these measures are not required: • The separation distance between infrastructure within the Site is to be determined in accordance with Codes and Standards and manufacturer's recommendations so that the preferred strategy of allowing a fire in one battery enclosure, inverter or transformer to burn without the risk of propagating to other infrastructure can be maintained without the need for external firefighting • The separation distance within the Site is to be determined in accordance with Codes and Standards and manufacturer's recommendations to allow safe escape from the Project in case of a fire • Applicable Australian Standards requirements will be adhered to in the design and tested the BESS. Where relevant, the design, operation and maintenance of BESS would also adhere to applicable International Standards for major BESS developments	Detailed design, construction, operation

ID	Management and mitigation measure	Timing
	• Procurement of a battery system that is certified to an internationally recognised method for evaluating thermal runaway fire propagation in the Site, proving that a credible fire within a battery rack or enclosure would not propagate to other battery enclosures • Detailed firefighting response and need for fire water containment should be assessed and reported (for example in the format of a Fire Safety Study) following development approval, for review by the DPE, FRNSW and the RFS • Measures to prevent a leak from occurring at the Site, and/or containing a spill of pollutant from the BESS, should be addressed in the detailed design phase for the Project • The specific risk associated with the location of the residents close to the Project must be integrated into the fire safety of this site, including evacuation plan in case of a major incident associated with the Project. Neoen's internal rule, based on other installations, is to provide a typical exclusion zone of 25 metre radius during a fire and to evacuate to a distance as advised by the manufacturer chosen to deliver the Project– this should be integrated into emergency response plan and communicated with emergency services.	
HR2	Equipment would be procured from reliable and internationally recognised supplier with proven track-record	Construction
HR3	Equipment would be installed by Contractors following Neoen's internal requirements for Contractor management, Permit to Work, control of modifications and other established systems	Construction
HR4	All installation and maintenance would be performed by trained persons using Safe Work Method Statements	Construction, operation
HR5	The BESS would follow rigorous Management of Change process throughout its life. This would include management of protective systems including trips and alarms within the Battery Management System	Operation
HR6	Induction of all personnel would occur prior to works commencing on Site	Construction, operation
HR7	Electrical safety best-practice would be in place during construction and installation as well as during commissioning and operation of the electrical equipment forming part of this Project	Construction, operation
HR8	Permit to Work, including hot work permits would be in place during construction and installation as well as during commissioning and operation of the equipment forming part of this Project	Construction, operation

ID	Management and mitigation measure	Timing
HR9	Preventative maintenance practices would be put in place, including maintenance schedules and calibration of equipment, instruments and sensors, APZ, vegetation control within the BESS, thermography and other Non-Destructive Testing	Construction, operation
HR10	Impact barriers would be installed to prevent damage of infrastructure and equipment from vehicles and heavy machinery	Construction
HR11	Where required warning signs would be installed as per Code and Standards requirements, including Dangerous Goods signage and High/Medium voltage warnings (including arc flash)	Construction, operation
HR12	Earthing of electrical equipment would be established	Construction, operation
HR13	Need for lightning protection would be determined in accordance with Neoen requirements and Australian Codes at the detailed design stage	Design, construction
HR14	The BESS would be housed within a secure fenced area. Onsite security protocols would be developed. Temporary fences would be installed during construction where appropriate.	Construction, operation
HR15	Battery Management System would be installed, including voltage control, charge/discharge current control and temperature monitoring to battery manufacturer's specifications. Automatic safety shut-down function would be initiated in case of safe limits exceeded	Construction, operation
HR16	Secondary detection would be installed in the enclosure, to manufacturer’s recommendations (e.g. smoke/heat) so that, if there is a fire, smoke or excessive temperature the information would be transferred to the BESS control room	Construction, operation
HR17	Alarms would be available to provide hazard warning on operations upset conditions, and fault conditions would be transmitted to permanently staffed control room located remotely. The offsite control room would be permanently staffed and operators would be able to manually shut down and isolate a battery enclosure/group of battery enclosures	Construction, operation
HR18	The batteries would be housed within dedicated enclosures. Non-essential emergency response personnel entry during a hazardous event such as a run-away would be prevented	Construction, operation
HR19	BESS and transformer enclosure venting would be achieved to reduce concentrations inside the enclosures as per requirements in Codes and Standards	Construction, operation
HR20	Escape from the BESS and substation would be assured in accordance with any relevant Code requirements	Construction, operation

ID	Management and mitigation measure	Timing
HR21	Explosion venting and venting of toxic or flammable gases, would be achieved as per Codes and Standards and in accordance with manufacturer's instructions. This includes both BESS enclosures and transformers	Construction, operation
HR22	The need for fire suppressant inside the battery enclosures, and any need for fire water at the BESS (e.g. hydrants and hoses), would be determined during detailed design and through consultation with FRNSW and RFS	Detailed design, construction, operation
HR23	The risk of seismic activity, dust storm and severe winds would to be integrated into the design for this BESS, through the application of the relevant Australian Standards	Detailed design
HR24	APZ would be established in accordance with the Bushfire Assessment or as otherwise agreed through consultation with FRNSW and RFS.	Detailed design, construction
HR25	The detailed design for the Project would consider the ARPANSA Standard (2016) and ICNIRP guideline (2010) to demonstrate that EMFs from the Project are acceptable to onsite and offsite receivers.	Detailed design
HR26	**A Fire Safety Study (FSS) would be prepared in accordance with the hazards division of the DPE and will address the Hazardous Industry Planning and Assessment Papers and all Credible fire hazards and associated fire prevention and mitigation measures for the Project.**	**Prior to construction**
HR27	**A Fire Management Plan (FMP) would be developed in consultation with the NSW Rural Fire Service Chifley / Lithgow Fire Control Centre..**	**Prior to construction**
Bushfire		
BF1	The construction area within the Site would be managed as an Asset Protection Zone (APZ) in broad alignment with Appendix 4 of Planning for Bushfire Protection 2019 and the NSW Rural Fire Service's document 'Standards for asset protection zones'.	Construction
BF2	Vulnerable buildings and/or critical assets would be constructed to appropriate BAL levels in accordance with the Australian Standard for the Construction of Buildings in Bushfire Prone Areas (AS3959).	Construction
BF3	During construction: • A minimum static water supply of 20,000 litres would be available at the Site for firefighting purposes • A 65 millimetres metal Storz outlet with a gate or ball valve shall be provided as an outlet on each of the tanks • The water tank, if located above ground, shall be of a non-combustible material • Underground tanks shall have an access hole of 200 millimetres to allow tankers to refill direct from the	Construction

ID	Management and mitigation measure	Timing
	tank. A hardened ground surface for truck access would be supplied within 4 metres of the access hole. • All associated above ground fittings to the tank shall be non-combustible. • Firefighting equipment would be maintained at and/or accessible to all active construction site during the declared bushfire danger season, and site personnel trained in its use.	
BF4	Separate Bushfire Emergency Management and Evacuation Plans would be developed for the construction and operational phases of the Project. These plans would outline stop work procedures and evacuation routes. The bushfire evacuation procedure within each plan would be completed in accordance with NSW RFS Guide to Developing a Bushfire Emergency Management and Evacuation Plan (2014).	Construction and operation
BF5	Around the perimeter and within the Site there will be access for Category 1 fire appliances such as appropriate passages and clearances for fire trucks.	Construction
BF6	Non-essential construction or operational works be postponed on days with Fire Danger Rating (FDR) of Severe or greater.	Construction and operation
BF7	Relevant works would be managed under a Hot Work and Fire Risk Work procedure. Where necessary essential hot works may be completed on a day declared to be a Total Fire Ban (TOBAN) providing it complies with the Hot Work and Fire Risk Work procedure exemption from the NSW RFS.	Construction and operation
BF8	The BESS facility would be managed as an APZ in broad alignment with Appendix 4 of 'Planning for Bushfire Protection 2019' and the NSW Rural Fire Service's document 'Standards for asset protection zones'.	Operation
BF9	Access for Category 1 fire appliances would be maintained around the perimeter of the BESS facility and to and from the BESS facility.	Operation
Visual		
V1	During detailed design of the Project, a review of materials and colour finishes for noise walls and other visible built components of the Project would be completed to further reduce potential visual impacts where practicable.	Detailed design
V2	Lighting of the Site would be designed in accordance with AS 4282:2019 Control of the obtrusive effects of outdoor lighting.	Detailed design
V3	Construction hoarding would be used as needed to minimise visual impacts, where reasonable and feasible.	

ID	Management and mitigation measure	Timing
V4	A Landscape Plan would be developed in consultation with the three affected visual residential receptors and other relevant stakeholders. The plan would comply with any fire safety requirements that are identified during detailed design. The Landscape Plan would be implemented as soon as practicable during construction to ultimately provide screening vegetation for the operation of the Project.	Detailed design, construction, operation
V5	Operational noise walls would be sensitively designed to blend into the surrounding landscape, where reasonable and feasible. Existing property boundary screening vegetation would be maintained as far as possible and additional planting would occur post construction to provide vegetation screening of the Site.	Operation
V6	Screening vegetation would be maintained throughout the operation of the Project to provide visual filtering and screening of the BESS facility	Operation
Social and economic		
SE1	A Community and Stakeholder Engagement Plan would be developed and implemented for the construction of the Project. This plan would detail the communication objectives of the plan and would outline how Neoen would consult and inform residences close to the Project and the wider Wallerawang community regarding key milestones or potential impacts related to the Project. The plan would describe where information of the Project is available, would contain a complaints management procedure and contact details for the person responsible for managing and resolving complaints.	Construction
SE2	All businesses, residential properties and other key stakeholders affected by the Project would be notified at least five working days prior to commencement of construction. The notification would include: Details of the Project Construction period and construction hours Complaint and incident reporting and how to obtain further information	Construction
SE3	Complaints received from the community would be recorded, monitored and acted upon in a timely manner.	Construction
SE4	Access to properties including businesses and social infrastructure would be maintained throughout construction of the Project. Temporary measures such as traffic control would be used as needed to enable this to occur.	Construction
SE5	A dilapidation survey prior to and following construction (at a minimum) would be completed to identify any damage caused by construction traffic to local roads. Any damage identified would be remedied, if necessary	Construction

ID	Management and mitigation measure	Timing
SE6	Local services and materials would be prioritised for the Project as far as practical.	Construction
Waste management		
W1	As part of the CEMP, a Waste Management Plan (WMP) would be prepared. The WMP would: • Include relevant measures from the National Waste Policy: Less Waste, More Resources (Department of Agriculture, Water and the Environment, 2018) • Incorporate any relevant waste disposal requirements • Provide consistent clear direction on waste and resource handling, storage, stockpiling, use and reuse management measures • Specify protocols for classification of waste materials for off-site disposal or assessment under a resource recovery exemption • Set out processes for disposal, including on-site transfer, management and the necessary associated approvals/permits. Waste generated would be regularly removed from Site, in order to avoid potential issues associated with odour, visual amenity and attracting animals/pest species • Outline procedures for waste generated within the Project Area to be segregated at source and suitably stored in designated waste management areas within the Project Area • Include material tracking measures to track waste and recyclables generated from the Project and removed from the Project Area.	Construction
W2	All waste would be assessed, classified, managed and disposed of in accordance with the Waste Classification Guidelines (NSW EPA, 2014a). A waste classification letter would be prepared to allow for materials to be disposed off-site to a licensed landfill in accordance with NSW EPA guidelines.	Construction, operation
Air quality		
AQ1	The CEMP would include air quality management measures including measures to minimise visible dust moving offsite. Air quality measures would include that: • Daily construction activities would consider the expected weather conditions for each workday. • Approaches to minimise exposed surfaces, such as stockpiles and cleared areas, including partial covering of stockpiles where practicable • Dust minimisation measures on exposed surfaces would be implemented, such as watering of exposed soil surfaces, dust mesh, water trucks and sprinklers to reasonably minimise dust generation • Defined Site entry and exit points would be defined to minimise tracking of soil on surrounding roads. Use wheel washes or shaker grids where the risk of offsite track out of dirt is identified	Construction

ID	Management and mitigation measure	Timing
	• Heavy vehicles entering and leaving the Site would be covered to prevent material escaping during transport, where there is a risk of this occurring • Vehicles and construction equipment operating onsite are kept well maintained and turned off when not operating (minimise idling on the Site) • The handling of spoil would be minimised when excavating and loading of vehicles.	
Cumulative		
CU1	Consultation between proponents and contractors for the Wallerawang Battery Energy System project and Great Western Battery project would be undertaken to gain an understanding of project timing and traffic movements to avoid potential cumulative traffic impacts where possible.	Construction

Appendix C

Addendum Aboriginal Cultural Heritage Assessment Report (ACHAR)

Prepared for
Neoen Australia Pty Ltd
ABN: 57 160 905 706

AECOM

Great Western Battery

Aboriginal Cultural Heritage Assessment Report Addendum

19 Sep 2022

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Delivering a better world

Great Western Battery

Aboriginal Cultural Heritage Assessment Report Addendum

Client: Neoen Australia Pty Ltd

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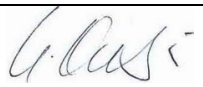
Rev	Revision Date	Details	Approved	
			Name/Position	Signature
A	14-Aug-2022	Tech Review	Geordie Oakes, Principal Heritage Specialist	
A	15-Aug-2022	QA Review	William Miles/ANZ Environment Power Sector Market Lead Technical Director - Environment, ANZ	
B	19-Sept-2022	QA Review - Final after RAP review	William Miles/ANZ Environment Power Sector Market Lead Technical Director - Environment, ANZ	

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Executive Summary

AECOM Australia Pty Ltd (AECOM) was commissioned by Neoen Australia Pty Ltd (Neoen) to prepare a second Addendum Aboriginal Cultural Heritage Assessment Report (Addendum ACHAR) for the Great Western Battery Project in Wallerawang, New South Wales (NSW). Neoen is seeking development consent to construct, operate and maintain a large-scale Battery Energy Storage System (BESS) of approximately 500 megawatts (MW) and approximately 1000 megawatt-hour (MWh) at 173 Brays Lane, Wallerawang, NSW (the Site), as well as a new transmission line that would connect the BESS to the existing TransGrid 330 kilovolt (kV) substation at Wallerawang (the Project).

In December 2021, AECOM finalised an Aboriginal Cultural Heritage Assessment Report (ACHAR) for the Project, with a follow up Addendum ACHAR, addressing some additional site access works adjacent to Brays Lane, finalised in February 2022. Both documents formed part of the Environmental Impact Statement (EIS) prepared for the Project, which was placed on public display between Tuesday 8 March 2022 and Monday 4 April 2022.

Subsequent to the EIS exhibition period, Neoen, in consultation with the Project's potential Horizontal Directional Drilling (HDD) contractors identified the need for an additional HDD launch/receipt pit on the left bank floodplain of Pipers Flat Creek, outside of the Project's previously assessed ACHAR study area. This additional launch/receipt pit has necessitated a revision of the Project's transmission connection corridor.

This Addendum ACHAR has been prepared to address potential impacts to Aboriginal heritage values as a result of the revised HDD alignment and associated drilling features, with the latter including a *c*.20 x 15 m drill rig hardstand and laydown area, as well as *c*.270 m section of a pre-existing vehicle track. The study area for this supplementary assessment comprises a *c*.585 m long linear corridor that has a maximum width of about 40 m. Referred to herein as the 'Addendum ACHAR study area', it encompasses all proposed ground disturbance activities outside of the Project's previously assessed ACHAR study area.

Based on a desktop review of existing Aboriginal heritage data sources for the Addendum ACHAR study area, as well as the results of an archaeological survey of this area, undertaken on 11 August 2022, this assessment finds that:

- Two Aboriginal sites are present within the Addendum ACHAR study area: previously recorded surface and subsurface artefact scatter SU1a-A5 (AHIMS ID #45-1-2716) and newly recorded isolated artefact 'GWB-IA1-22' (AHIMS ID #45-1-2891). Both sites have been assessed as being of low scientific significance.
- The mapped boundary of previously recorded artefact scatter SU1a-A5 is located partially within the Addendum ACHAR study area. However, the results of archaeological surveys undertaken for the Project, including that carried out to support the preparation of this Addendum ACHAR, indicate that none of the surface-based Aboriginal objects identified in association with this site occur within or immediately adjacent to the Addendum ACHAR study area.
- In general, land within the Addendum ACHAR study area, which encompasses part of the left bank floodplain of Pipers Flat Creek and a small section of adjoining slope, is considered to be of low Aboriginal archaeological sensitivity, with existing archaeological data for the Project suggesting an occupational emphasis on elevated low gradient landform elements away from the floodplain proper.
- Any subsurface archaeological deposits present within those portions of the Addendum ACHAR study area that have not been significantly disturbed are likely to be of low conservation value, consisting of low to very low density deposits.
- Land within the Addendum ACHAR study area retains variable Ground Integrity (GI). While sections of the study area, including the proposed drill rig hardstand and laydown area, have been significantly disturbed as a result of historical land use activities, the majority of land within this area retains moderate GI.

In view of these findings, and taking into consideration the nature of the proposed works within the Addendum ACHAR study area, the following recommendations are made:

1. Additional archaeological investigations within the bounds of the Addendum ACHAR study area, including a supplementary program of test excavation, are unwarranted. While Aboriginal archaeological deposits of low conservation value are likely to present within parts of the Addendum ACHAR study area, physical impacts to these deposits as a result of the proposed works are considered unlikely due to: a) the nature of the works proposed within identified areas of subsurface archaeological potential (i.e., HDD at nominal depth of 1.5 m below ground level (b.g.l).) and b) significant ground disturbance within the bounds of the proposed drill rig hardstand and laydown area.
2. All light and heavy vehicle movements within the mapped boundary of previously recorded artefact scatter SU1a-A5 (45-1-2716) should be restricted to the existing vehicle track present within this portion of the study area. An access corridor centred on the existing track and taking into account the maximum width of the vehicles required for the HDD installation process should be demarcated using high visibility fencing. Fencing should be installed prior to works commencing and remain in place until works are completed. All fencing works should be undertaken by, or under the supervision of, a qualified Aboriginal heritage specialist. Sections of SU1a-A5 outside of the recommended access corridor should be clearly defined in the Project's Construction Environmental Management Plan (CEMP) as 'no-go zones'.
3. To ensure no inadvertent impacts during construction, newly recorded isolated artefact 'GWB-IA1-22' should be protected via high visibility fencing. Fencing should be installed prior to works commencing and remain in place until works are completed. All fencing works should be undertaken by, or under the supervision of, a qualified Aboriginal heritage specialist. The location of GWB-IA1-22 should be clearly defined in the Project's CEMP as a 'no-go zone'.
4. Proposed management measures for SU1a-A5 and GWB-IA1-22 should be included in the Project's Aboriginal Cultural Heritage Management Plan (ACHMP).
5. Should any confirmed or suspected Aboriginal objects be identified within the Addendum ACHAR study area during construction, the Unexpected Aboriginal Heritage Finds Procedure (UAHFP) detailed in the ACHMP would be followed.
6. All contractors engaged to complete the proposed works within the Addendum ACHAR study area should be made aware of the nature and location of SU1a-A5 and GWB-IA1-22, as well as their associated 'no-go zones'.

1.0 Introduction & Background

1.1 Introduction

AECOM Australia Pty Ltd (AECOM) was commissioned by Neoen Australia Pty Ltd (Neoen) to prepare an Addendum Aboriginal Cultural Heritage Assessment Report (Addendum ACHAR) for the Great Western Battery Project in Wallerawang, New South Wales (NSW). Neoen is seeking development consent to construct, operate and maintain a large-scale Battery Energy Storage System (BESS) of approximately 500 megawatts (MW) and approximately 1000 megawatt-hour (MWh) at 173 Brays Lane, Wallerawang, NSW (the Site), as well as a new transmission line that would connect the BESS to the existing Transgrid 330 kilovolt (kV) substation at Wallerawang (the Project).

The Project is considered State Significant Development (SSD) under the *Environmental Planning and Assessment Act 1979* (EP&A Act) as it satisfies the requirements of Section 2.6 of the *State Environmental Planning Policy (Planning Systems) 2021* (PS SEPP).

In December 2021, AECOM finalised an Aboriginal Cultural Heritage Assessment Report (ACHAR) for the Project (AECOM, 2021), with a supplementary ACHAR, addressing some additional site access works adjacent to Brays Lane, finalised in February 2022 (AECOM, 2022). Both documents formed part of the Environmental Impact Statement (EIS) prepared for the Project, which was placed on public display between Tuesday 8 March 2022 and Monday 4 April 2022. Subsequent to the EIS exhibition period, Neoen, in consultation with the Project's potential Horizontal Directional Drilling (HDD) contractors identified the need for an additional HDD launch/receipt pit on the left bank floodplain of Pipers Flat Creek, outside of the Project's previously assessed ACHAR study area. This additional launch/receipt pit has necessitated a revision of the Project's transmission line corridor.

This Addendum ACHAR has been prepared to address potential impacts to Aboriginal heritage values as a result of the revised HDD alignment and associated features, with the latter including a *c*.20 x 15 m hardstand and laydown area, as well as a *c*.280 m section of a pre-existing light vehicle track. The study area for this supplementary Aboriginal cultural heritage assessment, shown on **Figure 1** and referred to herein as the 'Addendum ACHAR study area', comprises a *c*.585 m long linear corridor that has a maximum width of about 40 m. As shown, it encompasses all proposed HDD-related ground disturbance activities outside of the Project's previously assessed ACHAR study area. It is intended that this Addendum ACHAR be read in conjunction with the Project's ACHAR (AECOM, 2021) and first Addendum ACHAR (AECOM, 2022).

1.2 Background to this Addendum ACHAR

AECOM was commissioned by Neoen to prepare an ACHAR for the Project in accordance with the Secretary's Environmental Assessment Requirements (SEARs) and relevant Heritage NSW guidelines including the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010a), *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW, 2010b) and *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH, 2011). Finalised in early December 2021, AECOM's ACHAR documented the results of an assessment of the Aboriginal heritage values of the ACHAR study area, shown in part on **Figure 1**.

As detailed in the ACHAR, information regarding the Aboriginal heritage values of the ACHAR study area was obtained through a combination of background research, archaeological fieldwork and Aboriginal community consultation. A total of nine Registered Aboriginal Parties (RAPs), listed in **Table 1** in **Section 2.1**, were consulted for the assessment, with key consultation activities including:

- RAP review of AECOM's draft assessment methodology
- RAP review of AECOM's draft test excavation methodology
- RAP participation in archaeological field investigations
- RAP review of a draft of the ACHAR.

Archaeological survey of the ACHAR study area was undertaken on 16 June 2021 by a combined field team of two AECOM archaeologists of three RAP field representatives. All landform elements,

excluding areas of severely disturbed terrain within the fenced Lidsdale Siding facility and existing Transgrid Wallerawang 330 kV substation, were subject to survey, with particular attention paid to areas of higher Ground Surface Visibility (GSV) therein.

Two Aboriginal archaeological sites, consisting of previously identified artefact scatter SU1a-A5 (45-1-2716) and a new stone quarry site designated as 'GWB-STQ1-21' (45-1-2853), were identified during survey. In addition to these surface sites, three areas of subsurface archaeological sensitivity were also identified, two within the transmission line corridor and one within the Site. Designated in the field as 'ASAS-1', 'ASAS-2' and 'ASAS-3', these areas were assessed by the survey team as retaining moderate to high potential for the presence of subsurface archaeological deposits, albeit of variable character, extent and integrity. ASAS1 incorporated the crest and upper flanks of the main low gradient ridgeline within the Site, while ASAS-2 and ASAS-3 encompassed sections of the left bank floodplain of Pipers Flat Creek. Those portions of GWB-STQ1-21 and SU1a-A5 located within the ACHAR study area fell within ASAS-1 and ASAS-2 respectively.

Archaeological test excavations within ASAS1, ASAS-2 and ASAS-3 were undertaken over a four day period in October 2021 (5-8 October 2021). As per Requirement 14 of the Code of Practice, the overarching aim of the test excavation program was to collect information about the nature and extent of any subsurface Aboriginal objects present within these areas. Subsidiary objectives included site delineation and an assessment of levels of historical land disturbance.

Test excavations in ASAS-1, ASAS-2 and ASAS-3 were completed in two phases under a systematic sampling design. For ASAS-1, Phase 1 testing involved the excavation of 50 x 50 cm test pits across all non-severely-disturbed sections of this area, with pits placed on an underlying 25 m grid. For ASAS-2 and ASAS-3, Phase 1 testing involved the completion of two linear transects of 50 x 50 cm test pits, with pits on each transect spaced at 25 m intervals. Phase 2 of the test excavation program involved small expansion excavations around four Phase 1 test pits, two located within ASAS-1 (TPs 12 and 21) and two within ASAS-2 (TPs 42 and 52). These pits were selected for expansion on the basis of artefact yields and/or the technological characteristics of their associated Phase 1 artefact assemblages. In all instances, expansions involved the excavation of an additional three 50 x 50 cm test pits around the original test pit, producing 1 m^2 pits.

A total of 71 subsurface Aboriginal objects, consisting exclusively of flaked stone artefacts, were recovered from ASAS-1 and ASAS-2, with the majority (n = 58, 81.7%) coming from ASAS-1. Subsurface densities in both areas were uniformly low, with a maximum Phase 1 density of 7 artefacts per 0.25 m^2 occurring in ASAS-1. Phase 2 expansion excavations in ASAS-2 failed to yield any additional Aboriginal objects while those in ASAS-2 yielded a further 16 objects. Subsurface testing results for ASAS-2 are deemed consistent with existing surface evidence for GWB-STQ1-21 in attesting, amongst other activities, to low intensity Aboriginal quarrying and on-site reduction of naturally occurring quartz pebbles and cobbles derived from the Early Permian Shoalhaven Group. East of Brays Lane, subsurface evidence from ASAS-2, associated with artefact scatter site SU1a-A5, suggest low intensity Aboriginal use of the left bank floodplain of Pipers Flat Creek.

Taking into account the results of the archaeological survey and test excavation works detailed in AECOM's ACHAR for the Project, a total of two Aboriginal archaeological sites were ultimately recognised within the ACHAR study area: surface and subsurface artefact scatter SU1a-A5 (45-1-2716) and surface and subsurface stone quarry site GWB-STQ1-21 (45-1-2853) (**Figure 2**). Both sites extend outside of the ACHAR study area. An assessment of the scientific significance of SU1a-A5 and GWB-STQ1-21 attributed low significance to SU1a-A5 and moderate significance to GWB-STQ1-21.

Proposed ground disturbance activities within the ACHAR study area are expected to result in a near-complete loss of value for stone quarry GWB-STQ1-21 and, subject to appropriate protective measures, no loss of value for artefact scatter SU1a-A5. Measures to both mitigate and manage the potential impacts of the Project on the identified Aboriginal cultural heritage values of the ACHAR study area are detailed in Section 11.0 of AECOM's (2021) ACHAR.

Subsequent to the finalisation of the AECOM's ACHAR in December 2021, Neoen identified the need for some additional site access works adjacent to Brays Lane, outside of the previously assessed ACHAR study area. Accordingly, an Addendum ACHAR addressing potential impacts to Aboriginal heritage values as a result of these works was prepared by AECOM and included in the EIS prepared for the Project (see AECOM, 2021). Based on a desktop review of existing Aboriginal heritage data

sources for the Addendum ACHAR study area, this assessment identified that land required for the proposed access works had been significantly disturbed as a result of historical land use activities, with the most severe impacts to natural landform elements and soil profiles within this area associated with the construction of Brays Lane and the main driveway into Lot 1 DP126659. No previously recorded Aboriginal sites were identified within the proposed works area. However, two sites, consisting of previously recorded open artefact site 'Brays Lane AS1' (AHIMS ID #45-1-2799) and stone quarry site 'GWB-STQ1-21' (AHIMS ID #45-1-2853) were noted as being located in close proximity. While impacts to Aboriginal objects as a result of the proposed site access works were assessed as highly unlikely, in recognition of the fact that the proposed works area was not physically inspected for such objects, it was recommended that the ACHMP proposed for the Project include a provision requiring this area to be subject to a visual inspection prior to the commencement of any ground disturbing works therein. Additionally, it was recommended that a previously demarcated 'no-go zone' for open artefact site 'Brays Lane AS1' be adhered to throughout the duration of the proposed access works.

Following public exhibition of the Project EIS, WaterNSW informed Neoen that the Project's proposed transmission line would cross an existing underground water pipeline (the Fish River Pipeline). Neoen consulted with WaterNSW to understand the separation distances and construction methods required to avoid impacting the Fish River Pipeline. The recommended separation distances mean that the transmission connection would need to make sharper turns underground. The separation distances were discussed with the Project's potential HDD contractors and it was agreed that whilst the HDD methodology could still be used to cross from the Site to the northern end of the rail corridor, an additional entry/exit pit along this part of the alignment is likely to be required to account for the required separation distances and the turns required to install the transmission connection. The additional HDD pit means that the cable pulls between the pit locations are possible to complete. Neoen has completed a review of the land between the Site and the northern end of the rail corridor and identified a suitable location for the additional pit that would avoid as far as practicable additional environmental impacts.

As indicated in Section 1.1, this Addendum ACHAR has been prepared to address potential impacts to Aboriginal heritage values as a result of the revised HDD alignment and associated features.

1.3 Description of Proposed Works

As shown on **Figure 1**, installation of that portion of the proposed transmission line located within the Addendum ACHAR study area is to occur using HDD. HDD is a trenchless construction method for installing conduits that is associated with less surface ground disturbance than trenching. A drill rig is used to bore an opening in the ground through which a pipe is passed through. The hole is opened by passing progressively larger pipes through the bore hole until a sufficient diameter is reached to allow the conduits to be passed through. Drilling fluid is used in the process of HDD, which comprises a mixture of water and biologically neutral drill additives (such as bentonite). This fluid is continuously pumped through the bore and serves multiple purposes, including cooling the drill cutting head, removing cuttings, stabilising the bore hole and lubricating the passage of the conduits. Slurry generated from the drilling fluid would primarily be captured and reused in the HDD process. When this is no longer feasible the waste slurry would be collected and appropriately disposed.

Proposed HDD-related ground disturbance activities within the Addendum ACHAR study (hereafter the 'proposed works') include:

1. Use of an existing unsealed vehicle track off Brays Lane to the proposed additional launch/receipt pit location (approximately 280 m in length)
2. Excavation down to approximately 1 m below natural ground to accommodate a prefabricated concrete cable joining pit
3. Installation of the joining pit (2.5m x 9m) and works required to join underground cables terminating within it
4. Establishment of a temporary equipment laydown area of 15 m x 12 m
5. Installation of a temporary drill rig of 15 m x 8 m
6. Rehabilitation of the hardstand and laydown area to allow it to return to its condition prior to the works once construction is completed.

1.4 Scope of this Addendum ACHAR

This Addendum ACHAR has been prepared to address potential impacts to Aboriginal heritage values as a result of the proposed works. Tasks undertaken have included:

- An updated search of the AHIMS database
- A review of AECOM's ACHAR and first Addendum ACHAR for the Project
- A review of the landscape context of the Addendum ACHAR study area
- A review of historical aerial photographs for the Addendum ACHAR study area, spanning the years 1954 to 2019
- Consultation with the Project's nine RAPs.

1.5 Authorship

This report was prepared by AECOM Principal Aboriginal Heritage Specialist Dr Andrew McLaren, with technical and QA review provided by Geordie Oakes (Principal Heritage Specialist) and William Miles (Technical Director - Environment, ANZ) respectively.

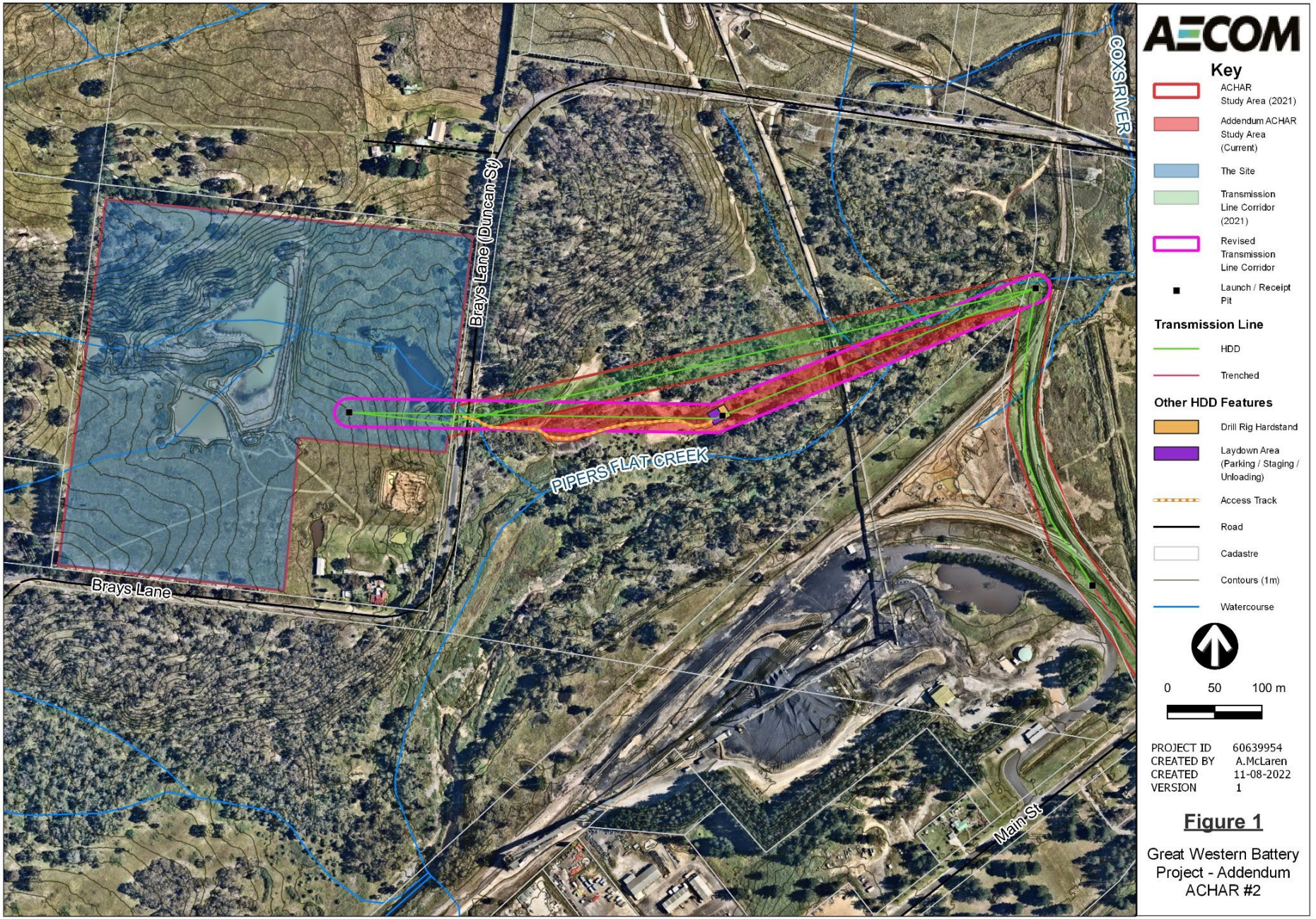

Figure 1 Map showing location of Addendum ACHAR study area relative to the Site, original transmission line corridor and ACHAR study area

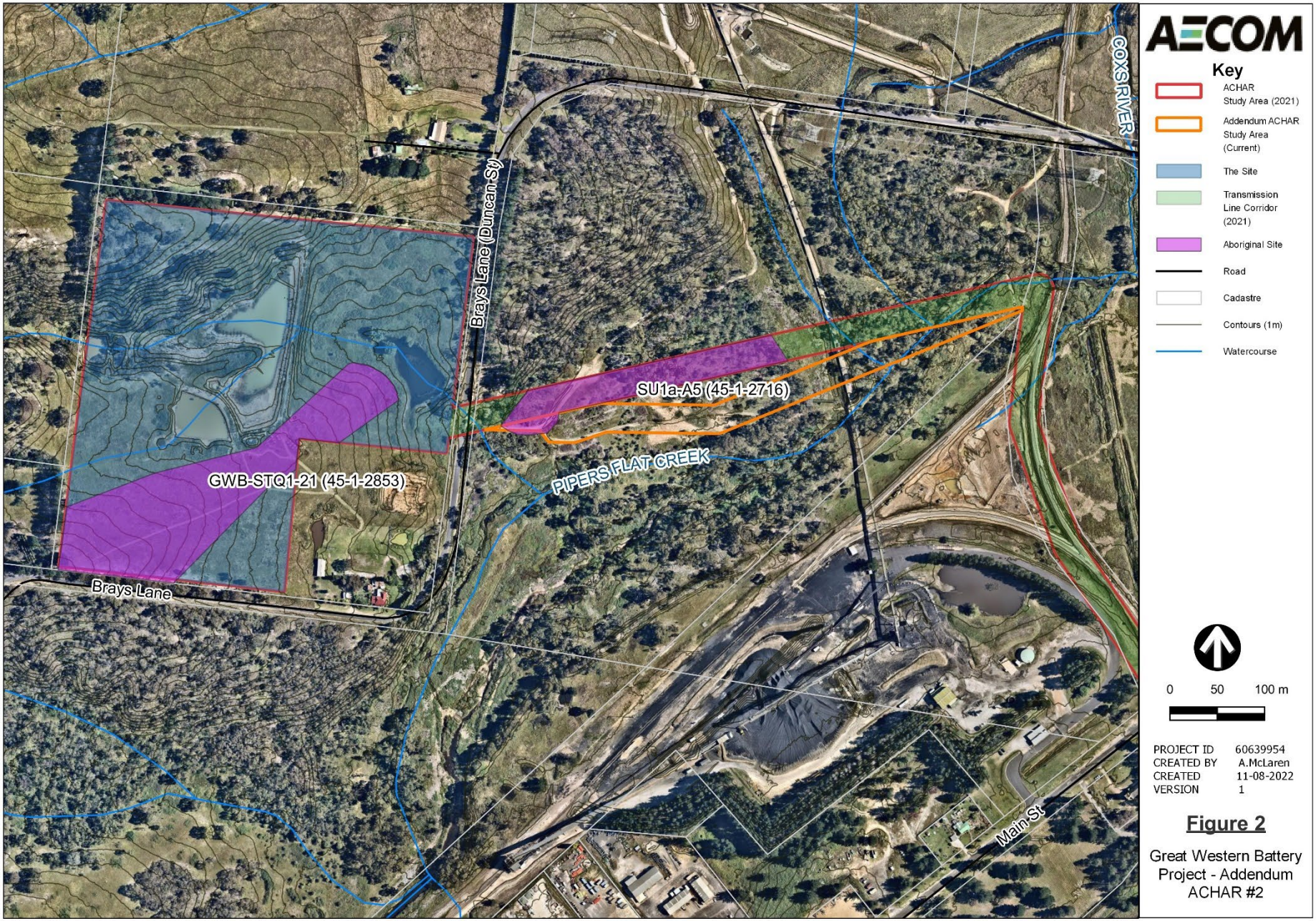

Figure 2 Aboriginal sites identified as part of AECOM's (2021) Aboriginal cultural heritage assessment

2.0 RAP Consultation

2.1 RAP Consultation for ACHAR and first Addendum ACHAR

RAP consultation for the Project has been undertaken in accordance with Heritage NSW's *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010) (the Consultation Requirements). As indicated in **Section 1.2**, a total of nine RAPs have been consulted for the assessment, with key ACHAR consultation activities including:

- RAP review of AECOM's draft assessment methodology
- RAP review of AECOM's draft test excavation methodology
- RAP participation in archaeological field investigations
- RAP review of a draft of the Project ACHAR.
- RAP review of a draft of the Project's first Addendum ACHAR

RAPs for the Project, including associated registration dates, are listed in **Table 1** below.

Table 1 Registered Aboriginal Parties (RAPs) for the Project

Organisation	Date of registration
Warrabinga-Wiradjuri #7 Native Title Claimant Group	02.02.2021 (automatically registered)
Bathurst LALC	17.02.2021 (automatically registered)
North East Wiradjuri Company	04.02.2021
Didge Ngunawal Clan	04.02.2021
Murra Bidgee Mullangari Aboriginal Corporation	08.02.2021
Merrigarn	08.02.2021
Muragadi	08.02.2021
Corroboree Aboriginal Corporation	10.02.2021
Gunjeewong Cultural Heritage Aboriginal Corporation	10.02.2021

2.2 RAP Consultation for this Addendum ACHAR

2.2.1 Archaeological Survey

All RAPs were invited to participate in the archaeological survey detailed in **Section 4.0** of this report, with invitations to participate forwarded via e-mail on 26 July 2022. Ultimately, five RAPs provided site officers for the survey, with attending officers listed by organisation in in **Section 4.0**.

2.2.2 RAP review of draft Addendum ACHAR

Consistent with Section 4 of the Consultation Requirements, on 17 August 2022, a draft of this Addendum ACHAR was issued to all RAPs for their review. The closing date for comments was 15 September 2022, which provided the necessary 28 days for comment. However, comments were actively sought up to 19 September 2022.

Ultimately, a total of four RAPs provided responses to the draft Addendum ACHAR, all in writing. RAP responses are presented in **Table 2** and attached in **Appendix B**.

Table 2 RAP responses to draft Addendum ACHAR

RAP Organisation	Representative(s)	Date of response	Type	Response	AECOM Response
Didge Ngunawal Clan	Paul Boyd	15-09-22	E-mail	"We are happy with the 2nd ACHAR, as we have reviewed it"	-
Warrabinga-Wiradjuri #7 Native Title Claimant Group	Jack Pennell	15-09-22	E-mail	"I would like to thank the site officers for their time and apologise that Warrabinga NTCAC could not supply an officer for the site surveys. I have strong feelings for our cultural history and I feel that any sites being small or large are the same. If we find one or one thousand artifacts it proves that our ancestors were present in this area hunting, gathering or living I just have a problem with Low Moderate and High to make this determination"	AECOM respectfully acknowledges that all Aboriginal archaeological sites, regardless of assessed levels of scientific significance, are culturally significant to Aboriginal people.
Murra Bidgee Mullangari Aboriginal Corporation	Darleen Johnson	16-09-22	E-mail	"I have read the project information and ACHAR for the above project, I endorse the recommendations made"	-
Corroboree Aboriginal Corporation	Marilyn Carroll-Johnson	16-09-22	E-mail	"We see no issues with the second addendum"	-

3.0 Desktop Review

3.1 AHIMS Database

The AHIMS database, administered by Heritage NSW, contains records of all Aboriginal objects reported to the Secretary of the Department of Premier and Cabinet in accordance with Section 89A of the NPW Act. It also contains information about Aboriginal places, which have been declared by the Minister to have special significance with respect to Aboriginal culture. Previously recorded Aboriginal objects and declared Aboriginal places are known as 'Aboriginal sites'.

An updated search of the AHIMS database on 12 August 2022 for a 5 x 5 km area centred on the Addendum ACHAR study area, returned 38 site entries (**Table 3**). As is typical for the local area, open artefact sites are the most common site type within the AHIMS search area, accounting for 68.4% of recorded sites. Other less common site types include five rockshelter sites, two burial sites, two grinding groove sites, a single area of PAD and one stone quarry (i.e., 'GWB-STQ1-21' (45-1-2853)).

Registered centroid coordinates for previously recorded Aboriginal sites within the AHIMS search area place three sites - artefact scatters 'SU1a-A5' (45-1-2716) and 'S2' (45-1-0211), and stone quarry 'GWB-STQ1-21' (45-1-2853) - within 200 m of the Addendum ACHAR study area (**Figure 3**). However, a review of associated site cards and reports, including AECOM's ACHAR (2021) for the Project, confirms that only one of these sites - surface and subsurface artefact scatter 'SU1a-A5 - extends into this area. Further information on this site is provided in **Section 3.1.1** below.

Table 3 AHIMS search results

Site type	AHIMS feature(s)	Number	%
Open artefact site	AFT; PAD	26	68.4
Rockshelter	AFT; GRD; ART	5	13.2
Burial	BUR; TRE	2	5.3
Grinding groove(s)	GRD	2	5.3
Potential Archaeological Deposit (PAD)	PAD	1	5.3
Stone quarry	STQ; AFT; PAD	1	2.6
Total	-	**38**	**100**

3.1.1 Surface and subsurface artefact scatter 'SU1a-A5' (45-1-2716)

Artefact scatter SU1a-A5 was first identified by RPS (2012) as part of archaeological survey undertaken for the Lidsdale Siding Project. At that time, a total of 19 stone artefacts were identified on a north-easterly trending vehicle track to the east of Brays Lane. Artefacts were identified across an area measuring approximately 120 m (east-west) by 20 m (north-south) and consisted primarily of flake debitage items (n = 15, 78.9%), with quartz (n = 12, 63.2%) the dominant raw material. Formed objects were limited to two multidirectional cores, one manufactured out of 'mudstone' (likely silicified tuff) and the other chalcedony.

AECOM's (2021) archaeological survey of the ACHAR study area, undertaken on 16 June 2021, included a physical reassessment of SU1a-A5, with a total of ten stone artefacts identified on and immediately adjacent to the vehicle track surveyed by RPS. Artefacts identified during AECOM's (2021) survey were clustered towards the northern end of the site (see **Figure 3**), as mapped by RPS (2012). Consistent with RPS's (2012) observations, recorded artefacts were primarily manufactured out of quartz (n = 7, 70%), with one quartzite and two silicified tuff artefacts also represented. No silcrete or chalcedony artefacts were observed (cf. RPS, 2012: 85- 86). Recorded artefact types included four flake shatter fragments, one complete flake, two proximal flakes, one split flake, a multidirectional quartz core and a unidirectional silicified tuff core made on a flake.

Land within and surrounding the bounds of SU1a-A5, as defined by RPS (2012), was subsequently subject to test excavation as part of AECOM's test excavation program for the Project, with that portion

of the SU1a-A5 extending into the original ACHAR study area falling within of a broader area of subsurface archaeological sensitivity designated as 'ASAS-2'. Testing within ASAS-2, which encompassed part of the left bank floodplain of Pipers Flat Creek and a small section of adjoining slope, was completed in two phases under a systematic sampling design. Phase 1 testing involved the completion of a single linear transect of 50 x 50 cm test pits (n = 14) (**Figure 14**), with pits spaced at 25 m intervals, while Phase 2 comprised two small expansion excavations around Phase 1 test pits TPs 42 and 52, with both pits expanded to 1 m^2.

A total of 14 Aboriginal objects, consisting exclusively of flaked stone artefacts, were recovered as a result of subsurface testing across ASAS-2. Artefact-yielding pits (n = 7) were spread widely across the area tested (**Figure 4**). However, the majority (n = 5) occurred in the eastern half of the PAD area. Densities for Phase 1 test pits within ASAS-2 ranged from one to four artefacts per 0.25 m^2 (mean = 2±1.4 artefacts/0.25m^2). All pits contained fewer than five artefacts, with TPs 42 and 52 containing the equal highest count (n = 4). Phase 2 expansion excavations at TPs 42 and 52 produced no additional artefacts. Collectively, artefacts recovered as a result of Phase 1 and 2 testing across ASAS-2 and ASAS-3 (n = 14) provided a mean artefact density of 2.3 artefacts per m^2.

Based on AECOM's (2021) survey and test excavation results, RPS's (2012) boundary for SU1a-A5 was revised to that shown on **Figure 4**.

3.2 NSW State Heritage Inventory

The NSW State Heritage Inventory, administered by Heritage NSW, is an online database containing more than 30,000 heritage items and places on statutory lists in NSW. The inventory, which can now be searched using an interactive map, includes:

- Declared Aboriginal Places
- Items listed on the State Heritage Register (SHR)
- Listed Interim Heritage Orders
- Items of local heritage significance listed in the heritage schedules of Local Environmental Plans.

Of relevance to the current assessment are declared Aboriginal places. As per the AHIMS search results above, reference to the State Heritage Inventory interactive map (accessed 12 August 2021) confirms that there are no declared Aboriginal places located within or immediately adjacent to the Addendum ACHAR study area, with the closest example being the Blackfellows Hand rockshelter (also known as Maiyingu Marragu), located around 7.5 km north-northeast of this area.

3.3 Project ACHAR

As detailed in **Section 1.2**, archaeological field investigations undertaken to inform AECOM's (2021) ACHAR for the Project included a full coverage pedestrian survey of ACHAR study area and targeted test excavation program, with AECOM ultimately identifying a total of two Aboriginal sites within and immediately surrounding the ACHAR study area. These consisted of previously recorded surface and subsurface artefact scatter SU1a-A5 (AHIMS ID #45-1-2716) and newly identified surface and subsurface stone quarry site GWB-STQ1-21 (AHIMS ID #45-1-2853).

As shown on **Figure 2**, SU1a-A5 extends into the Addendum ACHAR study area, while GWB-STQ1-21 is located wholly outside of this area. Reference to **Figure 4**, meanwhile, indicates that none of surface artefacts identified by AECOM (2021) within the bounds of SU1a-A5 are located within or immediately adjacent to the Addendum ACHAR study area.

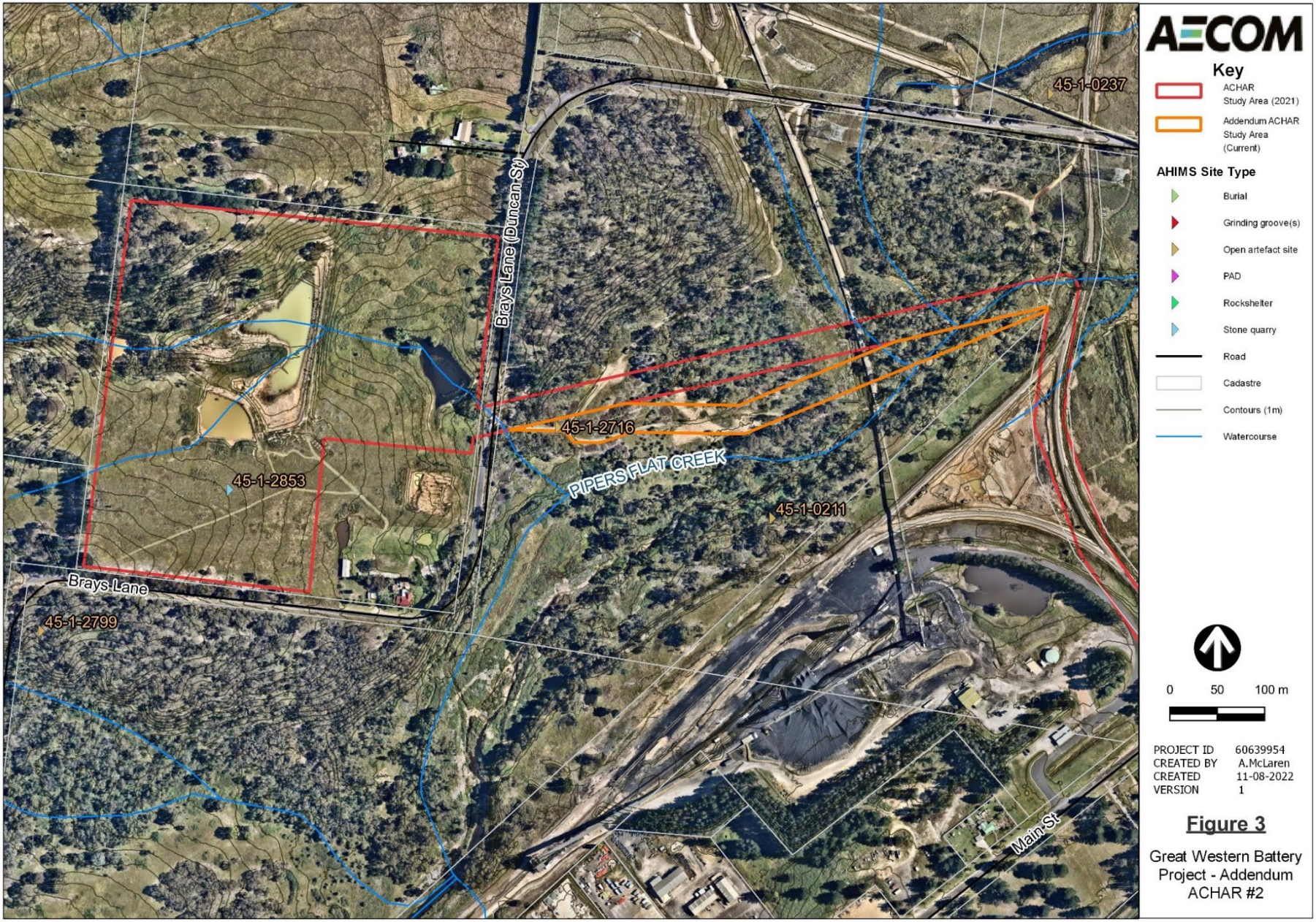

Figure 3 AHIMS search results

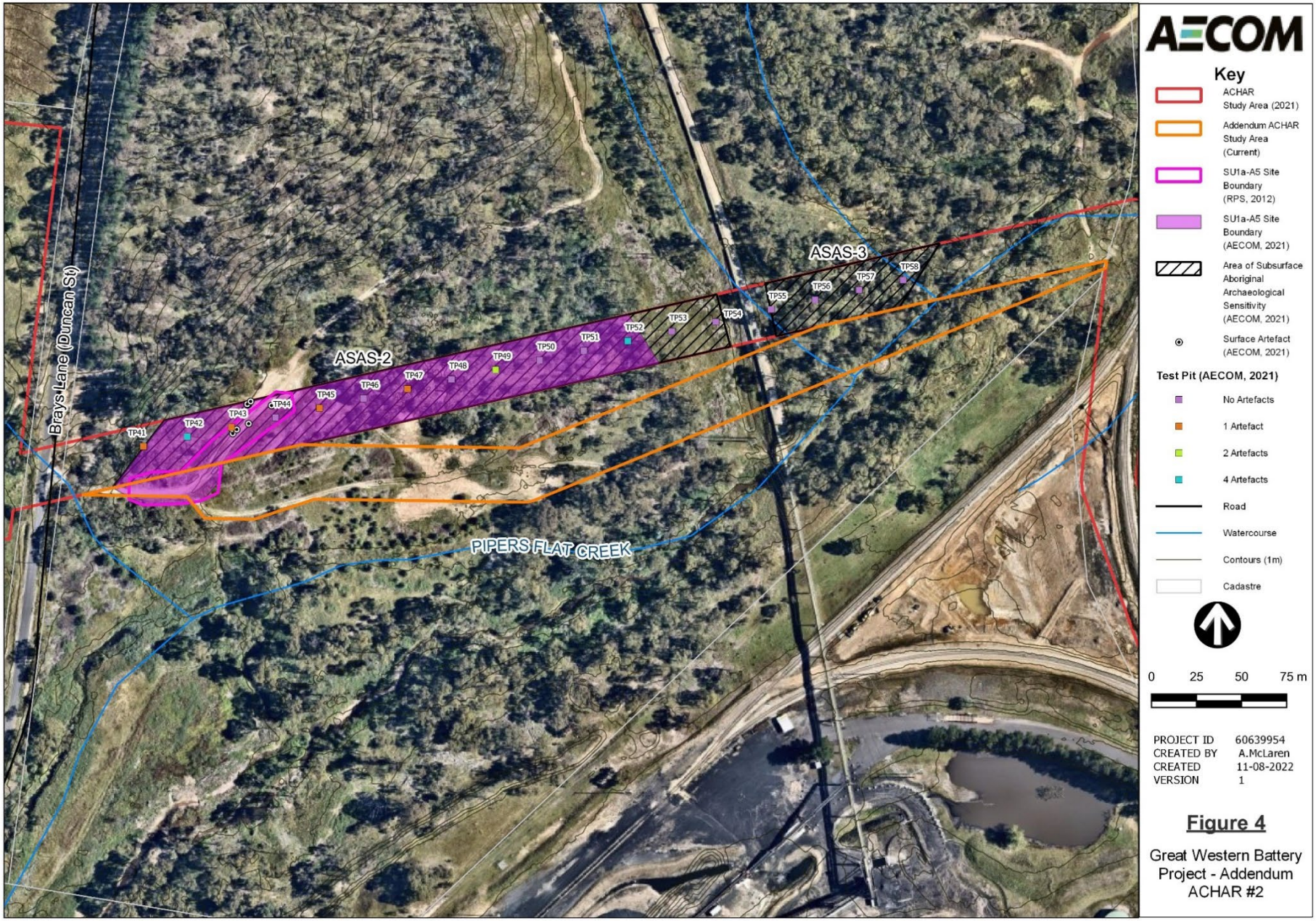

Figure 4 Surface and subsurface artefact scatter SU1a-A5 (37-6-2716)

3.4 Landscape Context

Key observations to be drawn from a review of the landscape context of the Addendum ACHAR study area are as follows:

- The Addendum ACHAR study area encompasses part of the level to very gently inclined left bank floodplain of Pipers Flat Creek, a locally significant >4th order watercourse, with a small section of adjoining slope also represented. While the former landform unit could be described as being amenable to Aboriginal occupation in the past, it is noted that existing archaeological data for this component of ACHAR study area, detailed in AECOM (2021) and summarised above, indicated low intensity use by Aboriginal people in the past.
- At its closest point, the current channel of Pipers Flat Creek is located approximately 25 m to south of the Addendum ACHAR study area.
- While sections of Pipers Flat Creek, both within and outside of Addendum ACHAR study area, are known to have been modified historically, the original alignment of the creek adjacent to this area appears to have been largely preserved.
- Stones suitable for stone artefact manufacture are known to occur within and immediately surrounding the Addendum ACHAR study area in the form of surface and subsurface deposits of fluvial gravels.
- Existing archaeological data for the greater Wallerawang-Lidsdale area indicate that Aboriginal people occupying this area utilised a diverse range of rock types for flaked and edge-ground stone tool manufacture. Nonetheless, quartz and silicified tuff are particularly well represented in recorded assemblages (e.g., White, 2004: 5, Table 1), including those from the ACHAR study area.
- Native vegetation within the Addendum ACHAR study area has been extensively modified as a result of historical land use activities, with the majority now comprising ‘non-native vegetation’ (after Biosis, 2022). Historical disturbance activities notwithstanding, the results of Biosis ‘(2022) biodiversity assessment for the Project suggests that this area would once have supported Black Gum grassy woodland.
- Given the scale of past vegetation clearance activities within the Addendum ACHAR study area, culturally modified trees are unlikely to be present within this area.
- Land within the Addendum ACHAR study area retains variable Ground Integrity (GI). While the majority of land within this area is assessed as retains a moderate degree of integrity, having been cleared historically for grazing but not subject to severe disturbance in the form of earthworks or the like, other parts have been significantly disturbed and retain low GI. Areas of severely disturbed terrain therein are assessed as retaining low Aboriginal archaeological potential.

3.5 Historical Aerials

Alongside field observations, historical aerial photographs provide an avenue for assessing the nature and extent of past ground disturbance within the Addendum ACHAR study area. Aerials from 1954 to 2019, provided in **Appendix D**, indicate a range of ground-disturbing land use activities including:

- Extensive native vegetation clearance
- Light vehicle track construction and use (including the creation of multiple turning circles)
- Modifications to Pipers Flat Creek
- Coal transport and handling (i.e., Lidsdale Siding and its associated overland conveyor)

To varying degrees, all of the above cited activities are relevant to the survival, integrity and identification of Aboriginal archaeological deposits within the Addendum ACHAR study area. Key implications for the current assessment include:

- The probable destruction of a proportion of the Aboriginal archaeological record of this area (i.e., due to severe ground disturbance)

- The disturbance of pre-existing archaeological deposits through both direct (e.g., earthworks) and indirect (e.g., erosion) means, resulting in a loss of archaeological integrity
- A substantially reduced likelihood for the presence of culturally scarred trees
- An increase of archaeological site visibility in areas affected by erosion.

Figure 5 comprises a land disturbance map for the Addendum ACHAR study area. For the current assessment, two basic levels of disturbance are recognised: ‘low’ and ‘high’. Any Aboriginal archaeological deposits located within areas of high disturbance are likely to have been either destroyed or significantly disturbed. Areas of low disturbance, in contrast, retain potential for the presence of intact archaeological deposits, albeit of variable character.

Figure 5 Land disturbance

4.0 Archaeological Survey

4.1 Objectives and Survey Strategy

Archaeological survey of the Addendum ACHAR study area was undertaken on 10 August 2022, with the survey team comprising personnel from AECOM, five RAPs and Complete Assessment Management (CAM). Consistent with the draft ACHAR methodology issued to RAPs in February 2021, a full coverage survey strategy was adopted for the current survey, with all sections of the Addendum ACHAR study area subject to survey. Specific survey objectives were as follows:

- To identify and record any existing surface evidence of past Aboriginal activity within the Addendum ACHAR study area
- To identify areas of subsurface archaeological sensitivity (if present)
- To ground truth levels of past ground disturbance
- To physically reassess that portion of 'SU1a-A5' (45-1-2716) extending into the Addendum ACHAR study area.

All survey was conducted on foot under the supervision of a rail protection officer (Mr David Horder, CAM), with associated survey data recorded in accordance with the relevant provisions of the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW*. Survey units, shown on **Figure 6**, were demarcated on the basis of landform.

Table 4 Survey results

Organisation	Representative	Position
AECOM	Andrew McLaren	Principal Aboriginal Heritage Specialist
Didge Ngunawal Clan	Paul Boyd	Site officer
Murra Bidgee Mullangari Aboriginal Corporation	Ethan Trewlynn	Site officer
Merrigarn	Peter Carroll	Site officer
Muragadi	Lee Carroll	Site officer
Corroboree Aboriginal Corporation	Marilyn Carroll Johnson	Site officer
Complete Asset Management	David Horder	Rail Protection Officer

4.2 Results

The results of the survey undertaken, including coverage data, are presented in **Table 5**. As indicated, a single Aboriginal site, consisting of an isolated flaked stone artefact ('GWB-IA1-22'), was identified during the survey (see **Plate 4** and **Plate 5**). Consistent with AECOM's (2021) initial survey results, no Aboriginal objects were identified within the relevant section of previously recorded artefact scatter 'SU1a-A5' (45-1-2716).

Ground Exposure (GE) across Survey Unit 1, encompassing part of a pre-existing vehicle track, averaged 90%, with GSV averaging 70%. Observed ground disturbance phenomena within this unit included native vehicle clearance, vehicle track construction/use and erosion (sheet and gully).

GE across Survey Unit 2, encompassing part of the left bank floodplain of Pipers Flat Creek, averaged 30%. GSV in exposed areas was generally very high, averaging 90% (**Plate 1**). Ground Integrity (GI), meanwhile, varied from low to moderate, with observed areas of low GI associated with vehicle track construction/use (including former turning circle areas), erosion, the overland coal conveyor and historical modifications to Pipers Flat Creek (represented by multiple revegetated earth mounds) adjacent to the creek's current channel) (**Plates 2 to 5**). Notably, extensive surface deposits of fluvial

gravels were noted in the vicinity of newly recorded isolated artefact ‘GWB-IA1-22’, ostensibly exposed by repeated light/heavy vehicle movements.

With regards to areas of subsurface archaeological sensitivity, drawing on AECOM’s (2021) testing results for nearby ‘ASAS-2’ and ‘ASAS-3’ (see **Figure 4**), sections of floodplain outside of areas of disturbed terrain west of the overland coal conveyor were assessed in the field as retaining subsurface archaeological potential, albeit for low to very low density deposit.

Located towards the southern edge of a vehicle track exposure in the central portion of the Addendum ACHAR study area, newly identified isolated artefact ‘GWB-IA1-22’ has been registered on the AHIMS database and assigned the AHIMS ID #45-1-2891. The site is described in **Section 4.2.1** and its location shown on **Figure 6**.

Table 5 Survey results

Survey unit	Landform unit(s)	Area (m^2)	Ground Surface Visibility (%)	Ground Exposure (%)	Effective Coverage (m^2)	Effective coverage (%)	Disturbance rating	Observed ground disturbance phenomena	Aboriginal site(s)?	Areas of subsurface archaeological sensitivity?	Plates
1	Slope	35.7	70	90	22.5	63	High	Native vegetation clearance; light vehicle track construction/use; erosion	None	None	**Plate 1**
2	Floodplain	14,267	90	30	3852	27	Moderate to High	Native vegetation clearance; Light vehicle track construction/use; erosion; coal conveyor; tree planting; modifications to Pipers Flat Creek (straightening)	Yes Newly identified isolated artefact 'GWB-IA1-22' (see **Section 4.2.1**) No Aboriginal objects identified within relevant portion of previously identified artefact scatter 'SU1a-A5' (45-1-2716)	Yes Sections of floodplain outside of disturbed areas west of coal conveyor assessed in the field as retaining potential for low to very low density deposits.	**Plates 2 to 5**

Figure 6 Survey results

Plate 1: View east from central portion of Survey Unit 1. Note enhanced GSV and erosion on vehicle track (Source: AECOM, 2021)

Plate 2: View east from western portion of Survey Unit 2. Note poor GSV on existing vehicle track (Source: AECOM, 2021)

Plate 3: View across western ‘turning circle’ area within Survey Unit 2 Note enhanced GSV and exposure of fluvial river gravels (Source: AECOM, 2021)

Plate 4: View across eastern ‘turning circle’ area within Survey Unit 2. Proposed drill rig hardstand and laydown area at rear. Green pin marker, centre foreground, demarcates newly identified isolated artefact ‘GWB-IA1-22’. Note enhanced GSV in exposed areas (Source: AECOM, 2021)

Plate 5: New identified isolated artefact 'GWB-IA1-22': an IMT flake (Source: AECOM, 2021)

Plate 6: View across easternmost portion of Survey Unit 2. Note mounds on right, likely associated with the realignment of Pipers Flat Creek in the 1950s, and very poor GSV (Source: AECOM, 2021)

4.2.1 GWB-IA1-22

Site type: Isolated artefact **GPS coordinates:** GDA Zone 56 227778E 6300834N

Date recorded: 10 August 2022 **1:25,000 topographic map:** Lithgow 8931-3S

Site area: 1 m^2 **Landform unit(s):** Floodplain (Pipers Flat Creek)

Vegetation: Cleared (formerly Black Gum grassy woodland)

Slope: Level to very gently inclined **GSV (%):** 90 **Ground integrity:** Low

Disturbance factors: Native vegetation clearance, vehicle track construction/use, erosion

Distance to nearest mapped watercourse (name, order): *c*.28 metres (Pipers Flat Creek, 4th order)

Site description:

GWN-IA1-22 consists of an isolated indurated mudstone/silicified tuff (IMT) flake with a single facet striking platform and no dorsal cortex. The flake, which measures 33 x 27 x 7.5 mm and is missing part of its distal termination, is located towards the southern edge of a former turning circle area on the left bank floodplain of Pipers Flat Creek, approximately 265 m east of Brays Lane. GSV at and immediately surrounding GWB-IA1-22 is excellent (90%). Large quantities of fluvial gravels are present in the vicinity of the site and appear to have been exposed via repeated light and/or heavy vehicle movements.

5.0 Significance assessment

5.1 Principles of assessment

Heritage sites hold value for different communities in a variety of different ways. All sites are not equally significant and thus not equally worthy of conservation and management (Pearson & Sullivan, 1995: 17). One of the primary responsibilities of cultural heritage practitioners, therefore, is to determine which sites are worthy of preservation and management (and why) and, conversely, which are not (and why) (Smith & Burke, 2007: 227). This process is known as the assessment of cultural significance and, as highlighted by Pearson and Sullivan (1995: 127), incorporates two interrelated and interdependent components. The first involves identifying, through documentary, physical or oral evidence, the elements that make a heritage site significant, as well as the type(s) of significance it manifests. The second involves determining the degree of value that the site holds for society (i.e., its cultural significance) (Pearson & Sullivan, 1995: 126).

In Australia, the primary guide to the assessment of cultural significance is the Australian ICOMOS Charter for Places of Cultural Significance (2013), informally known as The Burra Charter, which defines cultural significance as the "*aesthetic, historic, scientific, social or spiritual value for past, present or future generations*" of a site or place (ICOMOS Australia, 2013: 2). Under the Burra Charter model, the cultural significance of a heritage site or place is assessed in terms of its aesthetic, historic, scientific, social and spiritual values, none of which are mutually exclusive (**Table 6**). Establishing cultural significance under the Burra Charter model involves assessing all information relevant to an understanding of the site and its fabric (i.e., its physical make-up). The assessment of cultural significance and the preparation of a statement of cultural significance are critical prerequisites to making decisions about the management of any heritage site or place.

Table 6 Values relevant to determining cultural significance, as defined by The Burra Charter

Value	Definition
Aesthetic	"Aesthetic value refers to the sensory and perceptual experience of a place-that is, how we respond to visual and non-visual aspects such as sounds, smells and other factors having a strong impact on human thoughts, feelings and attitudes. Aesthetic qualities may include the concept of beauty and formal aesthetic ideals" (Australia ICOMOS, 2013: 3)
Historic	"Historic value is intended to encompass all aspects of history. A place may have historic value because it has influenced, or has been influenced by, an historic event, phase, movement or activity, person or group of people. It may be the site of an important event. For any place the significance will be greater where the evidence of the association or event survives at the place, or where the setting is substantially intact, than where it has been changed or evidence does not survive. However, some events or associations may be so important that the place retains significance regardless of such change or absence of evidence" (Australia ICOMOS, 2013: 3)
Scientific	"Scientific value refers to the information content of a place and its ability to reveal more about an aspect of the past through examination or investigation of the place, including the use of archaeological techniques. The relative scientific value of a place is likely to depend on the importance of the information or data involved, on its rarity, quality or representativeness, and its potential to contribute further important information about the place itself or a type or class of place or to address important research questions" (Australia ICOMOS, 2013: 4)
Social	"Social value refers to the associations that a place has for a particular community or cultural group and the social or cultural meanings that it holds for them" (Australia ICOMOS, 2013: 4)

Value	Definition
Spiritual	"Spiritual value refers to the intangible values and meanings embodied in or evoked by a place which give it importance in the spiritual identity, or the traditional knowledge, art and practices of a cultural group. Spiritual value may also be reflected in the intensity of aesthetic and emotional responses or community associations, and be expressed through cultural practices and related places" (Australia ICOMOS, 2013: 4)

5.2 Scientific Values

Scientific value or significance refers to the importance of a place in terms of its rarity, representativeness and the extent to which it may contribute further information (i.e. its research potential) (OEH, 2011: 9).

5.2.1 Rarity and representativeness

Rarity and representativeness are related concepts. Rarity refers to the relative uniqueness of a site within its local and regional context. The scientific significance of a site is assessed as higher if it is unique or rare within either context. Conversely, it is considered to be of lower significance if it is common in one or both. The concept of representativeness, meanwhile, refers to the question of whether or not a site is "*a good example of its type, illustrating clearly the attributes of its significance*" (Burke & Smith 2004: 247). Representativeness is an important criterion as one of the primary goals of cultural heritage management is to preserve for future generations a representative sample of all archaeological site types in their full range of environmental contexts.

5.2.2 Research potential

Research potential can be defined as the potential of an archaeological site to address what Bowdler (1981: 129) has referred to as "*timely and specific research questions*". These questions may relate to any number of issues concerning past human lifeways and environments and, as suggested by Bowdler's quote, will inevitably reflect current trends or problems in academic research (Burke & Smith, 2004: 249). For their part, Bowdler and Bickford (1984: 23-4) suggest that the research potential of an archaeological site can be determined by answering the following series of questions:

1. Can the site contribute knowledge which no other resource can?
2. Can the site contribute knowledge which no other such site can?
3. Is this knowledge relevant to general questions about human history or other substantiative subjects?

Several criteria can be used to assess the research potential of an archaeological site. Particularly important in the context of Aboriginal archaeology are the intactness or integrity of the site in question, its complexity and its potential for archaeological deposit (NPWS, 1997: 7). The connectedness of the site to other sites or natural landscape features may also be relevant, as may its educational potential and aesthetic qualities.

Integrity refers to the extent to which a site has been disturbed by natural and/or anthropogenic phenomena and includes both the state of preservation of particular remains (e.g. animal bones, plant remains) and, where applicable, stratigraphic integrity. Assessments of archaeological integrity are predicated on the notion that undisturbed or minimally disturbed sites are likely to yield higher quality archaeological and/or environmental data than those whose integrity has been significantly compromised by natural and/or anthropogenic phenomena. Establishing levels of preservation or integrity in the context of a surface survey is difficult. Nonetheless, useful rating schemes are available for open artefact sites (Coutts & Witter, 1977: 34) and scarred trees (Long, 2003).

The *complexity* of a site refers primarily to the nature or character of the artefactual materials or features that constitute it but also includes site structure (e.g. the physical size of the site, spatial patterning in observed cultural materials). In the case of open artefact sites, the principal criteria used to assess complexity are the site's size (i.e. number of artefacts and/or spatial extent), the presence, range and frequency of artefact and raw material types, and the presence of features such as hearths.

Potential for archaeological deposit refers to the potential of a site to contain subsurface archaeological evidence which may, through controlled excavation and analysis, assist in answering questions that are of contemporary archaeological interest. Assessing subsurface potential in the absence of subsurface investigation is difficult. Nonetheless, consideration of a range of factors, including the integrity of the site, the complexity of extant surface evidence, local geomorphic conditions (as established through surface observations and documentary research) and the results of previous archaeological excavations in the area, help inform assessment of this criterion.

Connectedness concerns the relationship between archaeological sites within a given area and may be expressed through a combination of factors such as site location, type and contents. It may, for example, be possible to establish a connection between a stone quarry and discarded edge-ground hatchet head found nearby. Demonstrating connectedness archaeologically, however, is far from straightforward, especially when dealing with surface evidence alone. Ultimately, this difficulty rests with the need to demonstrate contemporaneity between sites that may have been created hundreds, if not thousands, of years apart. As Shiner (2008: 13) has observed with respect to surface sites, "*much of the surface archaeological record documents the accumulation of materials from multiple behavioural episodes occurring over long periods of discontinuous time*". Contemporaneity, then, needs to be demonstrated not assumed.

5.2.3 Significance Assessment for GWB-IA1-22

An assessment of the scientific significance of newly identified isolated artefact GWB-IA1-22 is presented in **Table 7**. Surface and subsurface artefact scatter SU1a-A5 (45-1-2716) is not included here as the scientific significance of this site was assessed as part of the preparation of the Project ACHAR and remains unchanged.

Following Australian Museum Business Services (AMBS) (2009b, 2009c), a scored ranking system has been employed for the current assessment, with overall significance ratings based on a cumulative 'score' derived from a ranked assessment of the research potential, rarity and representativeness of the site on a local and regional scale. Rankings for each of the criteria discussed above are associated with one of three potentials scores: low (score = 1), moderate (score = 2) and high (score = 3). Overall significance ratings are defined as follows:

- Low significance: score 10-15
- Moderate significance: score 16-25
- High significance: score 26-30.

As indicated, GWB-IA1-22 has been assessed as being of low scientific significance.

Table 7 Scientific significance assessment

Site	Site type	Rarity		Representativeness		Integrity		Complexity		PAD		Overall score	Overall significance
		L	R	L	R	L	R	L	R	L	R		
GWB-IA1-22	IA	1	1	1	1	1	1	1	1	1	1	10	Low

5.3 Cultural values

Social or cultural value refers to the spiritual, traditional, historic and contemporary associations and attachments a place or area has for Aboriginal people and can only be identified through consultation with Aboriginal people (OEH, 2011: 8).

No specific cultural values pertaining to the Addendum ACHAR study area were identified by RAPs during the archaeological survey detailed in **Section 4.0**. Regardless, it is acknowledged that all material remains of past Aboriginal activity within and surrounding this area, including new identified isolated artefact GWB-IA1-22, hold significant cultural value to RAPs and that this value was expressed broadly by multiple RAPs during the preparation of the Project ACHAR.

6.0 Key Findings and Recommendations

6.1 Key Findings

The key findings of this assessment are as follows:

- Two Aboriginal sites are present within the Addendum ACHAR study area: previously recorded surface and subsurface artefact scatter SU1a-A5 (45-1-2716) and newly recorded isolated artefact 'GWB-IA1-22'. Both sites have been assessed as being of low scientific significance.
- The mapped boundary of previously recorded artefact scatter SU1a-A5 is located partially within the Addendum ACHAR study area. However, the results of archaeological surveys undertaken for the Project, including that carried out to support the preparation of this Addendum ACHAR, indicate that none of the surface-based Aboriginal objects identified in association with this site occur within or immediately adjacent to the Addendum ACHAR study area.
- In general, land within the Addendum ACHAR study area, which encompasses part of the left bank floodplain of Pipers Flat Creek and a small section of adjoining slope, is considered to be of low Aboriginal archaeological sensitivity, with existing archaeological data for the Project suggesting an occupational emphasis on elevated low gradient landform elements away from the floodplain proper.
- Any subsurface archaeological deposits present within those portions of the Addendum ACHAR study area that have not been significantly disturbed are likely to be of low conservation value, consisting of low to very low density deposits.
- Land within the Addendum ACHAR study area retains variable GI. While sections of the study area, including the proposed drill rig hardstand and laydown area, have been significantly disturbed as a result of historical land use activities, the majority of land within this area retains moderate GI, having been cleared historically but not subject to severe disturbance.

6.2 Recommendations

In view of the key findings above, the following recommendations are made regarding the proposed works:

1. Additional archaeological investigations within the bounds of the Addendum ACHAR study area, including a supplementary program of test excavation, are unwarranted. While Aboriginal archaeological deposits of low conservation value are likely to present within parts of the Addendum ACHAR study area, physical impacts to these deposits as a result of the proposed works are considered unlikely due to: a) the nature of the works proposed within identified areas of subsurface archaeological potential (i.e., HDD at nominal depth of 1.5 m below ground level (b.g.l).) and b) significant ground disturbance within the bounds of the proposed drill rig hardstand and laydown area.
2. All light and heavy vehicle movements within the bounds of previously recorded artefact scatter SU1a-A5 (45-1-2716) should be restricted to the existing vehicle track that is present within this portion of the study area. An access corridor centred on the existing track and taking into account the maximum width of the vehicles required for the HDD installation process should be demarcated using high visibility fencing. Fencing should be installed prior to works commencing and remain in place until works are completed. All fencing works should be undertaken by, or under the supervision of, a qualified Aboriginal heritage specialist and minimum of one RAP representative. Sections of SU1a-A5 outside of the recommended access corridor should be clearly defined in the Project's Construction Environmental Management Plan (CEMP) as 'no-go zones'.
3. To ensure no inadvertent impacts during construction, newly recorded isolated artefact 'GWB-IA1-22' should be protected via high visibility fencing. Fencing should be installed prior to works commencing and remain in place until works are completed. All fencing works should be undertaken by, or under the supervision of, a qualified Aboriginal heritage specialist and minimum of one RAP representative. The location of GWB-IA1-22 should be clearly defined in the Project's CEMP as a 'no-go zone'.

4. Proposed management measures for SU1a-A5 and GWB-IA1-22 should be included in the Project's Aboriginal Cultural Heritage Management Plan (ACHMP).
5. Should any confirmed or suspected Aboriginal objects be identified within the Addendum ACHAR study area during construction, the Unexpected Aboriginal Heritage Finds Procedure (UAHFP) detailed in the ACHMP should be followed.
6. All contractors engaged to complete the proposed works within the Addendum ACHAR study area should be made aware of the nature and location of SU1a-A5 and GWB-IA1-22, as well as their associated 'no-go zones'.

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Appendix A

Consultation Log

Date	To/From AECOM	Organisation	Contact person(s)	Method of contact	AECOM representative	Summary
26.07.22	From AECOM	All RAPs (n = 9)	Various	E-mail	A.McLaren	Fieldwork notification
26.07.22	To AECOM	Didge Ngunawal Clan	Lily Carroll & Paul Boyd	E-mail	A.McLaren	Confirming survey attendance
26.07.22	To AECOM	Corroboree Aboriginal Corporation	Marilyn Carroll-Johnson	E-mail	A.McLaren	Confirming survey attendance
26.07.22	To AECOM	Merrigarn	Shaun Carroll	E-mail	A.McLaren	Confirming survey attendance
26.07.22	To AECOM	Muragadi	Jesse Johnson	E-mail	A.McLaren	Confirming survey attendance
02.08.22	To AECOM	Muragadi	Jesse Johnson	E-mail	A.McLaren	Notifying that site officer will be Lee Carroll
04.08.22	To AECOM	Muragadi	Jesse Johnson	E-mail	A.McLaren	Providing Lee's JHR certificates
08.08.22	From AECOM	Bathurst LALC	Tonilee Scott	E-mail	A.McLaren	Follow-up to fieldwork notification
	To AECOM	Bathurst LALC	Tonilee Scott	E-mail	A.McLaren	Won't be able to make the survey as no site officers available
08.08.22	To AECOM	Murra Bidgee Mullangari Aboriginal Corporation	Darleen Johnson	E-mail	A.McLaren	Providing JHR certificates for Ethan
08.08.22	To AECOM	Merrigarn	Shaun Carroll	E-mail	A.McLaren	Providing JHR certificates for Peter Carroll
09.08.22	To AECOM	Corroboree Aboriginal Corporation	Marilyn Carroll-Johnson	E-mail	A.McLaren	Confirming if survey is still on
09.08.22	From AECOM	Corroboree Aboriginal Corporation	Marilyn Carroll-Johnson	E-mail	A.McLaren	Confirmation that survey is proceeding
17.08.22	From AECOM	All RAPs (n = 9)	Various	E-mail	A.McLaren	Draft Addendum ACHAR
15.09.22	To AECOM	Didge Ngunawal Clan	Paul Boyd	E-mail	A.McLaren	Response to draft addendum. Refer to **Table 2** in **Section 2.2**.
15.09.22	To AECOM	Warrabinga-Wiradjuri #7 Native Title Claimant Group	Jack Pennell	E-mail	A.McLaren	Response to draft addendum. Refer to **Table 2** in **Section 2.2**.
16.09.22	To AECOM	Murra Bidgee Mullangari Aboriginal Corporation	Darleen Johnson	E-mail	A.McLaren	Response to draft addendum. Refer to **Table 2** in **Section 2.2**.
16.09.22	To AECOM	Corroboree Aboriginal Corporation	Marilyn Carroll-Johnson	E-mail	A.McLaren	Response to draft addendum. Refer to **Table 2** in **Section 2.2**.

Appendix B

RAP Responses to Draft Addendum ACHAR

McLaren, Andrew

From: Corrroboree Aboriginal Corporation <corroboreecorp@bigpond.com>
Sent: Friday, 16 September 2022 2:03 PM
To: McLaren, Andrew
Subject: [EXTERNAL] Re: Second Addendum ACHAR - Great Western Battery Project, Wallerawang
Attachments: 60639954_ACHAR_Addendum_2022_08_16_Drft_REV.pdf

Hi Andrew
Sorry day late. We see no issues with second addendum.

Kind regards
Marilyn Carroll-Johnson
Director
Corroboree Aboriginal Corporation
Mob: 0415911159
Ph: 0288244324
E: corroboreecorp@bigpond.com
Address: PO Box 3340
ROUSE HILL NSW 2155

CAC acknowledges the Traditional Owners of Country throughout Australia and their continuing connection to land, sea & community. We pay our respects to them and their cultures, to the Elders past and present, and emerging.

> On 15 Sep 2022, at 2:28 pm, McLaren, Andrew <Andrew.McLaren@aecom.com> wrote:
>
> Afternoon Marilyn,
>
> Just following up on the below re our second Addendum ACHAR for the Great Western Battery project in Wallerawang.
>
> Today is the official closing date for comment. Wanted to check in and see if you had any feedback on the document.
>
> Cheers,
>
> Andy
>
> ---
>
> **From:** McLaren, Andrew
> **Sent:** Wednesday, 17 August 2022 11:59 AM

McLaren, Andrew

From: lilly carroll <didgengunawalclan@yahoo.com.au>
Sent: Thursday, 15 September 2022 3:30 PM
To: McLaren, Andrew
Subject: [EXTERNAL] Re: Second Addendum ACHAR - Great Western Battery Project, Wallerawang

Hi Andrew

We are happy with the 2nd ACHAR, as we have reviewed it.

Kind regards Paul

Sent from Yahoo Mail for iPhone

On Thursday, September 15, 2022, 2:20 pm, McLaren, Andrew <Andrew.McLaren@aecom.com> wrote:

> Afternoon Lilly/ Paul,
>
> Just following up on the below re our second Addendum ACHAR for the Great Western Battery project in Wallerawang.
>
> Today is the official closing date for comment. Wanted to check in and see if you had any feedback on the document.
>
> Cheers,
>
> Andy
>
> **From:** McLaren, Andrew
> **Sent:** Wednesday, 17 August 2022 11:59 AM
> **To:** McLaren, Andrew <Andrew.McLaren@aecom.com>
> **Subject:** Second Addendum ACHAR - Great Western Battery Project, Wallerawang

McLaren, Andrew

From: Darleen Johnson <murrabidgeemullangari@yahoo.com.au>
Sent: Friday, 16 September 2022 2:43 AM
To: McLaren, Andrew
Subject: [EXTERNAL] Re: Second Addendum ACHAR - Great Western Battery Project, Wallerawang
Attachments: 60639954_ACHAR_Addendum_2022_08_16_Drft_REV.pdf

Hi Andrew,
I have read the project information and ACHAR for the above project, I endorse the recommendations made.
Kind regards
Darleen Johnson
0490051102

On Thursday, 15 September 2022 at 02:21:50 pm AEST, McLaren, Andrew <andrew.mclaren@aecom.com> wrote:

Afternoon Darleen,

Just following up on the below re our second Addendum ACHAR for the Great Western Battery project in Wallerawang.

Today is the official closing date for comment. Wanted to check in and see if you had any feedback on the document.

Cheers,

Andy

From: McLaren, Andrew
Sent: Wednesday, 17 August 2022 11:59 AM
To: McLaren, Andrew <Andrew.McLaren@aecom.com>
Subject: Second Addendum ACHAR - Great Western Battery Project, Wallerawang

Dear Registered Aboriginal Party (RAP),

McLaren, Andrew

From: jack pennell <jackpennell@hotmail.com>
Sent: Thursday, 15 September 2022 4:52 PM
To: McLaren, Andrew
Subject: [EXTERNAL] Re: Second Addendum ACHAR - Great Western Battery Project, Wallerawang

Hi Andrew,

I would like to thank the site officers for their time and apologise that Warrabinga NTCAC could not supply an officer for the site surveys. I have strong feelings for our cultural history and I feel that any sites being small or large are the same. If we find one or one thousand artifacts it proves that our ancestors were present in this area hunting, gathering or living I just have a problem with Low Moderate and High to make this determination

Regards

Jack Pennell
Chairperson for Warrabinga Native Title Claimants Aboriginal Corporation
Phone: 0407006097

From: McLaren, Andrew <Andrew.McLaren@aecom.com>
Sent: Thursday, 15 September 2022 2:30 PM
To: dfabar@optusnet.com.au <dfabar@optusnet.com.au>; jack pennell <jackpennell@hotmail.com>; Peter Swain <peterswain20@gmail.com>; Rick Slaven <rickyslaven69@gmail.com>; david.masters@warrabinga.com.au <david.masters@warrabinga.com.au>
Subject: FW: Second Addendum ACHAR - Great Western Battery Project, Wallerawang

Afternoon all,

Just following up on the below re our second Addendum ACHAR for the Great Western Battery project in Wallerawang. Attached again for your records.

Today is the official closing date for comment. Wanted to check in and see if you had any feedback on the document.

Cheers,

Andy

From: McLaren, Andrew
Sent: Wednesday, 17 August 2022 11:59 AM
To: McLaren, Andrew <Andrew.McLaren@aecom.com>
Subject: Second Addendum ACHAR - Great Western Battery Project, Wallerawang

Dear Registered Aboriginal Party (RAP),

Appendix C

AHIMS Search Results

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : GWB Addendum

Client Service ID : 707739

AECOM Australia Pty Ltd - Sydney

Level 21 420 George Street
SYDNEY New South Wales 2000

Attention: Andrew Peter Mclaren

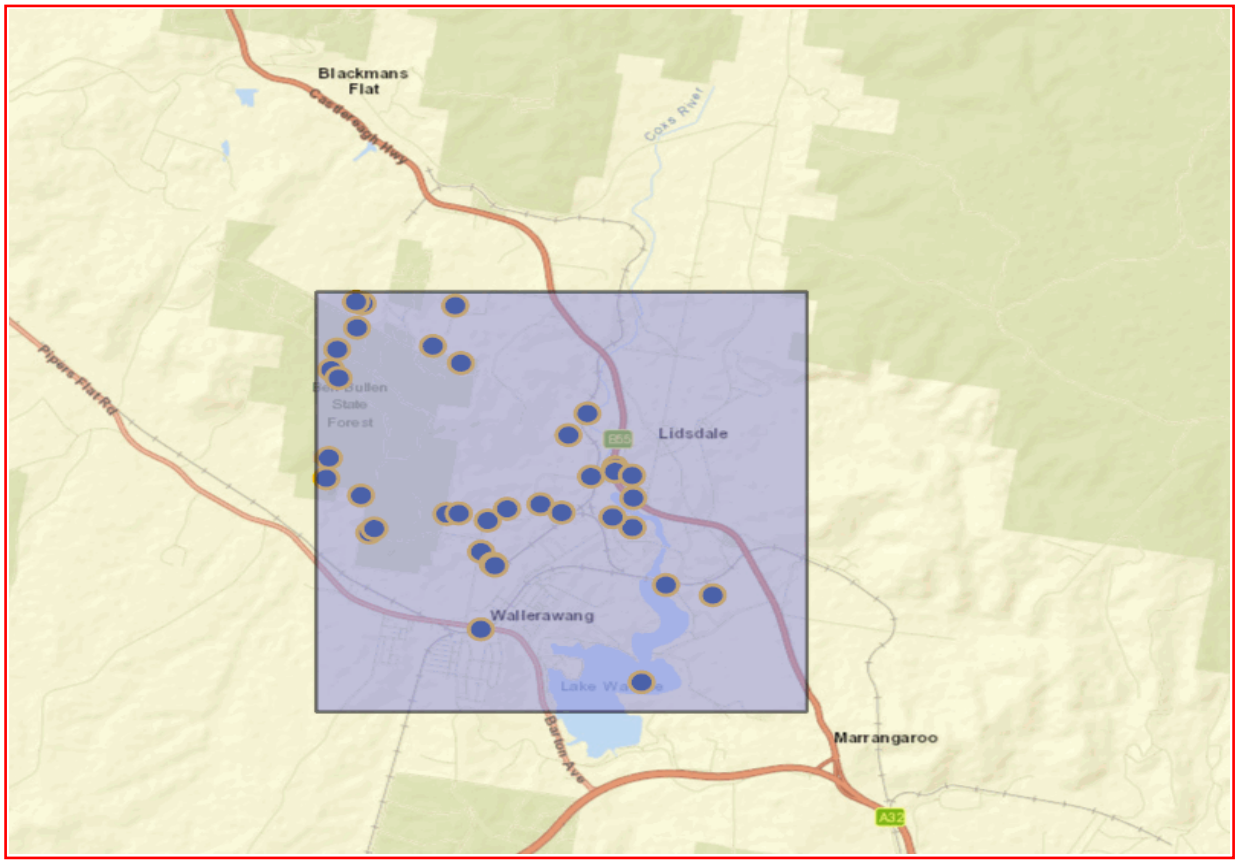
Email: andrew.mclaren@aecom.com

Date: 12 August 2022

Dear Sir or Madam:

AHIMS Web Service search for the following area at Datum :GDA, Zone : 56, Eastings : 225306.0 - 230306.0, Northings : 6298373.0 - 6303373.0 with a Buffer of 0 meters, conducted by Andrew Peter Mclaren on 12 August 2022.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

38	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (https://www.legislation.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Heritage NSW upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Heritage NSW and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date. Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

Level 6, 10 Valentine Ave, Parramatta 2150
Locked Bag 5020 Parramatta NSW 2124
Tel: (02) 9585 6345

ABN 34 945 244 274
Email: ahims@environment.nsw.gov.au
Web: www.heritage.nsw.gov.au

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : GWB Addendum

Client Service ID : 707739

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
45-6-2355	Lamberts Creek 6;	AGD	56	225480	6303070	Open site	Destroyed	Artefact : -	Open Camp Site	
	Contact	**Recorders**	Ms.Laila Haglund,Ms.Jillian Comber					**Permits**	405	
45-1-0071	Mt Piper;Lamberts Creek 1;	AGD	56	225325	6302130	Closed site	Valid	Artefact : -	Shelter with Deposit	2294
	Contact	**Recorders**	Helen Brayshaw,Ms.Laila Haglund					**Permits**		
45-1-0072	Lamberts Creek2	AGD	56	225245	6302229	Open site	Valid	Artefact : -	Open Camp Site	2294
	Contact	**Recorders**	Helen Brayshaw,Ms.Laila Haglund					**Permits**		
45-1-0206	S9;Lidsdale;	AGD	56	227750	6301500	Open site	Valid	Artefact : -	Open Camp Site	2300
	Contact	**Recorders**	Elizabeth Rich,Alice Gorman					**Permits**		
45-1-0207	S8;Blackmans Flat;	AGD	56	226520	6303050	Open site	Valid	Artefact : -	Open Camp Site	2300
	Contact	**Recorders**	Elizabeth Rich,Alice Gorman					**Permits**		
45-1-0208	S5;Blackmans Flat;	AGD	56	225550	6303050	Open site	Valid	Artefact : -	Open Camp Site	2300
	Contact	**Recorders**	Elizabeth Rich					**Permits**	361	
45-1-0209	S4;Wallerawang;	AGD	56	226300	6302550	Open site	Valid	Artefact : -	Open Camp Site	2300
	Contact	**Recorders**	Elizabeth Rich					**Permits**		
45-1-0210	S3;Wallerawang;	AGD	56	226600	6302350	Open site	Valid	Artefact : -	Open Camp Site	2300
	Contact	**Recorders**	Elizabeth Rich					**Permits**	472	
45-1-0211	S2;Wallerawang;	GDA	56	227811	6300741	Open site	Valid	Artefact : -	Open Camp Site	2300
	Contact	**Recorders**	Mr.Neville Baker,Elizabeth Rich,Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats					**Permits**	467	
45-1-0215	Lamberts Ck 5;Mt Piper;	AGD	56	225300	6302480	Open site	Valid	Artefact : -	Open Camp Site	2294
	Contact	**Recorders**	Helen Brayshaw,Ms.Laila Haglund					**Permits**		
45-1-0237	Springvale Colliery;	AGD	56	228000	6301000	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	Doctor.Susan (left ahms) Mcintyre-Tamwoy					**Permits**	496	
45-1-0247	Wallerawang Schoolhouse;	AGD	56	228240	6300510	Open site	Valid	Artefact : -	Open Camp Site	3818
	Contact	**Recorders**	Ms.Elizabeth White					**Permits**		
45-1-0010	Pipers Flat Creek;	AGD	56	225600	6300700	Closed site	Valid	Artefact : -, Grinding Groove : -	Axe Grinding Groove,Shelter with Deposit	1515
	Contact	**Recorders**	D Miller					**Permits**		
45-1-0012	Pipers Flat Creek;	AGD	56	225250	6301150	Closed site	Valid	Artefact : -, Art (Pigment or Engraved) : -	Shelter with Art,Shelter with Deposit	
	Contact	**Recorders**	D Miller					**Permits**		
45-1-0013	Pipers Flat Creek;	AGD	56	225230	6300900	Closed site	Valid	Artefact : -, Grinding Groove : -	Axe Grinding Groove,Shelter with Deposit	
	Contact	**Recorders**	ASRSYS					**Permits**		

Report generated by AHIMS Web Service on 12/08/2022 for Andrew Peter Mclaren for the following area at Datum :GDA, Zone : 56, Eastings : 225306.0 - 230306.0, Northings : 6298373.0 - 6303373.0 with a Buffer of 0 meters.. Number of Aboriginal sites and Aboriginal objects found is 38

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : GWB Addendum

Client Service ID : 707739

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
45-1-0019	Irondale;	AGD	56	225500	6302750	Closed site	Valid	Artefact : -, Grinding Groove : -	Axe Grinding Groove,Shelter with Deposit	
	Contact	**Recorders**	R Miller					**Permits**		
45-1-0020	Pipers Flat Creek;	AGD	56	225750	6300300	Closed site	Valid	Artefact : -, Art (Pigment or Engraved) : -, Grinding Groove : -	Axe Grinding Groove,Shelter with Art,Shelter with Deposit	
	Contact	**Recorders**	R Miller					**Permits**		
45-1-0021	Pipers Flat Creek;	AGD	56	225700	6300250	Open site	Valid	Grinding Groove : -	Axe Grinding Groove	
	Contact	**Recorders**	R Miller					**Permits**		
45-1-0022	Pipers Flat Creek;Bald Rock;	AGD	56	226630	6300510	Open site	Valid	Grinding Groove : -	Axe Grinding Groove	
	Contact	**Recorders**	R Miller					**Permits**		
45-1-0023	Pipers Flat Creek;Bald Rock;	AGD	56	226500	6300500	Closed site	Valid	Artefact : -	Shelter with Deposit	
	Contact	**Recorders**	R Miller					**Permits**		
45-1-0048	Wallerawang; Lithgow;	AGD	56	226900	6299100	Open site	Valid	Burial : -, Modified Tree (Carved or Scarred) : -	Burial/s,Carved Tree	
	Contact	**Recorders**	David Bell,NPWS - Blackheath Office,Betty Meehan					**Permits**	473	
45-1-2572	Site 1, Catlereagh Highway Realignment, Lidsdale	AGD	56	228430	6301025	Open site	Valid	Artefact : -		4549
	Contact	**Recorders**	Ms.Louise Gay					**Permits**		
45-1-2573	PAD 1, Castlereagh Highway Realignment, Lidsdale	AGD	56	228250	6301070	Open site	Destroyed	Potential Archaeological Deposit (PAD) : -		98700,102443
	Contact	**Recorders**	Ms.Louise Gay					**Permits**	1436,1666	
45-1-2574	PAD 2, Castlereagh Highway Realignment, Lidsdale	AGD	56	228250	6301120	Open site	Partially Destroyed	Artefact : -, Potential Archaeological Deposit (PAD) : -		98700,102443
	Contact	**Recorders**	Ms.Louise Gay					**Permits**	1436,1707	
45-1-2545	Wallerowong Station Massacre	AGD	56	228600	6298500	Open site	Valid	Burial : -	Burial/s	
	Contact	**Recorders**	Ms.Adrienne Howe-Piening					**Permits**		
45-1-2583	Duncan/Main Street PAD	AGD	56	228450	6300750	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Doctor.Jodie Benton					**Permits**	1793	
41-1-0238	Duncan Street PAD(refer to site 45-1-2583)	AGD	56	228450	6300750	Open site	Deleted	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Doctor.Jodie Benton					**Permits**		
45-1-2715	SU1a - A4	GDA	56	228046	6301960	Open site	Valid	Artefact : 1		

Report generated by AHIMS Web Service on 12/08/2022 for Andrew Peter Mclaren for the following area at Datum :GDA, Zone : 56, Eastings : 225306.0 - 230306.0, Northings : 6298373.0 - 6303373.0 with a Buffer of 0 meters.. Number of Aboriginal sites and Aboriginal objects found is 38

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : GWB Addendum

Client Service ID : 707739

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
	Contact	**Recorders**	Ms.Cheng-Yen Loo,RPS East Australia Pty Ltd - Echuca Victoria					**Permits**		
45-1-2716	SU1a - A5	GDA	56	227585	6300837	Open site	Valid	Artefact : 19		
	Contact	**Recorders**	Ms.Cheng-Yen Loo,RPS East Australia Pty Ltd - Echuca Victoria					**Permits**		
45-2-2539	SU1a - A7	GDA	56	227122	6300093	Open site	Valid	Artefact : 4		
	Contact	**Recorders**	Ms.Cheng-Yen Loo,RPS East Australia Pty Ltd - Echuca Victoria					**Permits**		
45-1-2717	SU1a - A8	GDA	56	227130	6300072	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Ms.Cheng-Yen Loo,RPS East Australia Pty Ltd - Echuca Victoria					**Permits**		
45-1-2718	SU1a - A9	GDA	56	226981	6300239	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Ms.Cheng-Yen Loo,RPS East Australia Pty Ltd - Echuca Victoria					**Permits**		
45-1-2719	SU1a - A6	GDA	56	227105	6300095	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Ms.Cheng-Yen Loo,RPS East Australia Pty Ltd - Echuca Victoria					**Permits**		
45-1-2799	Brays Lane AS1	GDA	56	227039	6300622	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats					**Permits**		
45-1-2800	WPS-IF1	GDA	56	228556	6300579	Open site	Valid	Artefact : -		104157,104158
	Contact	**Recorders**	Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats					**Permits**		
45-1-2853	GWB-STQ1-21	GDA	56	227238	6300771	Open site	Valid	Artefact : -, Potential Archaeological Deposit (PAD) : -, Stone Quarry : -		
	Contact	**Recorders**	AECOM Australia Pty Ltd - Sydney,Doctor.Andrew Peter Mclaren					**Permits**		
45-1-2843	Wallerawang BESS IF + PAD 02	GDA	56	229419	6299775	Open site	Valid	Artefact : -, Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Mr.Matthew Barber,NGH Heritage - Fyshwick					**Permits**		
45-1-2844	Wallerawang BESS AFT + PAD 01	GDA	56	228926	6299886	Open site	Valid	Artefact : -, Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Mr.Matthew Barber,NGH Heritage - Fyshwick					**Permits**		

**** Site Status**

Valid - The site has been recorded and accepted onto the system as valid

Destroyed - The site has been completely impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There is nothing left of the site on the ground but proponents should proceed with caution.

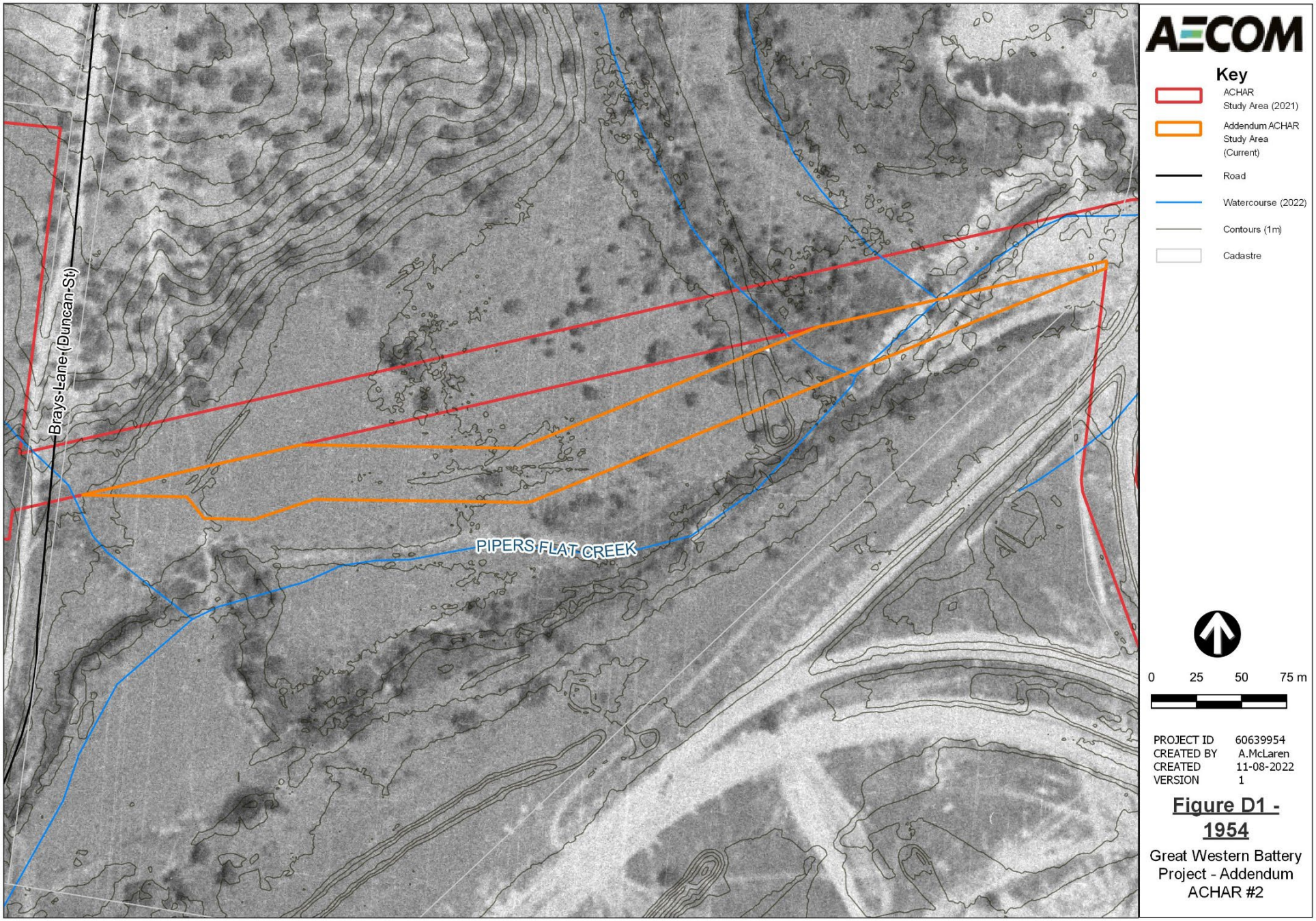
Partially Destroyed - The site has been only partially impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There might be parts or sections of the original site still present on the ground

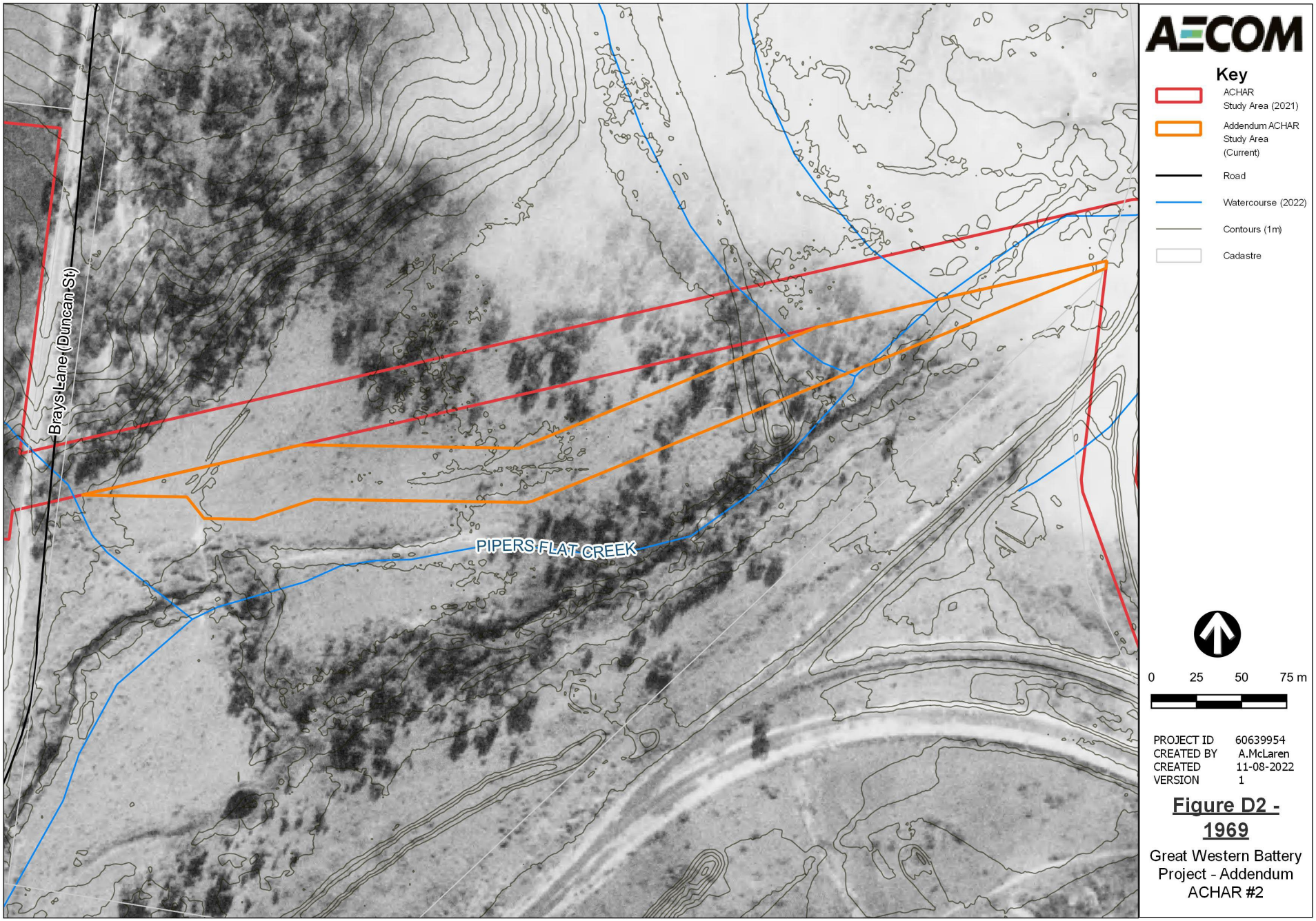
Not a site - The site has been originally entered and accepted onto AHIMS as a valid site but after further investigations it was decided it is NOT an aboriginal site. Impact of this type of site does not require permit but Heritage NSW should be notified

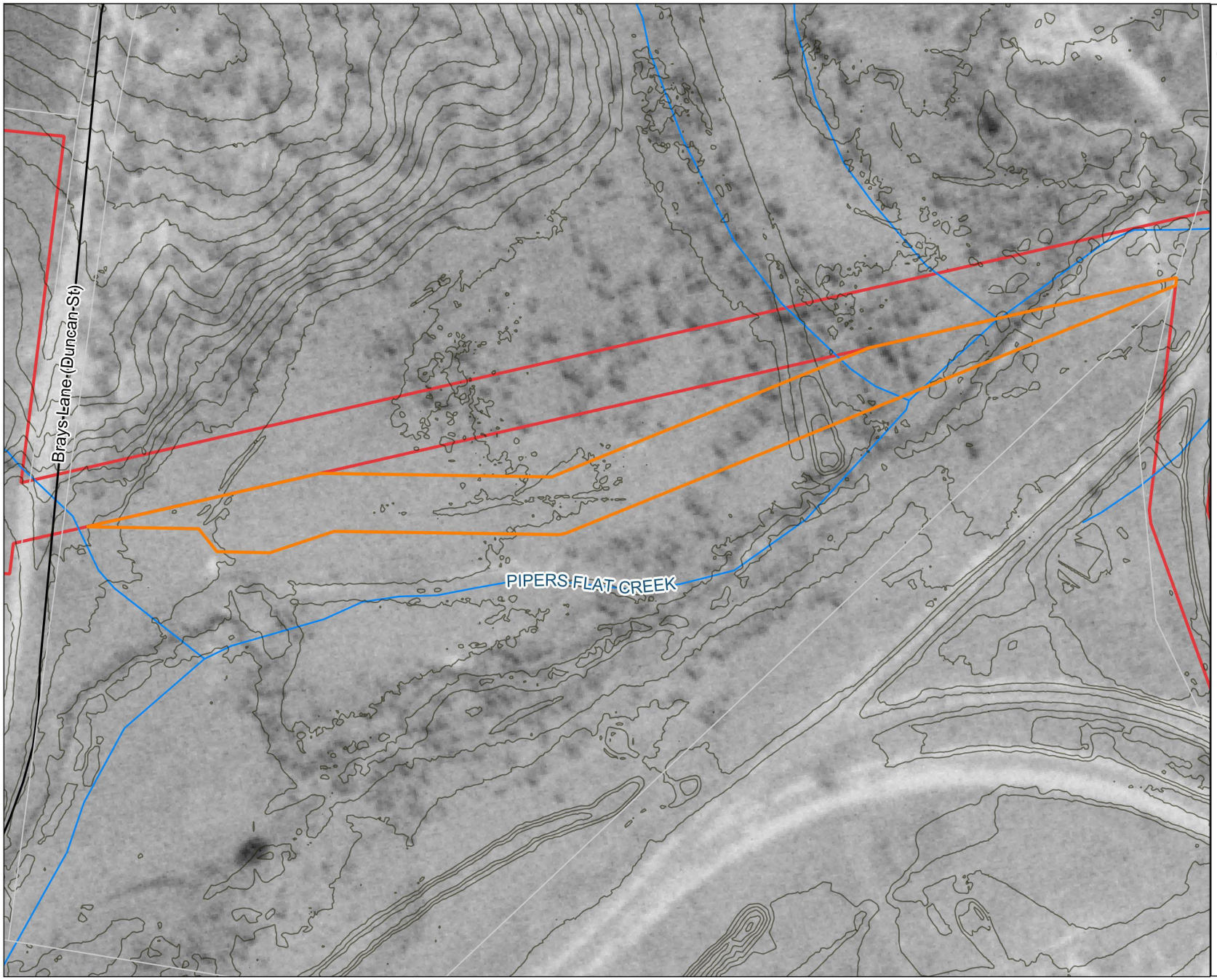
Report generated by AHIMS Web Service on 12/08/2022 for Andrew Peter Mclaren for the following area at Datum :GDA, Zone : 56, Eastings : 225306.0 - 230306.0, Northings : 6298373.0 - 6303373.0 with a Buffer of 0 meters.. Number of Aboriginal sites and Aboriginal objects found is 38

Appendix D

Addendum ACHAR Study Area - Historical Aerials


Brays Lane (Duncan St)
PIPERS FLAT CREEK
AECOM
Key
ACHAR Study Area (2021)
Addendum ACHAR Study Area (Current)
Road
Watercourse (2022)
Contours (1m)
Cadastre
0 25 50 75 m
PROJECT ID 60639954
CREATED BY A.McLaren
CREATED 11-08-2022
VERSION 1
Figure D1 - 1954
Great Western Battery Project - Addendum ACHAR #2


Brays Lane (Duncan St)
PIPERS FLAT CREEK
AECOM
Key
ACHAR Study Area (2021)
Addendum ACHAR Study Area (Current)
Road
Watercourse (2022)
Contours (1m)
Cadastre
0 25 50 75 m
PROJECT ID 60639954
CREATED BY A.McLaren
CREATED 11-08-2022
VERSION 1
Figure D2 - 1969
Great Western Battery Project - Addendum ACHAR #2



AECOM

Key

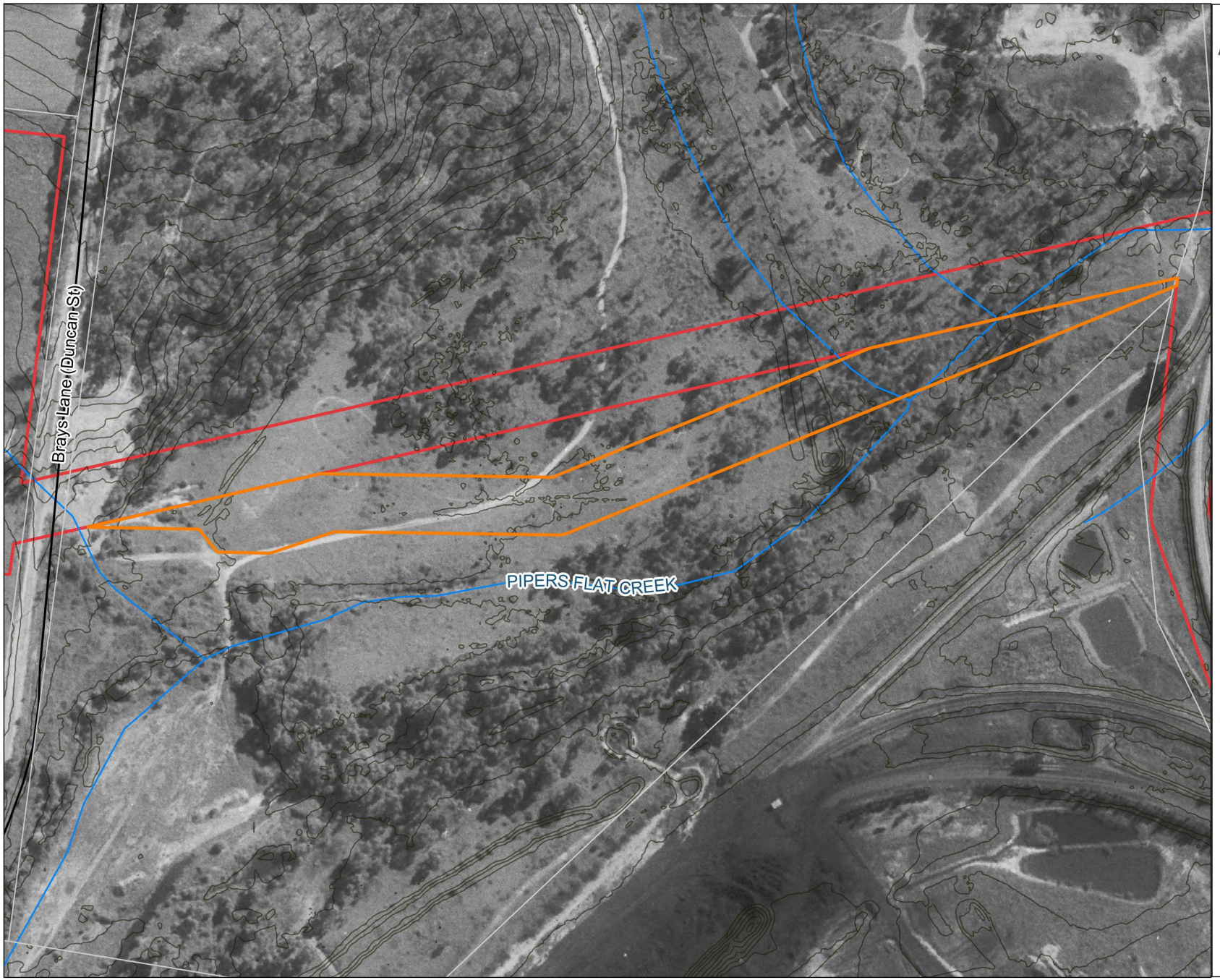
- ACHAR Study Area (2021)
- Addendum ACHAR Study Area (Current)
- Road
- Watercourse (2022)
- Contours (1m)
- Cadastre

0 25 50 75 m

PROJECT ID	60639954
CREATED BY	A.McLaren
CREATED	11-08-2022
VERSION	1

Figure D3 - 1972

Great Western Battery Project - Addendum ACHAR #2



AECOM

Key

- ACHAR Study Area (2021)
- Addendum ACHAR Study Area (Current)
- Road
- Watercourse (2022)
- Contours (1m)
- Cadastre

0 25 50 75 m

PROJECT ID	60639954
CREATED BY	A.McLaren
CREATED	11-08-2022
VERSION	1

Figure D4 - 1984

Great Western Battery Project - Addendum ACHAR #2

AECOM

Key

- ACHAR Study Area (2021)
- Addendum ACHAR Study Area (Current)
- Road
- Watercourse (2022)
- Contours (1m)
- Cadastre

0 25 50 75 m

PROJECT ID	60639954
CREATED BY	A.McLaren
CREATED	11-08-2022
VERSION	1

Figure D5 - 1989

Great Western Battery Project - Addendum ACHAR #2

AECOM

Key

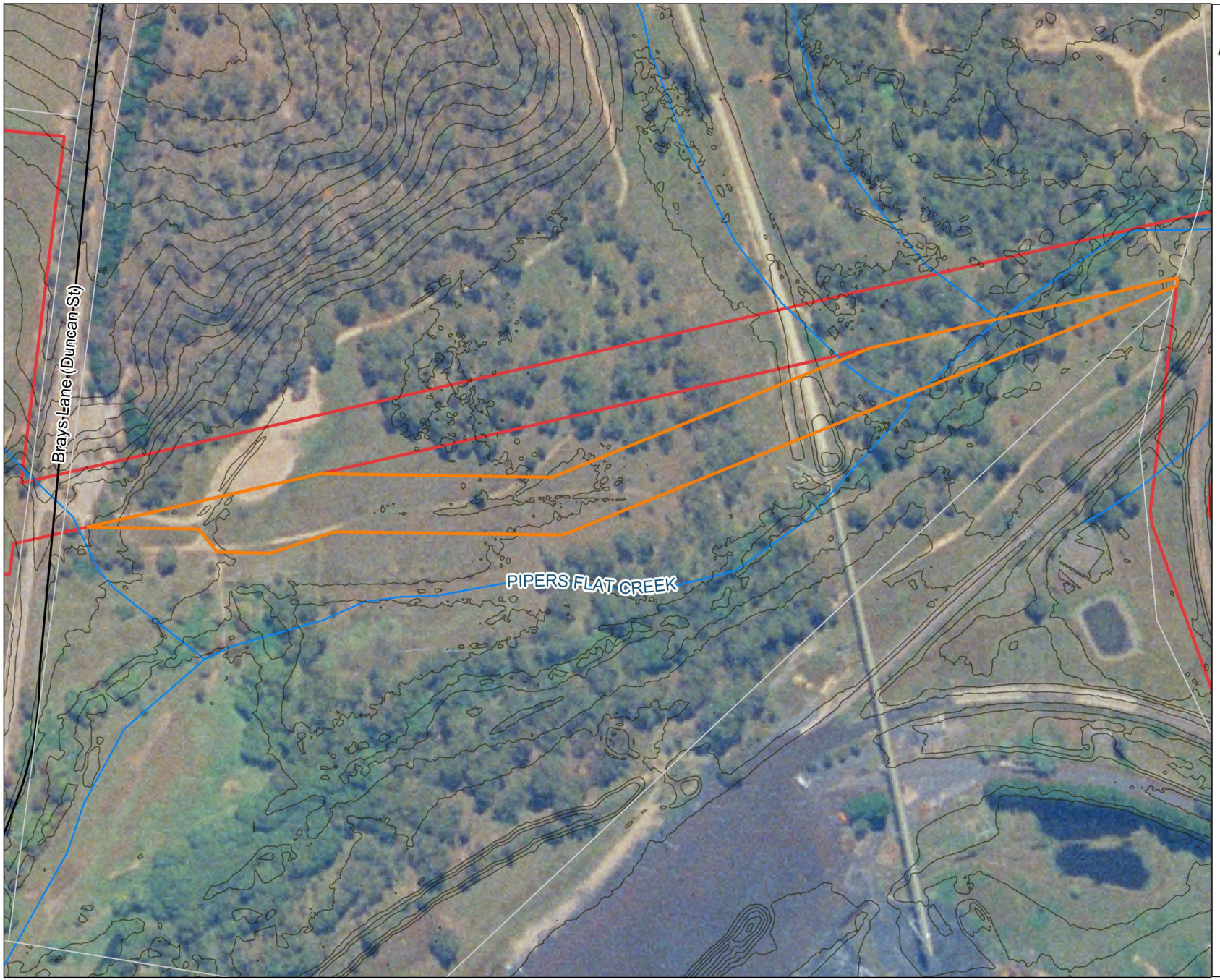
- ACHAR Study Area (2021)
- Addendum ACHAR Study Area (Current)
- Road
- Watercourse (2022)
- Contours (1m)
- Cadastre

0 25 50 75 m

PROJECT ID	60639954
CREATED BY	A.McLaren
CREATED	11-08-2022
VERSION	1

Figure D6 - 1998

Great Western Battery Project - Addendum ACHAR #2



AECOM

Key

- ACHAR Study Area (2021)
- Addendum ACHAR Study Area (Current)
- Road
- Watercourse (2022)
- Contours (1m)
- Cadastre

0 25 50 75 m

PROJECT ID	60639954
CREATED BY	A.McLaren
CREATED	11-08-2022
VERSION	1

Figure D7 - 2001

Great Western Battery Project - Addendum ACHAR #2

AECOM

Key

- ACHAR Study Area (2021)
- Addendum ACHAR Study Area (Current)
- Road
- Watercourse (2022)
- Contours (1m)
- Cadastre

0 25 50 75 m

PROJECT ID	60639954
CREATED BY	A.McLaren
CREATED	11-08-2022
VERSION	1

Figure D8 - 2006

Great Western Battery Project - Addendum ACHAR #2

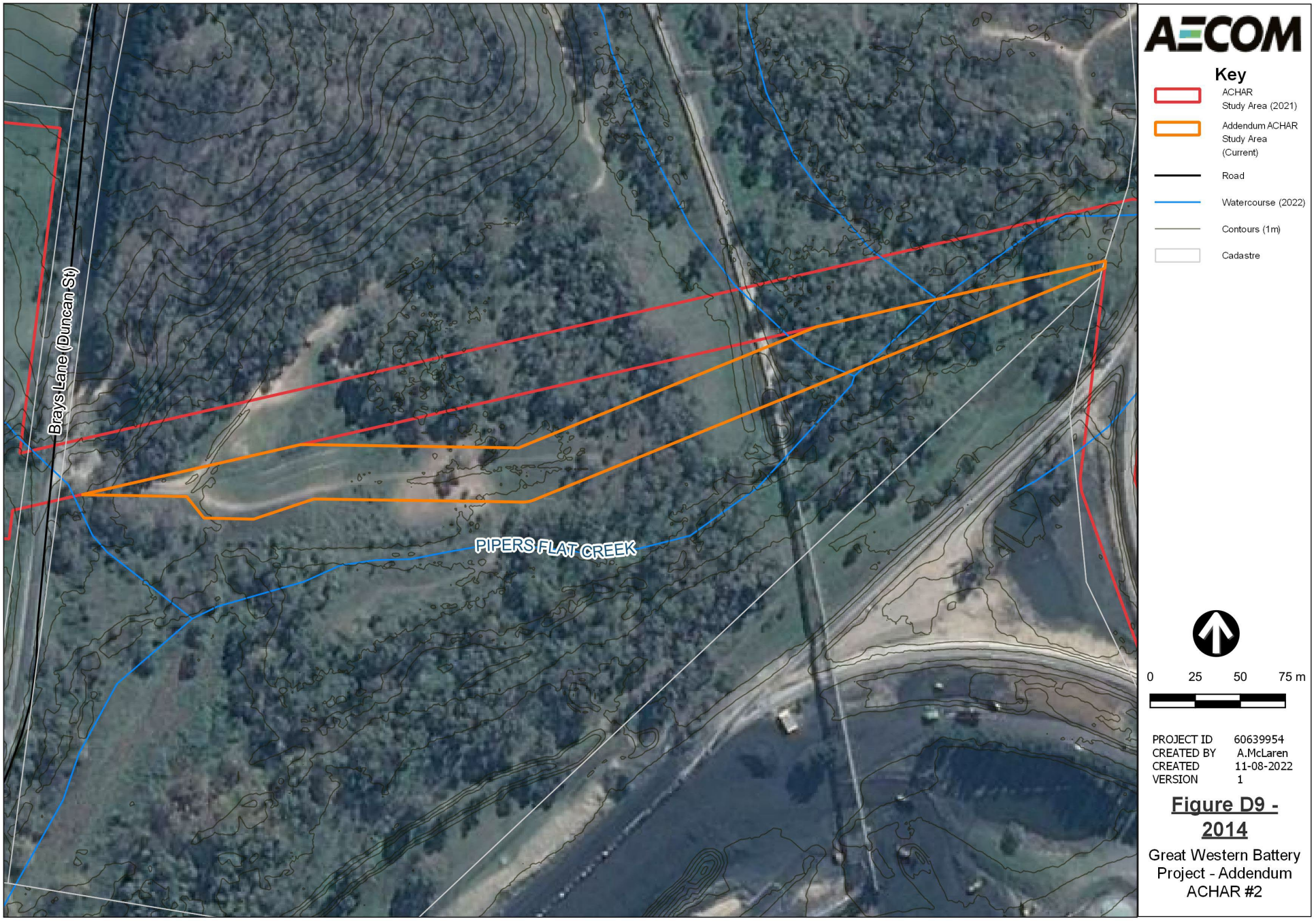


Figure D9 - 2014

Great Western Battery Project - Addendum ACHAR #2

AECOM

Key

- ACHAR Study Area (2021)
- Addendum ACHAR Study Area (Current)
- Road
- Watercourse (2022)
- Contours (1m)
- Cadastre

0 25 50 75 m

PROJECT ID	60639954
CREATED BY	A.McLaren
CREATED	11-08-2022
VERSION	1

Figure D10 - 2019

Great Western Battery Project - Addendum ACHAR #2

Appendix D

Updated Biodiversity Development Assessment Report (BDAR)

Battery Energy Storage System, Wallerawang Biodiversity Development Assessment Report

FINAL REPORT

Prepared for AECOM

16 September 2022

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- AECOM: Jessica Zickar.
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- Department of Primary Industries for indicative mapping of freshwater threatened species and fish populations.

Biosis staff involved in this project were:

- Paul Price, Anthony Cable, Sarah Allison, Jake Schwebel and Zoe Gerold (assistance in the field).
- Astrid Mackegard (mapping).

Contents

Tables

Figures

Glossary

Assessment Area	All land within 500m of a linear development and 1500m of a broader development site
BAM	NSW Biodiversity Assessment Method
BAM-C	BAM Calculator
BC Act	NSW *Biodiversity Conservation Act 2016*
BDAR	Biodiversity Development Assessment Report
BESS	Battery Energy Storage System
Biosecurity Act	NSW *Biosecurity Act 2015*
BOS	Biodiversity Offsets Scheme
CEMP	Construction Environmental Management Plan
DA	Development Application
DCDB	Digital cadastral database
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
Development footprint	The area of land that is directly impacted by the proposal
Development site	The broader area in which the subject land is located.
DoIW	Directory of Important Wetlands
DPE	NSW Department Planning and Environment
DPI	NSW Department of Primary Industries
DTDB	Digital topographic databases
Ecosystem credit species	A measurement of the value of EECs, CEECs and threatened species habitat for species that can be reliably predicted to occur with a PCT. Ecosystem credits measure the loss in biodiversity values at a development
EES	NSW Environment, Energy and Science Group
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
GDE	Groundwater Dependent Ecosystem
GIS	Geographic Information System
IBRA	Interim Biogeographic Regionalisation of Australia
LEP	Local Environmental Plan
LGA	Local Government Area

Locality	Area located within 10 kilometres radius from the subject land
LPI	NSW Land and Property Information
Matters of NES	Matters of National Environmental Significance protected by a provision of Part 3 of the EPBC Act
EES	NSW Environment, Energy and Science Group
PCT	Plant Community Type
SAII	Serious and Irreversible Impact
SALIS	NSW Soil and Land Information System
SEARs	Secretary's Environmental Assessment Requirements
SEPP	NSW State Environmental Planning Policy
SIS	Species Impact Statement
Species credits species	A class of biodiversity credits created or required for the impact on threatened species that cannot be reliably predicted to use an area of land based on habitat surrogates
SSD / SSI	State Significant Development / State Significant Infrastructure
Subject land	The areas within or the combined areas of the development site, and any indirect and prescribed impacts.
TEC	Threatened Ecological Community
TBDC	Threatened Biodiversity Data Collection
WM Act	NSW *Water Management Act 2000*

Certification and Declarations

I certify that this report has been prepared on the basis of the requirements of, and information provided under, the Biodiversity Assessment Method (DPIE 2020) and s6.15 of the *Biodiversity Conservation Act 2016*.

In preparing this assessment I have acted in accordance with the Accredited BAM Assessor Code of Conduct.

I declare that I have considered the circumstances and there is no actual, perceived or potential conflict of interest.

Name: Paul Price

Signature:

Date: 16/09/2022

BAM Assessor Accreditation Number: BAAS 18089

Summary

Neoen Australia Pty Ltd (Neoen) is seeking development consent to construct, operate and maintain a large-scale Battery Energy Storage System (BESS) at 173 Brays Lane, Wallerawang, NSW (the Site), as well as a new transmission line that would connect the BESS to the existing Transgrid 330 kilovolt (kV) substation at Wallerawang (the Project).

The project is considered State Significant Development (SSD) and will be assessed under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). Vegetation will be removed as part of the Project. As the Project is considered an SSD, the Biodiversity Offset Scheme (BOS) applies in accordance with Section 7.9 of the *Biodiversity Conservation Act 2016* (BC Act), and an assessment is required in accordance with the NSW Biodiversity Assessment Method (BAM) (DPIE 2020a), and the BC Act. This Biodiversity Development Assessment Report (BDAR) has been prepared by Accredited Assessor Paul Price (BAAS18089) and describes the outcome of the development assessment case (00024080/BAAS18089/21/00024081) conducted consistent with the BAM.

Field investigation, undertaken in accordance with the BAM, recorded 20.71 hectares of native vegetation within the subject land (inclusive of the Site, the transmission line corridor and other lands that could be impacted by the Project), representing no threatened ecological communities (TEC).

Consideration has been given to avoiding and minimising impacts to biodiversity where possible during the assessment and project design. As such mitigation and management measures will be put in place to adequately address impacts associated with the Project, both direct, indirect and prescribed.

Habitat for five threatened species were recorded within the subject land where the vegetation integrity (VI) score of the impacted vegetation was calculated as 0.2 to 83.6. As such, in accordance with Section 10 of the BAM, offsets are required to be secured for the Project, including:

- 0.27 ha of PCT 677
- 0.78 ha of PCT 732
- 0.27 ha of Black Gum habitat
- 0.83 ha of Koala habitat
- 0.78 ha of Squirrel Glider habitat
- 0.78 ha of Eastern Pygmy-possum habitat.
- 0.43 ha of Purple Copper Butterfly habitat.

The Project is not considered likely to result in a significant impact to species or communities listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), and as such a referral to the Minister for the Environment is not required.

Stage 1 – Biodiversity assessment

1 Introduction

Neoen Australia Pty Ltd (Neoen) is seeking development consent to construct, operate and maintain a large-scale Battery Energy Storage System (BESS) of approximately 500 megawatts (MW) and approximately 1000 megawatt-hour (MWh) at 173 Brays Lane, Wallerawang, NSW (the Site), as well as a new transmission line that would connect the BESS to the existing Transgrid 330 kilovolt (kV) substation at Wallerawang (the Project).

Biosis Pty Ltd was commissioned by AECOM to undertake a biodiversity assessment of the Project. The proposed BESS is to be constructed within the suburb of Wallerawang, in the Lithgow Local Government Area (LGA).

The Project is considered State Significant Development (SSD) under the *Environmental Planning and Assessment Act 1979* (EP&A Act) as it satisfies the requirements of Clause 8 of the State Environmental Planning Policy (State and Regional Development) 2011 (SRD SEPP). An Environmental Impact Statement (EIS) has been prepared for the Project in accordance with Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The purpose of this assessment is to apply the NSW Biodiversity Assessment Method 2020 (BAM) (DPIE 2020a) to the Project in accordance with the NSW *Biodiversity Conservation Act 2016*, and provide AECOM with a Biodiversity Development Assessment Report (BDAR) to support the EIS for the Project.

1.1 Project description

As described above, the Project would comprise the construction and operation of a large-scale BESS, as well as a new underground transmission line that would connect the BESS to the existing Transgrid 330 kV substation at Wallerawang.

The proposed location of the BESS is on the southern part of Lot 4 Deposited Plan (DP) 751651. The Site is located approximately 1.25 km north west of the Transgrid Wallerawang 330 kV substation. This substation is located at Main Street, Wallerawang 2845 (Lot 91 of DP 1043967).

The proposed transmission line would be constructed using a combination of an underboring method known as horizontal directional drilling (HDD) in conjunction with open trenching is less constrained areas. HDD would be used where required to avoid areas of sensitivity, including Aboriginal heritage, large remnant stands of intact vegetation which contains , large hollow-bearing trees and populations of Black Gum *Eucalyptus aggregata* (Vulnerable, EPBC and BC Act), Pipers Flat Creek, and rail crossings. The utilisation of this methodology will require the creation of both an entry and exit pit to facilitate the HDD. Both the entry and exit pits will be located on areas devoid of threatened species and native vegetation as such no impacts will be recorded. The remainder would be constructed using an open trenching methodology. The vast majority of the new transmission line would be installed underground except for where it connects to Transgrid Wallerawang 330kV substation within the substation site.

The new transmission line would traverse:

- Lot 8 and Lot 9 DP 252472
- Lot 2 DP 108089
- Lot 1 DP 108089
- Lot 10 DP 1168824
- Lot 1115 DP 1204803
- Lot 91 DP 1043967.

Key components of the Project are shown on Figure 13 and would include:

- Site establishment, including installation of fencing, environmental controls, grading, modification of dams, and other civil work including earthworks.
- Establishment of a new driveway and access road (up to 10 m wide), located at the south-western boundary of the Site, providing access to the Site from Brays Lane.
- The upgrading of an access track located off Brays lanes to provide a HDD staging drilling point.
- Establishment of an internal access road and construction of a permanent car parking area with spaces for up to eight light vehicles.
- Construction of permanent operations and management (O&M) buildings, including staff amenities.
- Construction of new switch rooms and control room.
- Construction of new 330/33 kV substation on the Site (including outdoor switchgear (up to 330 kV) and transformers).
- A 10 m buffer (or Asset Protection Zone (APZ) would be established around all battery storage infrastructure. This buffer area would comprise non-combustible ground cover with no vegetation present.
- Construction of stormwater controls (including swales and bioretention basins).
- Installation of two 45 kL metal water tanks.
- Provision of fire alert equipment.
- Construction of lighting and installation of security devices around the perimeter of the BESS compound, including cyclone mesh security fencing about 2.7 m high.
- Construction of 10 m high noise walls around all battery enclosures and high voltage transformers.
- Establishment of landscaping and screening vegetation.
- Upgrades to the Wallerawang 330 kV substation switchyard.
- Connection to the existing potable water supply and the 11kV transmission line in Brays Lane.
- Following completion of the construction activities, Neoen are proposing to subdivide Lot 4 DP 751651 to separate the existing rural residential use of the Lot from the proposed BESS.

The Project seeks to provide a critical element of the expanding renewable energy industry and support the future capacity and resilience of the NSW energy network through providing a large-scale energy storage system. The energy storage capacity provided by the Project would allow for increased installation of renewable energy sources while maintaining network stability and security.

The Project has been assessed as triggering the NSW Biodiversity Offset Scheme (BOS) through the following:

- The Project is considered to be SSD under the EP&A Act.

The NSW BC Act requires that the BAM be applied to all proposals that trigger the BOS, and that a BDAR is required to be submitted to the approval authority.

1.2 Purpose of this assessment

This BDAR will:

- Address the BAM (DPIE 2020a) and the BOS.
- Identify how the proponent has avoided and minimised impacts to biodiversity.
- Identify any potential impact that could be characterised as serious and irreversible.
- Describe the offset obligations required to compensate for any unavoidable biodiversity impacts resulting from the proposed development.
- Consider and assess the proposal in accordance with other relevant legislation such as the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

All biodiversity assessments have been undertaken in accordance with the BAM, and this BDAR has been prepared and reviewed by Accredited Assessor Paul Price (BAAS18089). This BDAR describes the outcome of the development assessment case (00024080/BAAS18089/21/00024081) conducted consistent with the BAM.

1.3 The subject land, development footprint and assessment area

The terms subject land, development footprint and assessment area are used throughout this BDAR and are defined as follows:

- The subject land is defined as the total area of proposed disturbance, encompassing the proposed development footprint and all areas that could be disturbed, including direct, indirect and prescribed impacts (Figure 1). The subject land is approximately 37.63 ha in area, and comprises the proposed development footprint, including the portion of Lot 4 /-/ DP 751651 that would be used to construct the BESS (the Site), and a 50 m buffer on the proposed transmission line that includes adjacent mapped native vegetation. The subject land is situated within the Lithgow LGA and the Central Tablelands (LLS) region. It is approximately 12 km north-west of the Lithgow central business district and is zoned as RU1 – Primary Production and IN1 – General Industrial and SP2 – Infrastructure (Rail Infrastructure Facilities) under the *Lithgow Local Environmental Plan 2014* (LEP). The subject land is bounded by farmland to the north and east, Ben Bullen State Forest to the west, and industrial zoned land to the south.
- The development footprint is the area of land that would be required to construct the Project (including the BESS, the new transmission line, and part of the Transgrid Wallerawang 330 kV substation. This area would be directly impacted by the Project. It comprises the clearing footprint, plant laydown, access roads and other associated construction works. The development footprint is approximately 9.95 ha in area. This development footprint corresponds to that area defined as the "Project Area' in the EIS.
- The assessment area has been determined as per the BAM and includes the subject land and the area of land within the 1,500 m buffer zone surrounding the subject land.

1.4 Sources of information

Sources of information used in the assessment included relevant databases, spatial data, literature and previous site reports.

In order to provide a context for the assessment area, records of flora and fauna from within 5 kilometres (the locality) were collated from the following databases and datasets were reviewed:

- Commonwealth Department of Agriculture, Water and Environment (DAWE) Protected Matters Search Tool for matters protected by the EPBC Act.
- NSW Environment, Energy and Science (EES) BioNet Atlas of NSW Wildlife for species, populations and ecological communities listed under the BC Act.

- PlantNET (The Royal Botanic Gardens and Domain Trust).
- BirdLife Australia, the New Atlas of Australian Birds 1998-2020.

Other sources of biodiversity information relevant to the assessment area were sourced from:

- The NSW Plant Community Types (PCTs), as held within the BioNet Vegetation Classification database (DPIE 2021a).
- Relevant vegetation mapping, such as the *State Vegetation Type Map: Central Tablelands Region Version 1.0. VIS_ID 4778*.
- NSW BAM Calculator.
- Biodiversity Values map.
- Native vegetation regulatory map.
- BAM Important Areas maps.

Mapping was conducted using hand-held (uncorrected) GPS units (GDA94), mobile tablet computers running Collector for ArcGIS™ and aerial photo interpretation. The accuracy of this mapping is therefore subject to the accuracy of the GPS units (generally ± 5 metres) and dependent on the limitations of aerial photo rectification and registration.

Basemap data was obtained from NSW Land and property information (LPI) 1:25,000 digital topographic databases, with cadastral data, obtained from LPI digital cadastral database.

The following spatial datasets were utilised during the development of this report:

- Catchment Boundaries of New South Wales dataset.
- Mitchell Landscapes Version 3.1.
- Interim Biogeographic Regionalisation of Australia (IBRA) Version 7.
- Directory of Important Wetlands (DoIW).
- NSW Soil and Land Information System (SALIS).

Mapping has been produced using a Geographic Information System (GIS). The following maps and data have been provided:

- Digital mapping with aerial photography showing 1:1000 or finer.
- Site map as described in subsection 3.1.1 of the BAM.
- Location Map as described in subsection 3.1.2 of the BAM.
- Landscape map with features including 1,500 m buffer, as described in section 3.1.3 of the BAM.

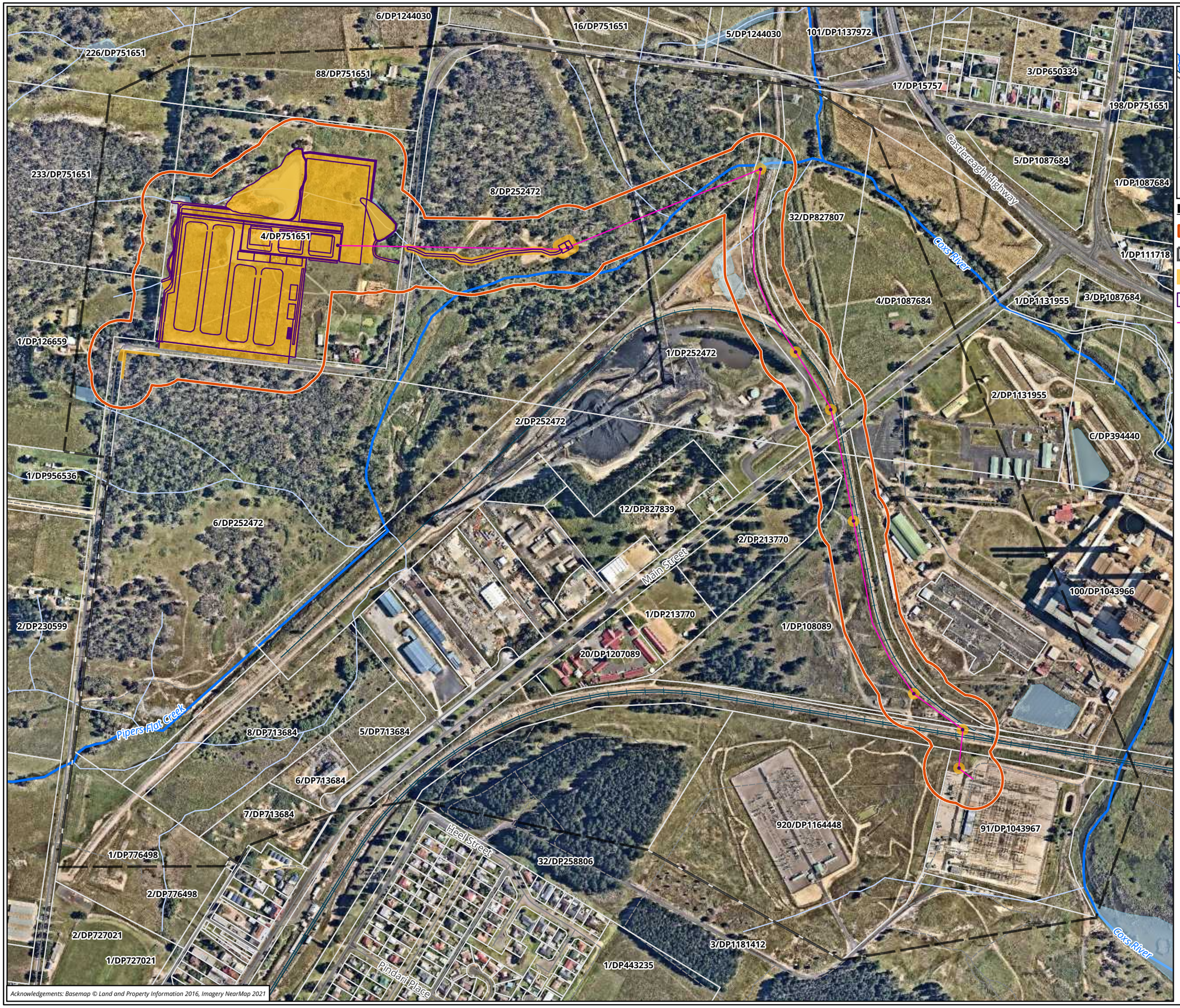
1.5 Legislative requirements

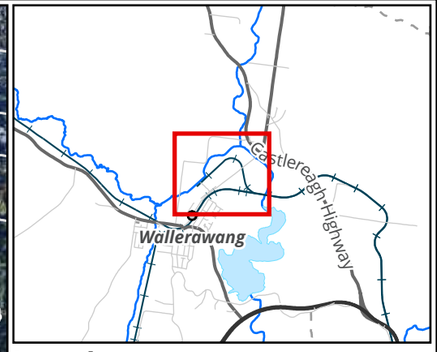
The Project has considered, or has been assessed against, relevant biodiversity legislation and government policy. This is provided in Table 1.

Table 1 Legislation relevant to the project

Legislation / Policy	Description	Relevance to the current assessment
Commonwealth Acts		
Environment Protection and Biodiversity Conservation Act 1999	Australian Government's key piece of environmental legislation. The EPBC Act applies to developments and associated activities that have the potential to significantly impact on MNES protected under the Act. Under the EPBC Act, the minister may agree to undertake a strategic assessment on the impacts of actions under a policy, plan or program.	Matters of National Environmental Significance (MNES) relevant to the Project include nationally threatened species and ecological communities and migratory species. Threatened species and ecological communities protected by the EPBC Act and present within the subject land are outlined in Sections 3, 4 and 10.
NSW Acts		
Environmental Planning and Assessment Act 1979	Provides the overarching structure for planning in NSW and is supported by other statutory environmental planning instruments (EPIs).	Determines the approval pathway for the Project and prescribes the consideration of relevant EPIs.
Biodiversity Conservation Act 2016	Key piece of legislation providing for the protection and conservation of biodiversity in NSW through the listing of threatened species and communities and key threatening processes.	Mandates the application of the NSW BOS and BAM.
Biosecurity Act 2015	Outlines biosecurity risks and impacts, and prescribes requirements for the management of risk to reduce the severity of impacts.	Biosecurity risks relevant to the current assessment include weeds, pest animals and pathogens that are known to occur, or potentially occur, within the subject land. Further details of biosecurity risks present assessment area are provided in Section 5.
Fisheries Management Act 1994 (FM Act)	Provides for the protection and conservation of aquatic species and their habitat throughout NSW.	The BAM focusses on impacts to terrestrial ecology and thus excludes items listed under the FM Act.

Legislation / Policy	Description	Relevance to the current assessment
NSW EPIs		
SEPP (Koala Habitat Protection) 2021.	This SEPP commenced on 17 March 2021 to replace and repeal the 2020 Koala SEPP. This SEPP aims to encourage the conservation and management of areas of natural vegetation that provide habitat for Koalas to support a permanent free-living population over their present range and reverse the current trend of Koala population decline.	The Lithgow LGA is listed under Schedule 1 as an area to which this SEPP applies. State Environmental Planning Policy (Biodiversity and Conservation) 2022 which address' Koala Habitat applies to identified LGAs in areas not zoned as RU1 Primary Production, RU2 Rural Landscape or RU3 Forestry, and within these rural land zonings. However, this SEPP only applies to development applications where Council is the consent authority, which is not the case for the project that has been designated as SSD under Section 4 of the EP&A Act.
Lithgow Local Environmental Plan 2014 (LEP).	This Plan aims to make local environmental planning provisions for land in Lithgow in accordance with the relevant standard environmental planning instrument under Section 3.20 of the Act.	The subject land is located within the Lithgow LGA. As such, the LEP applies.





Legend

- Subject land
- Development site
- Development footprint
- Construction footprint
- HDD and trenching

Figure 1 Subject land

0 50 100 150 200 250

Metres

Scale: 1:6,000 @ A3

Coordinate System:
GDA 1994 MGA Zone 56

N

biosis

Matter: 34343, Date: 15 September 2022,
GIS: AM, Checked by: PP, Last edited by: lharley
Location: P:\34300s\34343\Mapping\34343_BDAR2020_F1.aprx
Layout: 34343_F1_SubjectLand

2 Landscape Context

This chapter describes the landscape and site context of the assessment area. In accordance with the BAM, a number of features are assessed within the subject land and within a 1,500 metre buffer around the subject land (Figure 2). These landscape features are used to identify biodiversity values that are important for the subject land and inform the habitat suitability of the subject land for threatened species. Other features, such as rivers, streams, estuaries and wetlands, habitat connectivity, karst areas or areas of outstanding biodiversity value are considered, where appropriate.

2.1 Landscape features

2.1.1 IBRA bioregions and IBRA subregions

The subject land occurs within the Sydney Basin IBRA bioregion and the Capertee Uplands IBRA subregion. The Sydney Basin Bioregion lies on the central east coast of NSW and covers an area of approximately 3,624,008 hectares. It occupies approximately 4.53 % of NSW and is one of two bioregions contained wholly within the state. The bioregion extends from just north of Batemans Bay to Nelson Bay on the central coast, and almost as far west as Mudgee. The bioregion is bordered to the north by the Brigalow Belt South and North Coast bioregions, to the south by the South East Corner Bioregion and to the west by the South Eastern Highlands and South Western Slopes bioregions. The Sydney Basin Bioregion is one of the most species diverse in Australia. This is a result of the variety of rock types, topography and climates in the bioregion (DPIE 2016a).

2.1.2 Rivers, streams, estuaries and wetlands

The subject land is located within the Central Tablelands LLS region and the Hawkesbury Catchment Management Area (CMA). The closest major waterbody is Lake Wallace located approximately 200 metres south-east of the development footprint. The closest major river is Coxs River which flows parallel to the proposed transmission line and flows into Lake Wallace, joining Pipers Flat Creek immediately to the east of the subject site.

Several watercourses dissect the subject land, including; Pipers Flat Creek, which is a 5th order (Strahler method) watercourse which flows west to east through the subject land and has been designated a 'Poor' freshwater fish community status grade (DPI 2021). Other mapped waterways include one unnamed 3rd order watercourse, one unnamed 2nd order watercourse and multiple unnamed 1st order watercourses.

Of most relevant to the Project are two unnamed 1st order drainage lines, both of which are ephemeral, flowing east to west across a predominantly cleared portion of the subject site and join within it to form a 2nd order drainage line, which is also ephemeral. These drainage lines have been modified through historical land use activities; namely, the construction of onsite farm dams and/or road/vehicle track construction. These drainage lines are ephemeral and while some minor degree of remaining channel form is discernible in limited sections, due to the level and extent of modification (vegetation clearing, dam construction, and historical land use) they no longer function as ephemeral waterways but simply as drainage lines as the lowest points in the landscape and do not sustain aquatic habitats and are typically lacking native riparian vegetation structures particularly in their downstream extents and surrounding the dams.

Pipers Flat Creek and the unnamed 3rd order tributary are mapped as Key Fish Habitats as part of broad scale mapping of the Hawkesbury Nepean Catchment published by the NSW Department of Primary Industries (DPI) within the subject land (DPI 2021).

No local wetlands were identified within the subject land or development footprint. Two reservoirs are situated within 300 metres of the subject land, both of which contain some native vegetation. The native vegetation observed in these freshwater systems is made up of a range of water dependent or tolerant grasses, sedges, herbs and rushes, with a moderate cover of weeds also present. These reservoirs are not included in the DoIW of Australia (DAWE 2004) and are not classified as Ramsar Wetlands.

Ramsar wetlands are representative, rare or unique wetlands, or are important for conserving biological diversity. They are included on the List of Wetlands of International Importance developed under the Ramsar convention. No Ramsar Wetlands or "Important Wetlands" are located within the local area. The closest "Important Wetland" is situated over 60 kilometres south-east of the subject land and the closest Ramsar Wetland is located approximately 120 kilometres south-east of the subject land.

2.1.3 Habitat connectivity

The subject land does not form part of any recognised biodiversity corridors, flyways or significant habitat connectivity features.

The primary connectivity features of the subject land consist of a small patch of native vegetation in the north-west and a large patch of native vegetation located within the subject land (in the location of the proposed transmission line, between Brays Lane and the existing rail corridor) and Pipers Flat Creek, a 5th order watercourse that flows through the subject land. These connectivity features provide breeding, foraging and dispersal resources for terrestrial and arboreal mammals, flying mammals, and avifauna. Habitat fragmentation occurs across the subject land, however connectivity is preserved through bushland extending west towards Ben Bullen State Forest and riparian vegetation associated with Pipers Flat Creek. Across the broader landscape, the subject land exists on the fringes of a larger patch of native vegetation extending north-west of the subject land.

Aquatic habitat corridors for fish species across the subject land include Pipers Flat Creek and associated tributaries. Given the extent of modification to habitats along the first and second order waterways identified as being interrupted by the series of inline dams, most particular the barrier to fish passage presented by the dams, limit available connectivity along these specific drainage lines. The Vegetated Riparian Corridors (VRZ) identified within the subject land may also provide movement and dispersal areas for semi-terrestrial species, such as amphibians.

2.1.4 Geological features

There were no recorded karst, caves, crevices, cliffs or other areas of geological significance within the subject land.

Ben Bullen State Forest, which is located within the 1,500 metre buffer area surrounding the subject land, may contain areas of geological significance given the mountainous terrain and catchment areas present.

2.1.5 Areas of outstanding biodiversity value

Under the BC Act, the Minister for the Environment has the power to declare Areas of Outstanding Biodiversity Value (AOBVs). To date no AOBVs have been declared within the development footprint or subject land.

2.1.6 NSW (Mitchell) Landscape

The subject land occurs within the Capertee Plateau Mitchell Landscape (Mitchell 2002). This landscape is characterised by wide valleys, low rolling hills below sandstone cliffs on Permian conglomerates, sandstones, and shales with coal at the base of the Sydney Basin and exposure of underlying Devonian shale, siltstone or quartzite. The general elevation is between 800 and 1000 metres and the local relief is approximately 100 to120 metres.

Common vegetation communities found in this landscape are woodlands typically consisting of Rough-barked Apple *Angophora floribunda*, Red Stringybark *Eucalyptus macrorhyncha*, Red Box *Eucalyptus polyanthemos*, Yellow Box *Eucalyptus melliodora*, Blakely's Red Gum *Eucalyptus blakelyi* in open valleys, Scribbly Gum *Eucalyptus sclerophylla*, Red Stringybark Red Box and Broad-leaved Ironbark *Eucalyptus fibrosa* on talus slopes, and Silvertop Ash *Eucalyptus sieberi* and Sydney Peppermint *Eucalyptus piperita* on sandstone peaks.

2.1.7 Hydrology

The subject land is mapped on the Groundwater Dependent Ecosystems (GDE) Atlas as containing High and Moderate Potential Terrestrial GDEs (BOM 2021). Two plant communities, *Black Gum grassy woodland of damp flats and drainage lines of the eastern Southern Tablelands, South Eastern Highlands Bioregion* and *Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion*, that are known to be GDEs are mapped within the subject land (further discussed in section 3 of this report).

One watercourse, Pipers Flat Creek, within the subject land is designated on the Biodiversity Values Map (DPIE 2021b) as "Protected Riparian Land".

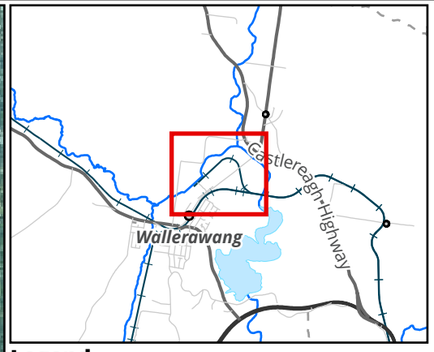
2.1.8 Additional landscape features

The subject land and 1,500 metre assessment area do not contain any soil hazard features or other additional features that are required to be assessed according to any Secretary's Environmental Assessment Requirements.

2.2 Native vegetation cover

In accordance with section 3.2 of the BAM, native vegetation cover must be estimated for a 1,500 metre buffer around the subject land to determine the landscape context of the subject land. The extent of native vegetation on the subject land and immediate surrounds was mapped using State Vegetation Type Map: Central Tablelands Region Version 1.0. VIS_ID 4778 (DPIE 2018), with edits made to the layer to improve line-work and where obvious changes to vegetation extent had occurred.

The total mapped area of the 1,500 metre buffer area around the subject land is 1,503 hectares, with the area of native vegetation mapped within the buffer being 427 hectares. This is a native vegetation cover of approximately 29% (>10 –30 % class as defined in Section 3.2.3 of the BAM) and this value was entered into the BAM Calculator.



Legend

- Subject land
- Development site
- Development footprint
- IBRA Region/Sub-region

HydroLine stream order

- 1
- 2
- 3
- 4
- 5
- 6
- 7

HydroLine stream order buffers

- 1
- 2
- 3
- 5
- 6

Mitchell landscapes

- Cpt,Capertee Plateau

Figure 2 Site map

0 50 100 150 200 250

Metres

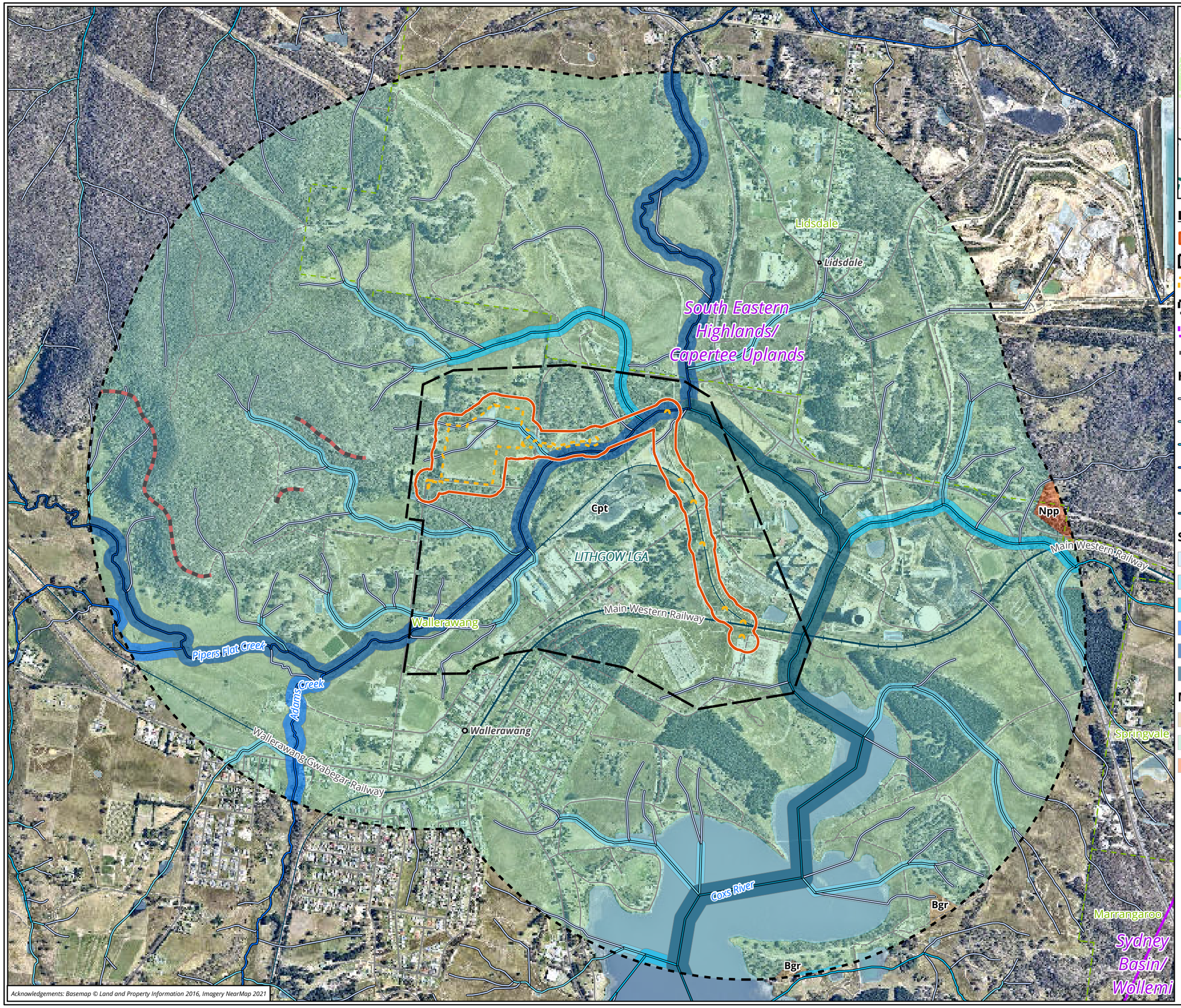
Scale: 1:6,000 @ A3

Coordinate System:
GDA 1994 MGA Zone 56

N

biosis

Matter: 34343, Date: 15 September 2022
GIS: AM, Checked by: PP, Last edited by: amackegard
Location: P:\34300s\34343\Mapping\34343_BDAR2020.aprx
Layout: 34343_F2_Sitemap



Legend

- Subject land
- Development site
- Development footprint
- Assessment area
- IBRA Region/Sub-region
- Cliff top

HydroLine stream order

- 1
- 2
- 3
- 4
- 5
- 6

Strahler stream order buffers

- 1
- 2
- 3
- 4
- 5
- 6

Mitchell landscapes

- Bgr,Bathurst Granites
- Cpt,Capertee Plateau
- Npp,Newnes Plateau

Figure 3 Location map

0 120 240 360 480 600

Metres

Scale: 1:16,000 @ A3

Coordinate System:
GDA 1994 MGA Zone 56

N

biosis

Matter: 34343, Date: 15 September 2022
GIS: AM, Checked by: PP, Last edited by: amackegard
Location: P:\34300s\34343\Mapping\34343_BDAR2020.aprx
Layout: 34343_F3_Location

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3 Native vegetation

The proposed development is located within a mosaic of agricultural and environmental lands. The environmental lands are situated along watercourses, reserves or roads and contain native woodland vegetation and terrestrial and aquatic fauna habitat features. However, the predominantly linear nature of these reserves means that they are subject to edge effects and are symptomatic of past disturbances that have occurred more broadly in the landscape associated with land clearing, irrigation development, cropping, livestock grazing and weed invasion.

The subject land supports 20.71 hectares of native vegetation with varying levels of disturbance. As such, the Project's development footprint can be defined as three distinctly different board vegetation types, medium, low and disturbed. The medium quality native vegetation, which was also deemed the highest quality, was limited to isolated patches located with the North West corner of the Lot where the BESS facility is proposed and a small section of the proposed transmission easement (Figure 5). This vegetation type contained large trees, an understorey with most of the structural components still intact and a number of species that characterise the PCT. The lowest quality and disturbed patches either support remnant canopy tree cover but generally have few large trees and have a modified understorey invaded by introduced pasture grasses and weeds or consists of exotic grasslands where the native canopy has been removed, such as the recorded railway corridor located in the eastern portion of the transmission line easement.

3.1 Native vegetation extent

The extent of native vegetation, TECs and vegetation integrity within the subject land was determined using the results of site investigations and Section 4 of the BAM (DPIE 2020a).

Figure 4 shows the native vegetation extent recorded within the subject land, development footprint and 1,500 metre assessment area, as assessed during field investigations undertaken in March and June 2021 as well as 15 July 2022. The figure includes all areas of native vegetation (native ground cover and areas with canopy).

3.1.1 Changes to mapped native vegetation extent

There were some differences between the actual native vegetation extent and that visible on aerial imagery. Portions of the development footprint had previously been mapped as cleared land by DPIE (DPIE 2018) that in actuality included patches of native vegetation. This was particularly relevant for vegetation identified within the North-Western portion of the proposed location of the BESS facility.

3.1.2 Areas that are not native vegetation

Parts of the subject land mapped as Urban Native / Exotics with no native over storey or mid storey cover met the definition of non-native vegetation. Areas not shown as native vegetation cover within the subject land, and which do not provide habitat for threatened species, are not included for further assessment in accordance with Section 5.1.1.5 of the BAM (DPIE 2020a). Non-native vegetation which does provide habitat for threatened species is required to be assessed.

3.2 Plant community types and ecological communities

3.2.1 Review of existing information

Existing information regarding native vegetation was reviewed to inform field investigations including:

- Existing vegetation mapping, including State Vegetation Type Map: Central Tablelands Region Version 1.0. VIS_ID 4778 (DPIE 2018).
- Database searches.

Based on the results of the background review and the requirements of the BAM with respect to this BDAR, appropriate surveys were designed for the subject land and development footprint.

3.2.2 Field investigation

A systematic biodiversity assessment was conducted 17-18 March 2021, 16 June 2021, 12 November 2021 and 15 July 2022 by Paul Price (Senior Restoration Ecologist, Accredited Assessor #BAAS18089), under the terms of Biosis' Scientific Licence issued by the Environment Energy and Science (EES) under the *National Parks and Wildlife Act 1974* (SL100758, expiry date 31 March 2022). Fauna survey was conducted 17-18 March 2021 by Anthony Cable (Senior Ecologist and Technical Lead) and 10, 15 and 16 November 2021 by Sarah Allison (Project Zoologist) and Zoe Goold (Project Zoologist) under approval 11/355 from the NSW Animal Care and Ethics Committee (expiry date 31 January 2022).

The BAM assessment was carried out by Paul Price and overseen by Accredited Assessor Rebecca Dwyer (#BAAS17067).

The development site was surveyed in accordance with the BAM (DPIE 2020a), which involved:

- The identification and mapping of Plant Community Types (PCTs) according to the structural definitions held in the BioNet Vegetation Classification database, with reference to information provided in State Vegetation Type Map: Central Tablelands Region Version 1.0. VIS_ID 4778 (DPIE 2018).
- Undertaking floristic plots within each vegetation zone in accordance with Section 4 of the BAM (DPIE 2020a), considering varying condition states and avoidance of ecotones, areas of disturbance, and edges.
- The identification of native and exotic plant species, according to the Flora of NSW (Harden 1992, 1993, 2000, 2002) with reference to recent taxonomic changes.
- Targeted searches for plant species of conservation significance according to the *Surveying threatened plants and their habitats* (DPIE 2016b).
- Incidental observations using the "random meander" method (Cropper 1993).
- Identification of previous and current factors threatening the ecological function and survival of native vegetation within and adjacent to the development site.
- An assessment of the natural resilience of the vegetation of the Site.
- Identifying and mapping fauna habitats (e.g., hollow-bearing trees, rock outcropping etc.), assessing their condition and value to threatened fauna species, and considering threatened species' habitat constraints.
- Observations of animal activity and searches for indirect evidence of fauna (such as scats, nests, burrows, hollows, tracks, scratches and diggings).

- Targeted surveys for threatened fauna species.

The conservation significance of plant species and plant communities was determined according to:

- BC Act for significance within NSW.
- EPBC Act for significance within Australia.

Detailed field mapping and collection of GPS point locations were conducted using hand-held (uncorrected) tablet units (Samsung Galaxy Tab X) running the ArcGIS Collector and Field Maps applications, using the inbuilt GPS, and aerial photo interpretation. Spatial locations are therefore considered to have an accuracy of generally ± 5 metres.

Areas of native vegetation for which a PCT could validly be assigned were identified and delineated in the field, and their condition determined and assigned. Identification of PCTs within the subject land was confirmed with reference to the community profile descriptors (and diagnostic species tests) held within the State Vegetation Type Map: Central Tablelands Region Version 1.0. VIS_ID 4778 (DPIE 2018) and NSW BioNet Vegetation Classification database (DPIE 2021a). Locations of floristic plots surveyed are shown on Figure 6.

Further details of targeted survey for threatened flora and fauna species are provided in Section 4.2 below.

3.2.3 Plant community types

The following PCTs were assessed as present within the subject land:

- PCT 677 - *Black Gum grassy woodland of damp flats and drainage lines of the eastern Southern Tablelands, South Eastern Highlands Bioregion* (Table 2).
- PCT 732 - *Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion* (Table 3).

Table 2 to Table 3 provide detailed descriptions of the two PCTs recorded within the subject land. PCTs recorded within the subject land are shown on Figure 5 and Figure 6.

Table 2 PCT 677 - Black Gum grassy woodland of damp flats and drainage lines of the eastern Southern Tablelands, South Eastern Highlands Bioregion

677 - Black Gum grassy woodland of damp flats and drainage lines of the eastern Southern Tablelands, South Eastern Highlands Bioregion	
Common name	*Black Gum grassy woodland of damp flats and drainage lines of the eastern Southern Tablelands, South Eastern Highlands Bioregion*
Vegetation formation	Grassy Woodlands
Vegetation class	Subalpine Woodlands
Extent within subject land	5.50 ha
Condition	This community at the subject land was recorded in two conditional states of moderate and low.
Description	Low condition PCT 677 (approx. 3.54 ha within the subject land) was primarily recorded at the bushland/urban native exotic interface (Figure 5). As a result, the recorded low conditional state lacked both structural and floristic diversity primarily within the mid and ground layer stratums. The upper stratum consisted of a dominant canopy of Black Gum *Eucalyptus aggregata* supported by a reduced native mid storey stratum of scattered Silver Wattle *Acacia dealbata*. Other recorded flora species within an observed

677 - Black Gum grassy woodland of damp flats and drainage lines of the eastern Southern Tablelands, South Eastern Highlands Bioregion	
	lower mid storey stratum were primarily exotic, with species such as Hawthorn *Crataegus monogyna*, Sweet Briar *Rosa rubiginosa* and Blackberry *Rubus anglocandicans* being most common. The reduced native ground layer stratum was confirmed to contain a number of native grasses and forb's with species such as Tussock Grass Poa *labillardierei* var. *labillardierei,* Bidgee-widgee *Acaena novae-zelandiae,* Common Woodruff *Asperula conferta* and Weeping Grass *Microlaena stipoides* var. *stipoides*. As a result of the disturbed nature of the conditional state, exotic species dominated the stratum with species such as Phalaris *Phalaris aquatica,* Cocksfoot Grass *Dactylis glomerata* and Paspalum *Paspalum dilatatum* being recorded. Moderate condition PCT 677 (approx. 0.97ha within the subject land) was recorded at the eastern portion of the proposed transmission alignment (Figure 5). The upper stratum consisted of a dominant canopy of Black Gum with occasional representations of Black Sally *Eucalyptus stellulata*. A native mid storey stratum was not present within the conditional state. The mid storey stratum consisted of primarily of Hawthorn, Small-leaved Privet *Ligustrum sinense* and Blackberry. The ground layer stratum was well represented by mixed dominance of both native and exotic flora. Native species recorded with the stratum included Common Everlasting *Chrysocephalum apiculatum,* Longhair Plumegrass *Dichelachne crinita*, Wattle Matt-*rush Lomandra filiformis* subsp. *coriacea,* Tussock Grass, Wild Sorghum *Sorghum leiocladum,* Kangaroo Grass *Themeda triandra* and Weeping Grass. Exotic flora species recorded within the stratum were primarily limited to soft wood perennials and grasses with recorded species such as Branched Centaury *Centaurium tenuiflorum*, Flaxleaf Fleabane *Cirsium vulgare*, Serrated Tussock *Nassella trichotoma* and Phalaris.
Survey effort	PCT 677 Low : One BAM plot/transect PCT 677 Moderate : One plot/transect (Figure 6)
Justification of PCT	The subject land is within the South Eastern Highlands IBRA bioregion. The community occurs as an open woodland with a densely grassy groundlayer and a sparse to absent shrub layer. The landscape position predominantly occurs on drainage lines and associated flats. Dominance of Black Gum, White Sally and/or Black Sally trees. The BioNet PCT Identification tool identified PCT 677 from the species recorded at the subject land.
Justification of condition	Low conditioned PCT 677 tree species richness (2) and percentage tree cover (10.1 %) was recorded to be distinctly below the PCT benchmark of 4 and 26% respectively. Furthermore, floristic surveys failed to document a shrub species richness or percentage cover, thus failing to meet that of the PCT benchmark requirements of 8 species and 9% cover. Similar results were also recorded within the other characteristic growth forms, by where the Grass and Grass-like growth form (7 species, 18.1% cover) failed to meet that of the PCT benchmarks of 8 species and 46% cover and the forb growth form (7 species, 0.7% cover) failed to meet the PCT benchmarks of 18 species and 11% cover. The growth forms of 'Fern' and "Other" were not recorded within the floristic plot. Four high threat weeds (HTW) (Hawthorn, St. Johns Wort *Hypericum perforatum*, Paspalum and Sweet Briar) were also recorded within the conditional state equating to a cover of 9.3%.

677 - Black Gum grassy woodland of damp flats and drainage lines of the eastern Southern Tablelands, South Eastern Highlands Bioregion	
	As a result of the reduced species diversity, low native cover abundance and abundance of high threat weed species, the conditional state of 'low" is justified. The moderate condition PCT 677 tree species richness (2) and percentage tree cover (5.1 %) was recorded to be distinctly below the PCT benchmark of 4 and 26% respectively. Again, floristic surveys failed to document a shrub species richness or percentage cover, thus failing to meet that of the PCT benchmark requirements of 8 species and 9% cover. The bulk of the floristic diversity of the conditional state was recorded within the Grass and Grass-like growth form by where 14 species with a cover of 29.1% were recorded. Whilst exceeding that of the species richness benchmark of 8, the conditional state failed to meet the required benchmark percentage cover of 46%. Whereas forb growth forms (10 species, 0.9% cover) failed to meet he PCT benchmarks of 18 species and 11% cover. In similarity to that of the low conditional state, the growth forms of 'Fern' and "other" were not recorded within the floristic plot. Four HTW (Hawthorn, St. Johns Wort, Paspalum and Sweet Briar) were also recorded within the conditional state equating to a percentage cover of 1.2 %. As a result of the recorded species diversity/ cover abundance within the canopy and ground layer stratums and the reduced cover of HTW, the conditional state of 'moderate' is justified.
TEC Status	Not listed under State or Commonwealth legislation.
Estimate of percent cleared value of PCT (BioNet)	95% (DPIE 2021a).
PCT 677 –Low condition	

677 - Black Gum grassy woodland of damp flats and drainage lines of the eastern Southern Tablelands, South Eastern Highlands Bioregion	
PCT 677 –Moderate condition	

Table 3 PCT 732 - Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion

PCT 732 - Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion	
Common name	*Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion*
Vegetation formation	Grassy Woodlands
Vegetation class	Southern Tableland Grassy Woodland
Extent within subject land	16.21ha
Condition	This community at the subject land was recorded in three conditional states of non-offsetable grasslands (NOG), scattered trees and moderate.
Description	The PCT 732 NOG (approx. 10.39 ha) was primarily recorded within proposed battery storage area, located in the western portions of the development footprint (Figure 5). As a result of the historical clearing and pasture improvement, the recorded NOG conditional state lacked both native structural and floristic diversity within all stratums. A distinguishable canopy layer was not recorded within the vegetation conditional state. Additionally, a native shrub layer was limited to occasional specimens of Sifton Bush *Cassinia sifton* only. The ground layer stratum was recorded to contain a reduced representation of native grass and forbs species dominated by a composite of exotic pasture species. Native flora species included in the stratum included Common Couch *Cynodon dactylon, Deyeuxia quadriseta,* Paddock Lovegrass *Eragrostis leptostachya,* Hairy Panic *Panicum effusum* and Variable Raspwort *Haloragis heterophylla.* Exotic flora recorded within the stratum included Browntop Bent, Sweet Vernal Grass *Anthoxanthum odoratum*, *Panicum gilvum,* Lamb's Tongues *Plantago lanceolata,* Catsear *Hypochaeris*

PCT 732 - Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion	
	radicata and Rat's Tail Fescue *Vulpia myuros.* The PCT 732 scattered trees (approx. 0.05 ha) was primarily recorded in the north east corner of subject area (Figure 5). As a result of the historical clearing and pasture improvement, the recorded scattered trees conditional state lacked both native structural and floristic diversity within all stratums. As such, distinguishable native mid and ground layer stratum were not recorded within the vegetation conditional state. The ground layer stratum was recorded to contain a reduced representation of native grass and forbs species dominated mixture of exotic pasture species. Native flora species included in the stratum included Common Couch and Variable Raspwort. Exotic flora recorded within the stratum included Paspalum *Paspalum dilatatum*, Sweet Vernal Grass, Lamb's Tongues and Rat's Tail Fescue. Moderate condition PCT 732 (approx.7.98 ha) was recorded within two locations within the development footprint area (Figure 5). The upper stratum consisted of a mixed canopy of Broad-leaved Peppermint *Eucalyptus dives,* Brittle Gum *Eucalyptus mannifera* subsp. *mannifera* and White Sally *Eucalyptus pauciflora.* As a result of the historical clearing and under scrubbing, the native mid storey stratum was characterised by a low open shrub layer represented by grouped stands of Native Blackthorn *Bursaria spinosa* subsp. *lasiophylla,* Dolly Bush *Cassinia aculeata,* Prickly Teatree *Leptospermum continentale and* Sifton Bush. The ground layer stratum was observed to contain a number of low shrubs, grasses and forb species. Native flora recorded within the vegetation type included *Bossiaea buxifolia,* Button Everlasting *Coronidium scorpioides,* Wattle Matt-rush, Weeping Grass, Ringed Wallaby Grass *Rytidosperma caespitosum* and Sticky Everlasting *Xerochrysum viscosum.* Exotic flora species recorded within the conditional state included the HTW's of Browntop Bent *Agrostis capillaris*, St. Johns Wort, Sweet Briar and Blackberry.
Survey effort	PCT 732 NOG : three BAM plot/transect PCT 732 scattered trees : One plot/transect PCT 732 Moderate : One plot/transect (Figure 6)
Justification of PCT	The subject land is within the South Eastern Highlands IBRA bioregion. The community occurs as an open forest with a sparse shrub layer and grassy groundcover. The landscape position predominantly occurs on undulating granite tablelands of the upper Coxs and Abercrombie River valleys. Dominance of Broad-leaved Peppermint trees. The subject land occurs between 600 m and 1100 m elevation. The BioNet PCT Identification tool identified PCT 732 from the species recorded at the subject land.
Justification of condition	PCT 732 NOG did not record a canopy or sub canopy with the conditional state across the three replicate plots, thus failing the required tree species richness and percentage tree cover PCT benchmark of 4 and 25% respectively. The recorded shrub species richness (1) and percentage cover (0.4%) across the three replicates also failed to meet that of the PCT benchmark requirements of 7 species and 5% cover. Similar results were also recorded within the other characteristic growth forms, by where the Grass and

PCT 732 - Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion	
	Grasslike growth form across the three replicates (3 species, 23.6% cover) failed to that the PCT benchmarks of 9 species and 37% cover. The forb growth form across the three replicates provided a mean species richness of 1 and a percentage cover of 0.1%. As such, the conditional state failed to that the forb growth form PCT benchmarks of 16 species and 9% cover. The growth forms of 'Fern' and "other" were not recorded within the three floristic plots. Four HTW's (Sheep Sorrel *Acetosella vulgaris,* Browntop Bent, St. Johns Wort and Paspalum) were also recorded within the conditional state equating to a mean cover of 15.3% across the three replicates. As a result of the reduced species diversity, low native cover abundance and abundance of high threat weed species and a calculated vegetation integrity (VI) score of 0.2 (Table 6) the conditional state of 'NOG' is justified. PCT 732 scattered trees conditional state tree species richness (1) and percentage tree cover (5%) were recorded to be below that of the PCT benchmark of 4 and 25% respectively. A native mid story stratum was not observed within the vegetation conditional state. The 'grass and grass like' growth form recorded a species richness (2) and percentage tree cover (1.1 %), thus failing to meet that of the PCT benchmarks of 9 species and a percentage cover 37%. Similar results were recoded within the 'forb' growth form, where the species richness of 2 and percentage cover of 0.2% failed to meet the PCT growth form benchmarks of 16 species and 9% cover. Again, due to the disturbed nature of the conditional type, the growth forms of 'fern' and 'other' were not recorded thus failing that of their associated PCT benchmarks. Four HTW's (Sheep Sorrel, St. Johns Wort, Blackberry Rubus anglocandicans and Paspalum) were also recorded within the conditional state with a percentage cover of 35.3%. As a result of the recorded species diversity/ cover abundance within all recorded stratums the conditional state of 'scattered trees' is justified. The moderate condition PCT 732 tree species richness (3) and percentage tree cover (20.5 %) was recorded to be below that of the PCT benchmark of 4 and 25% respectively. Similar results were also documented in association with the shrub growth form for the conditional state, by where a recorded species richness of 5 and percentage cover of 5.5% failed to meet the PCT benchmark condition of 7 species, yet exceeded that of the PCT benchmark percentage cover requirements by 0.5%. The bulk of the floristic diversity of the conditional state was recorded within the Grass and Grasslike growth form by where 10 species with a cover of 74.1% were recorded. These results exceeded that of the species richness benchmark of 9 and percentage cover of 37%. The forb growth form species richness of 12 and percentage cover of 1.6% was recorded to be below that of the PCT benchmark of 16 and 9% respectively. The growth forms of 'Fern' and "other" were not recorded within the floristic plot. Six HTW (Sheep Sorrel, Browntop Bent, St. Johns Wort Paspalum, Sweet Briar and Blackberry) were also recorded within the conditional state equating to a cover of 4.7%. As a result of the recorded species diversity/ cover abundance within all recorded stratums and the reduced cover of HTW, the conditional state of 'moderate' is justified.
TEC Status	Not listed under State or Commonwealth legislation

PCT 732 - Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion	
Estimate of percent cleared value of PCT (BioNet)	65 % (DPIE 2021a).
PCT 732 NOG condition	
PCT 732 - Scattered trees condition	

PCT 732 - Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion	
PCT 732 –Moderate condition	

3.2.4 Threatened ecological communities

Vegetation identified within the subject land was not found to form part of any TEC under the BC Act or EPBC Act.

3.3 Vegetation integrity assessment

3.3.1 Vegetation zones and patch size class

PCTs within the subject land were assessed and stratified, based on broad condition state, into vegetation zones in accordance with Section 4.3 of the BAM. This resulted in four vegetation zones identified within the development footprint. Table 4 describes each of the zones, and provides details on the numbers of BAM floristic plots undertaken in each zone.

Patch size classes for each vegetation zone present within the subject land were assessed as per Section 4.3.2 of the BAM (DPIE 2020a) using a select process in ArcGIS. All native vegetation with a gap of less than 100 metres from the next area of native vegetation (or ≤ 30 metres for non-woody ecosystems), is considered a single patch, with a patch able to extend onto adjoining land.

The minimum patch size that was entered into the BAM-C was 101 hectares. Patch size classes for each vegetation zone are also outlined in Table 4 below.

Table 4 Vegetation zones within the subject land

Vegetation zone	Plant Community Type	Condition	BAM plots completed	Impact assessment area	Max. patch size development footprint
677_Low	677 - *Black Gum grassy woodland of damp flats and drainage lines of the eastern Southern Tablelands, South Eastern Highlands Bioregion*	Low	1	0.04 ha	>100 ha
677_Moderate	677 - *Black Gum grassy woodland of damp flats and drainage lines of the eastern Southern Tablelands, South Eastern Highlands Bioregion*	Moderate	1	0.23 ha	>100 ha
732_Moderate	732 - *Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion*	Moderate	1	0.78 ha	>100 ha
732 _Scattered Trees	732 - *Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion*	Scattered trees	1	0.05 ha	>100 ha
732_NOG	732 - *Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion*	NOG	3	7.27ha	>100 ha

3.3.2 Vegetation integrity

Vegetation integrity, or condition, was assessed using data obtained from undertaking BAM plots within the vegetation zones, as per Section 4.3.4 of the BAM (DPIE 2020a). Plot data was collected via:

- A 20 m x 50 m quadrat and 50 m transect for assessment of site attributes and function.
- A 20 m x 20 m quadrat, nested within the larger quadrat for full floristic survey to determine composition and structure of the PCT.

The minimum number of BAM plots per vegetation zone was determined using Table 3 of the BAM (DPIE 2020a). A total of seven BAM plots have been completed within the vegetation zones present within the development footprint, details are provided in Table 5 and shown on Figure 6.

Table 5 BAM plots completed within the subject land

BAM plot reference	Vegetation zone	BAM plot reference	Vegetation zone
34343_Plot 1	677_Moderate	**34343_Plot 5**	732_NOG
34343_Plot 2	677_Low	**34343_Plot 6**	732_NOG

BAM plot reference	Vegetation zone	BAM plot reference	Vegetation zone
34343_Plot 3	732_Moderate	**34343_Plot 7**	732_Scattered trees
34343_Plot 4	732_NOG		

Assessment of vegetation integrity was undertaken using standard benchmark data as outlined in the BAM and held in the BioNet Vegetation Classification database. A list of flora species was compiled for each BAM plot completed and is included in Appendix 3. Records of all flora species will be submitted to EES for incorporation into the Atlas of NSW Wildlife.

3.3.3 Vegetation integrity score

Plot data was entered into the BAM calculator to determine vegetation integrity score. Plot data are presented in Appendix 3, with vegetation integrity scores for each vegetation zones provided in Table 6.

Table 6 Vegetation zone integrity scores

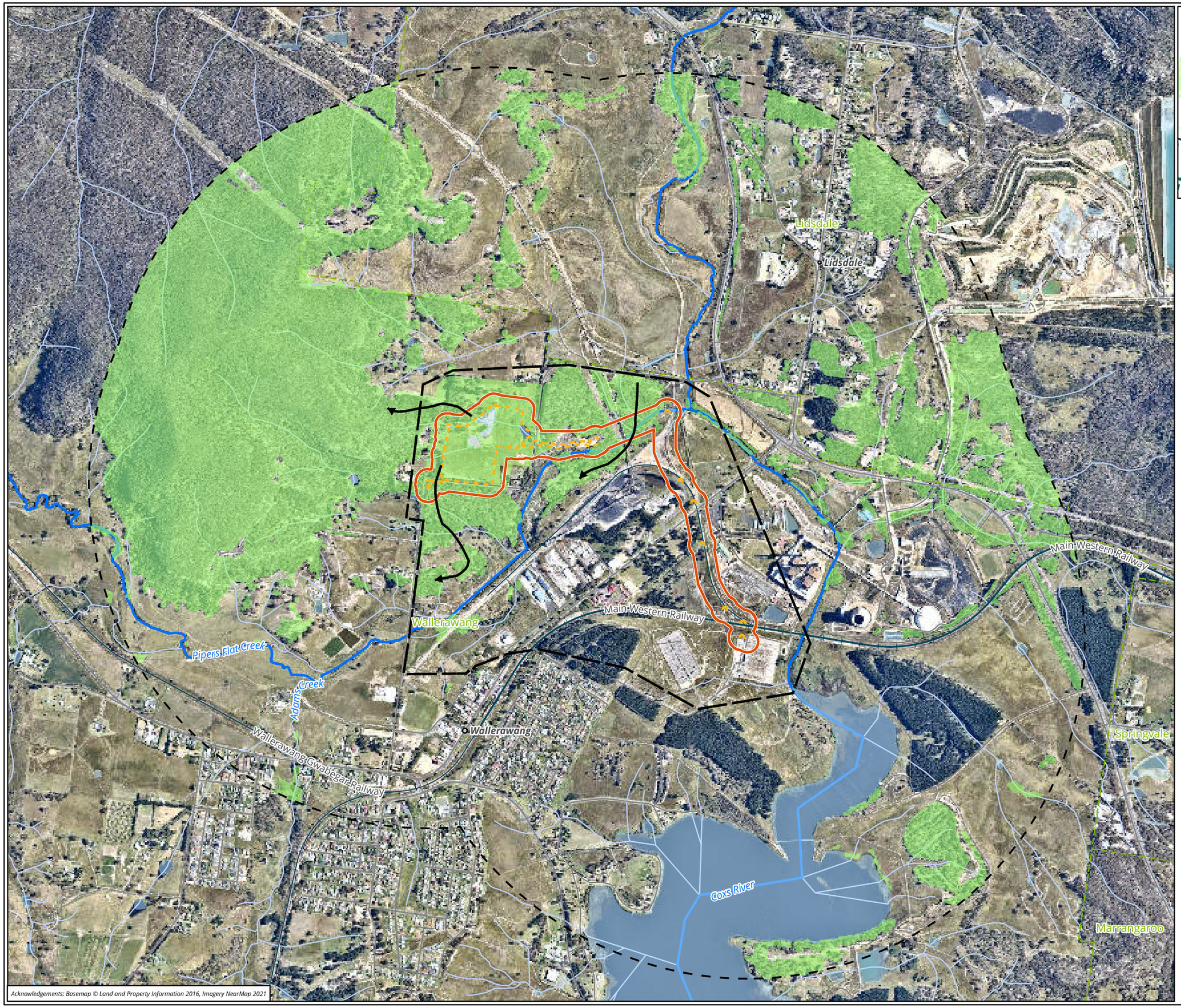
Vegetation zone	Composition score	Structure score	Function score	Vegetation integrity score*	IBRA subregion
677_Low	40.5	30.2	84.6	46.9	Capertee Uplands
677_Moderate	54.2	42.0	61.6	51.9	Capertee Uplands
732_Moderate	87.6	87.0	76.5	83.6	Capertee Uplands
732_NOG	10.2	36.5	0	0.2	Capertee Uplands
732_Scattered trees	4.5	2.7	4.7	3.9	Capertee Uplands

*Benchmark (pristine) condition vegetation would receive a VI score of 100.

As outlined in Section 9.2.1 of the BAM, an offset is required for impacts on native vegetation where the vegetation integrity score is:

- ≥15 where the PCT is representative of an endangered or critically endangered ecological community.
- ≥17 where the PCT is associated with threatened species habitat (as represented by ecosystem credits), or is representative of a vulnerable ecological community.
- ≥20 where the PCT is not representative of a TEC or associated with threatened species habitat.

As such, ecosystem credit offsets are not required for the vegetation zones 732_NOG and 732_Scattered trees due to the VI score of 0.2 and 3.9, respectively.



Legend

- Subject land
- Development site
- Development footprint
- Assessment area
- Habitat connectivity
- Native vegetation

Figure 4 Native vegetation extent

0 100 200 300 400 500

Metres

Scale: 1:16,000 @ A3

Coordinate System: GDA 1994 MGA Zone 56

N

biosis

Matter: 34343, Date: 15 September 2022GIS: AM, Checked by: PP, Last edited by: amackegardLocation: P:\34300s\34343\Mapping\34343_BDAR2020.aprx
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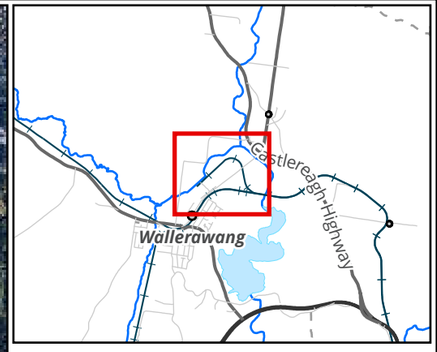


Legend

- Subject land
- Development site
- Development footprint
- HDD and trenching
- Hollow-bearing tree
- Cleared

Plant Community Type

- Urban Native/Exotic
- 677 - Black Gum grassy woodland of damp flats and drainage lines of the eastern Southern Tablelands, South Eastern Highlands Bioregion
- 732 - Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion

Figure 5 Vegetation within the subject land

0 50 100 150 200 250

Metres

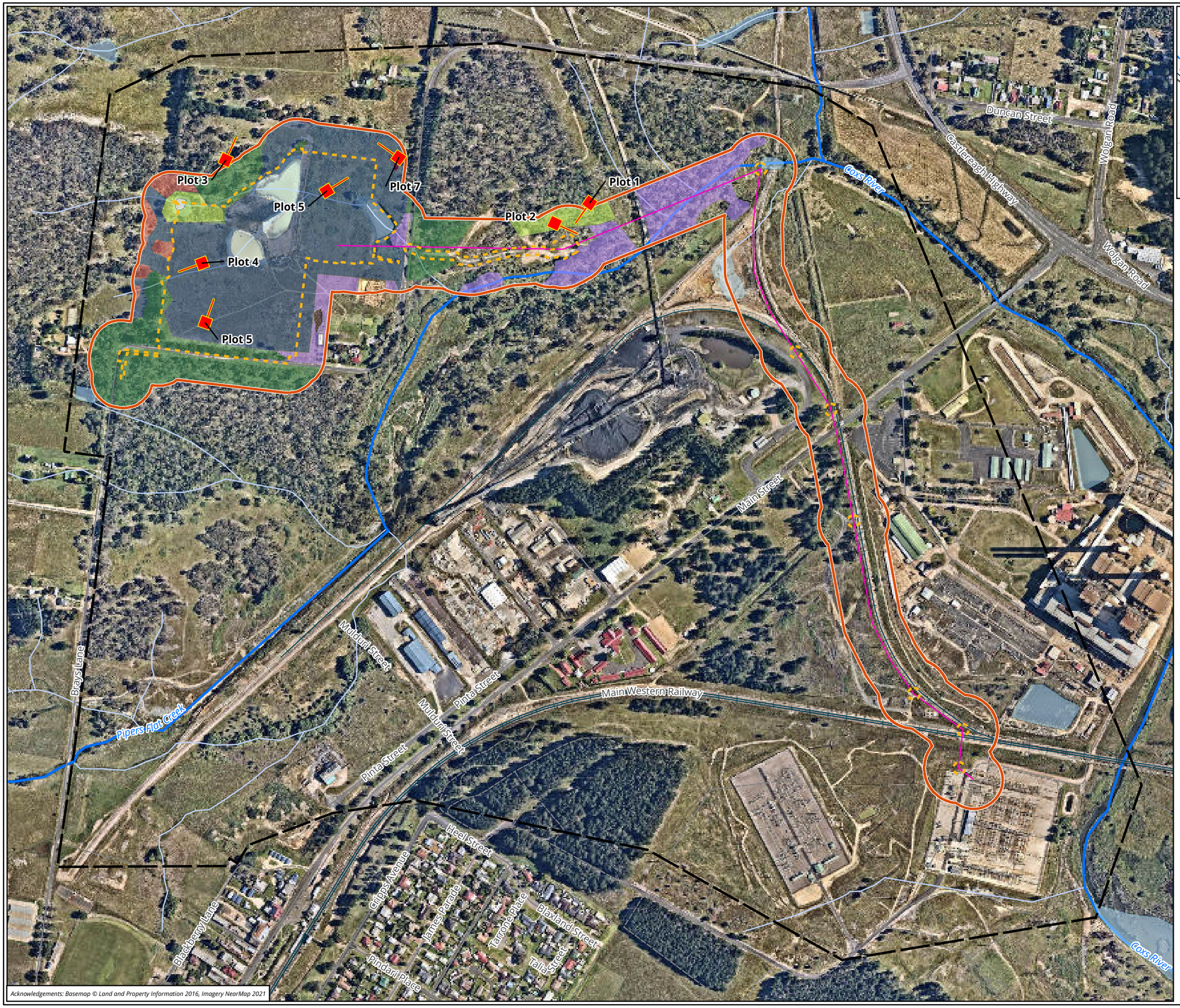
Scale: 1:6,000 @ A3

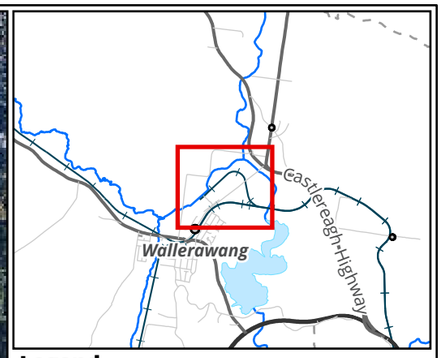
Coordinate System: GDA 1994 MGA Zone 56

biosis

Matter: 34343, Date: 15 September 2022
GIS: AM, Checked by: PP, Last edited by: amackegard
Location: P:\34300s\34343\Mapping\34343_BDAR2020.aprx
Layout: 34343_F5_BiosisVeg

Acknowledgements: Basemap © Land and Property Information 2016, Imagery NearMap 2021





Legend

- Subject land
- Development site
- Development footprint
- HDD and trenching
- BAM plot

Vegetation Zones

- 677-Low
- 677-Moderate
- 732-Low
- 732-Moderate
- 732-NOG
- 732-Scattered Trees

Acknowledgements: Basemap © Land and Property Information 2016, Imagery NearMap 2021

Figure 6 Vegetation zones and plot locations

0 50 100 150 200 250

Metres

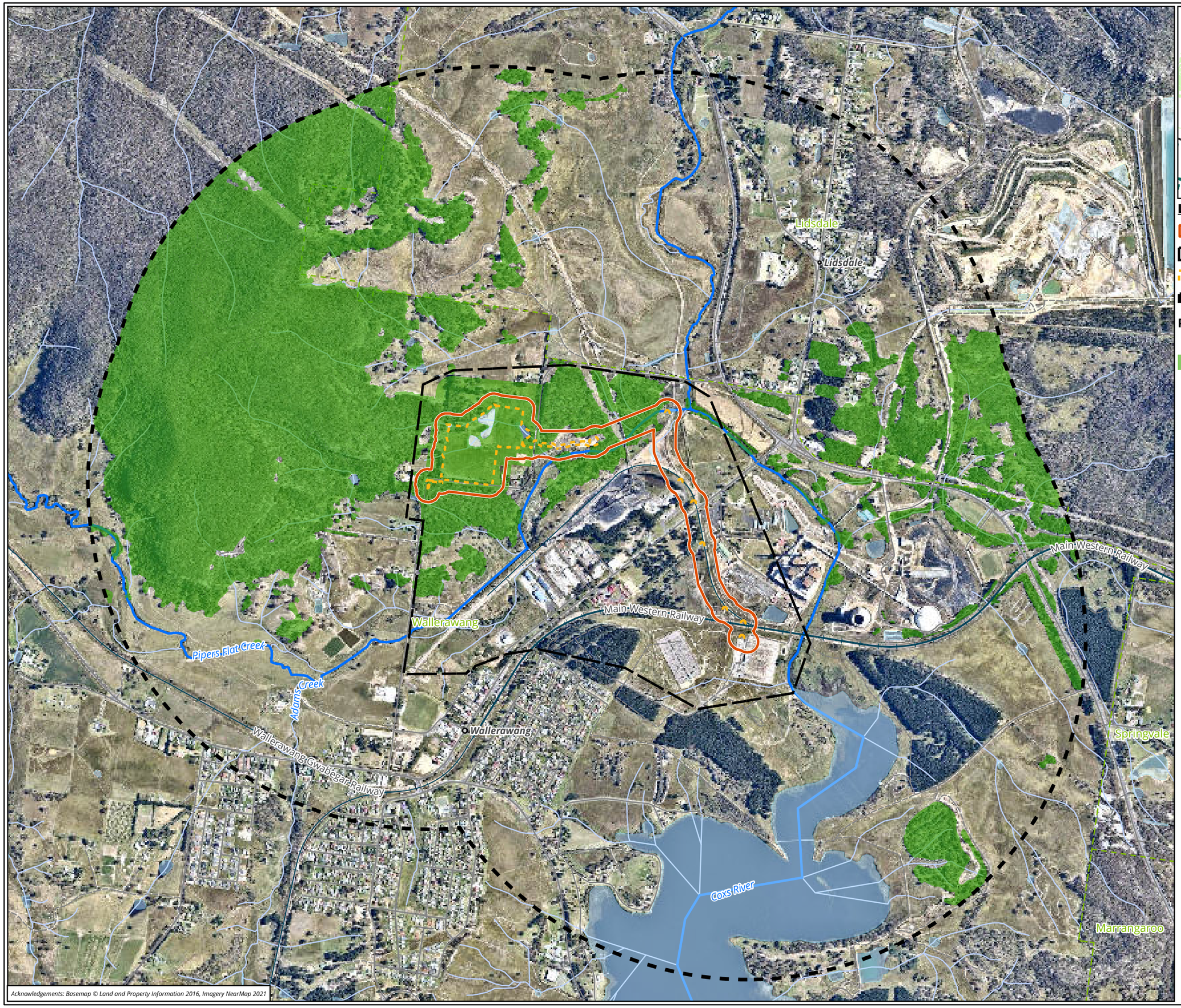
Scale: 1:6,000 @ A3

Coordinate System: GDA 1994 MGA Zone 56

N

biosis

Matter: 34343, Date: 15 September 2022
GIS: AM, Checked by: PP, Last edited by: amackegard
Location: P:\34300s\34343\Mapping\34343_BDAR2020.aprx
Layout: 34343_F6_VegZones



Legend

- Subject land
- Development site
- Development footprint
- Assessment area

Patch size

- ≥100ha (677 Low, 677 Moderate, 732 Low, 732 Moderate, 732 NOG, 732 Scattered trees)

Figure 7 Patch size

0 120 240 360 480 600

Metres
Scale: 1:16,000 @ A3
Coordinate System:
GDA 1994 MGA Zone 56

N

biosis

Matter: 34343, Date: 15 September 2022
GIS: AM, Checked by: PP, Last edited by: amackegard
Location: P:\34300s\34343\Mapping\34343_BDAR2020.aprx
Layout: 34343_F7_PatchSize

4 Threatened species

4.1 Predicted species (ecosystem credit species)

A list of predicted species (ecosystem credit species) expected to occur within the subject land was generated as per Section 5 of the BAM. Impacts to these species require assessment, however targeted survey is not required as these species are assumed to occur, based on the occurrence of the PCTs, habitat constraints, native vegetation cover in the landscape and calculated patch sizes. These species are identified as ecosystem credit species in the Threatened Biodiversity Data Collection (TBDC). Table 7 lists the ecosystem credit species that could not be discounted from using the subject land on occasion, based on geographical restrictions or a lack of suitable habitat.

These species were considered when prescribing management and mitigation measures for the Project.

Table 7 Ecosystem credit species (predicted species) with potential to occur

Species name	Common name
Anthochaera phrygia	Regent Honeyeater (foraging)
Artamus cyanopterus	Dusky Woodswallow
Callocephalon fimbriatum	Gang-gang Cockatoo (foraging)
Chthonicola sagittata	Speckled Warbler
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)
Daphoenositta chrysoptera	Varied Sittella
Dasyurus maculatus	Spotted-tailed Quoll
Falsistrellus tasmaniensis	Eastern False Pipistrelle
Glossopsitta pusilla	Little Lorikeet
Grantiella picta	Painted Honeyeater
Hieraaetus morphnoides	Little Eagle (foraging)
Hirundapus caudacutus	White-throated Needletail
Hoplocephalus bungaroides	Broad-headed Snake (foraging)
Lathamus discolor	Swift Parrot (foraging)
Miniopterus orianae oceanensis	Large Bent-winged Bat
Neophema pulchella	Turquoise Parrot
Ninox connivens	Barking Owl (foraging)
Ninox strenua	Powerful Owl (foraging)
Petaurus australis	Yellow-bellied Glider
Petroica boodang	Scarlet Robin
Petroica phoenicea	Flame Robin

Species name	Common name
Phascolarctos cinereus	Koala (foraging)
Pteropus poliocephalus	Grey-headed Flying-fox (foraging)
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat
Scoteanax rueppellii	Greater Broad-nosed Bat
Stagonopleura guttata	Diamond Firetail
Tyto novaehollandiae	Masked Owl (Foraging)
Varanus rosenbergi	Rosenberg's Goanna

The following ecosystem credit species were discounted from occurring within the subject land due to the absence of required habitat constraints:

- Glossy Black-Cockatoo *Calyptorhynchus lathami* – the subject land lacked the necessary required feed trees such as Black She-oak *Allocasuarina littoralis*, *A. diminuta* and *A. gymnanthera*. In addition, the lack large suitable nesting locations (Large Hollow-bearing trees) where not identified within the subject land.

4.2 Species credit species

Species credit species are threatened species for which vegetation surrogates and/or landscape features cannot reliably predict the likelihood of their occurrence, or components of their habitat. These candidate species are identified as species credit species in the TBDC. A targeted survey or an expert report is required to confirm the presence of these species on the subject land, or alternatively the species can be assumed to be present (DPIE 2020a).

Appendix 2 provides the full list of species credit species predicted to occur within the subject land based on the IBRA subregion within which the Project occurs, the native vegetation cover present within the 1,500 metre assessment area, the PCTs present within subject land, and patch sizes listed in Table 4. The potential for a species to occur within the subject land was assessed in accordance with Section 5.2 of the BAM and species with geographical restrictions, or habitat constraints not present, were not required to be assessed.

17 predicted species credit species have been excluded from occurring within the subject land based on a lack of suitable habitat, degradation of existing habitat and lack of required microhabitat features. Species credit species considered to potentially occur within the subject land, and thus considered 'candidate species credit species' have been either assumed present or the subject of the target of threatened species surveys. A detailed assessment of potential for occurrence, and potential for impact, for all species credit species predicted to occur within the subject land is provided in Appendix 2. Two species credit species (*Swainsona sericea* and *Prasophyllum petilum*) not predicted by the BAM Calculator (BAM-C) or BioNet to occur within the subject land were added to the assessment as candidate species credit species.

All candidate species credit species considered as part of this assessment, and their associated method of assessment, are listed in Table 8 (flora species) and Table 9 (fauna species).

Table 8 Candidate species credit flora species

Species name	Common name	Survey period	Method of assessment
Eucalyptus aggregata	Black Gum	All year	Targeted survey
Eucalyptus pulverulenta	Silver-leafed Gum	All year	Targeted survey
Leucochrysum albicans* var. *tricolor	Hoary Sunray	September – April	Targeted survey
Prasophyllum petilum	Tarengo Leek Orchid	September – December	Targeted survey
Swainsona sericea	Silky Swainson-pea	September – November	Targeted survey
Thesium australe	Austral Toadflax	November – February	Targeted survey
Veronica blakelyi	-	December – February	Targeted survey

Table 9 Candidate species credit fauna species

Species name	Common name	Survey period	Method of assessment
Chalinolobus dwyeri	Large-eared Pied Bat	November - January	Assumed present
Miniopterus orianae oceanensis	Large Bent-winged Bat	December – February	Targeted survey
Paralucia spinifera	Purple Copper Butterfly	September, October, December	Assumed present
Cercartetus nanus	Eastern Pygmy Possum	All year	Assumed present.
Petaurus norfolcensis	Squirrel Glider	All year	Targeted survey
Petauroides volans	Greater Glider	All year	Targeted survey
Phascolarctos cinereus	Koala	All year	Targeted survey

4.2.1 Threatened species survey details

Targeted threatened species surveys within the subject land were undertaken in March 2021, October 2021 and November 2021. Surveys undertaken and weather observations for each survey date are shown in Table 10. Weather observations were recorded using a handheld Kestrel device for some 2021 data. Weather observations were sourced from Lithgow (Cooerwull) weather station (station number 063226).

Table 10 Weather observations during targeted flora and fauna surveys

Survey undertaken	Survey date	Temperature (°C)		Rain (mm)	Wind (km/h)
		Min	Max		
• Flora habitat assessment. • Fauna habitat assessment – hollow-bearing trees and large stick-nest searches. • Habitat mapping – Purple Copper Butterfly.	17-18 March 2021	12.4	17.9	6.6	7

Survey undertaken	Survey date	Temperature (°C)		Rain (mm)	Wind (km/h)
		Min	Max		
• Targeted flora survey – Black Gum and Silver-leafed Gum	16 June 2021	-2.0	15.5	0.1	7
• Targeted fauna survey – microbats (ultrasonic recording).	10 – 16 November 2021	4.2	20.7	66.4	5 – 19
• Targeted flora survey – Hoary Sunray, Tarengo Leek Orchid, Silky Swainson-pea, Austral Toadflax and *Veronica blakelyi.*	12 November 2021	4.9	12.2	4.4	19 (3 pm)
• Targeted fauna survey – Koala, Squirrel and Greater Glider (spotlighting and call playback).	15 – 16 November 2021	4.4	15.6	0	9 (3 pm)
• Additional targeted surveys (Black Gum and Silver-leafed Gum) and ecological constraints mapping	14 and 15 July 2022	-1.0	9.4	0	11 (9 am)

4.2.2 Targeted threatened flora surveys and results

An initial site assessment was undertaken on 17 and 18 March 2021 to map broad scale vegetation types. Additional site visits were undertaken on 16 June 2021, to undertake targeted flora survey for Black Gum and Silver-leafed Gum and finalise a detailed flora assessment of the subject land, and 12 November 2021 for further potential flora credit species within the study area.

Furthermore, additional targeted surveys were undertaken 14 and 15 July 2022 as a part of the investigation exercise with scope to attain the boarder study areas ecological constraints as a result of the potential (now confirmed) staged bore hole drilling locations.

Native vegetation within subject land has been subject to a varying land use history of; grazing, agricultural, clearing, dumping and recreational impacts contributing to degradation of understorey vegetation, and thus threatened species habitats. Habitats for threatened flora species within the north-western portion of the development site are considered low to moderate due to the degree of management, grazing and history of pasture improvement. Open areas are typically dominated by exotic pasture grasses and herbaceous exotics well suited to the low lying and typically damp habitat. Habitats supported by vegetation identified within the proposed eastern transmission line were considered to be of moderately higher quality as a result of the lower levels of disturbance present in the understorey and the presence of mature canopy trees. However, overall, the vegetation occurs as edge effected patches across the subject land.

Targeted threatened flora survey, undertaken on the dates listed in Table 10 above, were done so in accordance with the required BAM survey guideline, *NSW Surveying threatened plants and their habitats* (DPIE 2020c). Targeted threatened flora survey was undertaken throughout the development footprint, utilising a minimum 10 metre separated transects, with the exception of private land areas, where access could not be arranged. Portions of the development footprint were not subject to targeted survey for threatened flora, as suitable habitat was not present.

Targeted threatened flora surveys undertaken for the Project are detailed in Table 8, and a detailed assessment of candidate flora species credit species is provided in Appendix 2.

Survey method and effort

The targeted survey for Black Gum and Black Gum and Silver-leafed Gum was undertaken on 16 June 2021 and 14 and 15 July 2022 (within the final development footprint, refer to Figure 1). Targeted survey for the remaining flora species, Hoary Sunray, Tarengo Leek Orchid, Silky Swainson-pea, Austral Toadflax and *Veronica blakelyi* were surveyed on 12 November 2021 to coincide with the relevant flowering periods as described in the TBDC. As a result of the constraints mapping undertaken (July 2022) and the disturbed nature of the proposed new drilling locations and access trail, the need for additional targeted surveys for other potential threatened species was not required to be undertaken. This action was support by the Biodiversity, Conservation and Science Directorate (BCS) of the Department of Planning and Environment (DPE)

Targeted surveys were undertaken for *Veronica blakelyi* 12 November 2021. Whilst the BAM C allocates the survey period for the species as December – February, the TBDC indicates the potential for a late Spring flowering event. As such the allocated time frame for the survey was deemed suitable, due to the TBDC.

Austral Toadflax surveys were undertaken within the recorded PCT 677 (moderate condition) and PCT 732 (moderate condition) as result of the presence of know associated species, Kangaroo grass *Themeda triandra*, a preferred symbiote host of the target species. With this in mind, targeted surveys for Austral Toadflax were not undertaken within PCT 732 (NOG) due to the lack of recorded Kangaroo Grass with the vegetation zone. This decision was supported by floristic data, by where the Grass and Grasslike growth forms across the three replicate plots scored an average of three species and a 23.6% cover, with no Kangaroo Grass being recorded. In addition, as a result of the reduced species diversity within PCT 732 (NOG), the low native cover abundance and the abundance of high threat weed species as well as a calculated vegetation integrity (VI) score of 0.2 (Table 6) the conditional state of 'NOG' is further justified.

An ecologist walked through all suitable habitat for each target species at 10 metre spaced transects for Black Gum/ Silver-leafed Gum and 5 metre spaced transects for all remaining species. The transect spacing is consistent with the spacing described within the NSW *Surveying threatened plants and their habitats* (DPIE 2020b). When encountered all individual plants were recorded using a using hand-held (uncorrected) GPS Tablet. Figure 8 shows the targeted flora survey effort.

Targeted flora surveys were undertaken by the qualified and experienced Biosis ecologists outlined in Table 11.

Table 11 Targeted flora survey personnel and relevant experience

Staff member	Role	Relevant experience
Paul Price	Senior Restoration Ecologist BAM Accredited Assessor	Over 10 years' experience undertaking targeted flora surveys in NSW.

Results

Targeted surveys resulted in the detection of a population of Black Gum, containing 286 individuals within the subject land. The remaining vegetation in the moderate and low condition PCT 677 across the subject land contained an approximate count of 1000 plus individual specimens of Black Gum.

Table 12 provides a summary of the results of the targeted flora surveys completed.

Table 12 Summary of targeted flora survey method and results

Species name	Common name	Survey method	Survey results	Species Polygon (ha) or count
Eucalyptus aggregata	Black Gum	10m separated transect searches of areas of potential	Recorded during targeted survey. 258	286 individuals recorded.

Species name	Common name	Survey method	Survey results	Species Polygon (ha) or count
		habitat in June 2021 and 14-15 July 2022 (for the new alignment)	individuals recorded with an additional 28 recorded within and adjacent to the new alignment.	
Eucalyptus pulverulenta	Silver-leafed Gum	10m separated transect searches of areas of potential habitat in June 2021 and 14-15 July 2022	Not recorded during targeted survey	n/a
Prasophyllum petilum	Tarengo Leek Orchid	5m separated transect searches of areas of potential habitat in November 2021	Not recorded during targeted survey	n/a
Leucochrysum albicans* var. *tricolor	Hoary Sunray	5m separated transect searches of areas of potential habitat in November 2021	Not recorded during targeted survey	n/a
Swainsona sericea	Silky Swainson-pea	5m separated transect searches of areas of potential habitat in November 2021	Not recorded during targeted survey	n/a
Thesium australe	Austral Toadflax	5m separated transect searches of areas of potential habitat in November 2021	Not recorded during targeted survey	n/a
Veronica blakelyi	-	5m separated transect searches of areas of potential habitat in November 2021	Not recorded during targeted survey	n/a

4.2.3 Targeted threatened fauna species

Fauna habitat within the subject land and development footprint were generally found to be in good condition, with localised areas of good quality habitat identified. A number of key habitat features were recorded across the landscape such as: patches of well-structured vegetation not subject to edge effects, and habitat connectivity corridors.

Threatened fauna species survey included habitat assessment to determine suitable microhabitats across the subject land and development footprint and, where necessary, targeted species survey to determine presence/absence of species and/or their habitats were completed.

Fauna habitat assessment was undertaken to determine whether the vegetation to be impacted by the Project contained microhabitats suitable to support the candidate fauna species credit species, as outlined in Appendix 2.

Fauna habitat assessments

Fauna habitat assessment was undertaken to determine the presence of microhabitats and other critical habitat components (habitat constraints) suitable for all fauna species outlined in Table 9 and Appendix 2. Habitat assessments focussed on the presence of the following features within the subject land:

- Habitat trees including large and/or hollow-bearing trees, stick nests, availability of flowering shrubs and canopy/understorey feed tree species.
- Soil type and presence of cliffs, overhangs and other rocky areas.
- Condition and type of native vegetation and the presence of exotic species.
- Presence and condition of pools and waterways.
- Quantity of ground litter and woody debris.
- Searches for indirect evidence of fauna (i.e. feathers, tracks and scats).
- General degradation of the site as a result of past and current disturbances such as vegetation clearing and industrial land management practices.
- Topography and landscape morphology.
- Presence of Flying-fox camps.

Several habitat features with potential to support threatened species credit species were identified during these habitat assessments. These features have been summarised in Table 13.

Table 13 Habitat features with potential to support threatened species credit species

Habitat feature	Presence within the development footprint
Hollow-bearing trees	Habitat trees supporting hollows of a variety of size classes from small (<50 mm diameter) through to large (150 - 400 mm diameter) were present across the subject land. These trees have the potential to provide breeding resources for a range of native fauna species including threatened microbats, Eastern Pygmy-possum *Cercartetus nanus* and Squirrel Glider *Petaurus norfolcensis.* Large hollows adjacent to the subject land were of poor quality for fauna due to the vertical aspect of entrances, these hollows will not be removed by the proposed works.
Feed tree species	Tree species within PCT 732 in the north-west of the subject land provide potential foraging habitat for Koala and Greater Glider. Across the subject land flowering tree species may also provide foraging resources for Squirrel Glider, Eastern Pygmy Possum and Grey-headed Flying Fox as well as a range of more common bird and mammal species. Vegetation within PCT 677 was limited in providing microhabitats suitable for most threatened species such as suitable flowering shrubs for arboreal mammal species and native ground cover species for foraging and shelter by terrestrial species.
Caves, overhangs and disused mines	Sandstone formations in the Blue Mountains to the north and east of the subject land provide caves and rocky overhangs. These environments provide potential breeding habitat for threatened microbats including Large-eared Pied Bat and Large Bent-winged Bat as well as Sooty Owl, and potentially Masked Owl. Disused mines can also provide suitable roosting habitat for threatened microbats, one disused coal mine 'Western Main' is located to the west of the subject land, adjacent to Ben Bullen State Forest and is approximately 2 kilometres from the subject land.
Rocky outcrops and sandstone crevices	The surface geology of the Blue Mountains, in the Great Dividing Range to the east of the subject land supports rocky outcrops, sandstone crevices, and caves. These

Habitat feature	Presence within the development footprint
	features provide potential habitat for native frogs and reptiles including the threatened Giant Burrowing Frog, Red-crowned Toadlet and Broad-headed Snake. The subject land occurs at the base of the mountains primarily on alluvial soils associated with Piper's Flat Creek and did not contain any rock outcropping or surface geology suitable for these species.
Major and minor watercourses and waterbodies (i.e. dams)	Piper's Flat Creek runs in the east of the subject land is a Strahler Order 5 waterway. This waterway runs through agricultural areas, cleared areas and remnant vegetation within the subject land. A high level of exotic species were observed on the banks of the waterway which is characterised by soils of recent alluvium with unconsolidated sands and gravels. Farm Dams occur on the Curran Bullen soil landscape which is characterised by hard setting topsoils. Waterways and dams lacked outcropping rock and complexity of micro-habitats and do not provide suitable habitat for threatened amphibian species. The aquatic habitat of Piper's Flat Creek is heavily degraded and does not contain suitable microhabitats for threatened fish species. A small ephemeral drainage line dissects the north-western section of the Project area. This waterway runs through agricultural areas and small sections of degraded remnant vegetation. Small stand s of Black Gum has been recorded at either end of the drainage line only.
Woody debris and leaf litter	Woody debris and leaf litter occurred in low abundance in the remnant vegetation patches across development footprints and impact assessment area. The subject land does not support complex habitat for species reliant on these features due to a lack of woody debris and history of disturbance through land clearing and ongoing livestock grazing.

Field capture of detailed fauna habitat information allowed for confirmation of presence/absence of habitat features and microhabitats for a range of candidate threatened species across surveyed portions of the subject land and development footprint. Fauna habitat assessments were captured using ArcGIS polygons attributed with specific habitat criteria that allowed for planning of further targeted survey for select species, or the exclusion of the potential for occurrence of various candidate species from the subject land.

These field captured polygons have also been used to refine species polygons developed for those species either recorded by targeted survey or assumed present. Further detail is provided in Section 4.4.

Mammals

Targeted mammal surveys were undertaken for the Koala (breeding habitat only), Greater Glider, Squirrel Glider and Eastern Pygmy Possum, due to its consideration as candidate species credit species and the potential availability of habitat within the subject land. The survey guidelines and requirements for the targeted surveys is detailed in Table 14.

Table 14 Survey guidelines and requirements for mammal surveys

Survey guidelines	Survey requirements
EPBC Act referral guidelines for the vulnerable Koala **(DoE 2014)** ***Biodiversity Assessment Method (BAM)*** **(DPIE 2020)**	**Koala** • Call playback. • Spotlight survey.
Threatened Biodiversity Survey and Assessment Guidelines for Developments and Activities (Working Draft) **(DEC 2004)**	**Squirrel Glider, Greater Glider** • Spotlight survey.
Threatened Biodiversity Survey and Assessment Guidelines for Developments and Activities (Working Draft) **(DEC 2004)**	**Eastern Pygmy Possum** • Species assumed present and habitat polygon generated.

Survey method and effort

All woodlands and trees within the development footprint were identified and recorded during the general fauna habitat assessment described above and this ensured a focused effort for targeted surveys.

Targeted survey for Koala was undertaken over two survey nights, 15 – 16 November 2021. Two ecologists undertook spotlighting on foot through all woodland habitats to detect eye shine. Call playback was undertaken at two locations in the subject land (Figure 8) and involved a 10 minute listening period followed by two minutes of call playback, played twice (total of four minutes call playback) and ending with a ten minute listening period.

Threatened mammal surveys were undertaken by the Biosis ecologists outlined in Table 15.

Table 15 Targeted mammal survey personnel and relevant experience

Staff member	Role	Relevant experience
Sarah Allison	Project Zoologist	Over 5 years' experience undertaking targeted arboreal and terrestrial mammal surveys across NSW.
Zoe Goold	Project Zoologist	One year experience assisting arboreal mammal survey.

Results

Targeted fauna survey was conducted over two nights; weather conditions are provided in Table 10. Conditions on the 15 November started poor with wind approximately 19 kilometres an hour (moderate wind) observed, survey was commenced once windy conditions began to ease (approximately 8:15 pm) and a light wind was observed for the remainder of the night. Survey was conducted when the moon was approximately three quarters full with cloud cover of approximately 70 % on the 15 November and clear conditions on the 16 November.

One Squirrel Glider was detected during targeted survey within PCT 732 vegetation (Figure 8). A Sugar Glider was also observed further south within vegetation comprising low condition PCT 677, it is noted identification

of the two species can be difficult to discern and identification was made by an experienced observer after visually inspecting the individuals multiple times over a prolonged period (> 10 minutes).

The vegetation in the north-west corner of the subject land could not be surveyed both nights due to access issues and as such, presence has been assumed for Koala and Greater Glider and species polygons have been created.

Spotlighting alone is not considered effective for detection of Eastern Pygmy-possum, the species is not associated with the PCTs within the subject land (DPIE 2020c). However suitable potential foraging habitat occurs within the PCT 732 vegetation of the subject land, and the subject land is connected to large areas of habitat within National Parks in the wider area. Therefore, this species has been assumed present within PCT 732 in the subject land.

Table 16 provides a summary of the results of the mammal surveys completed.

Table 16 Summary of mammal survey method and results

Species name	Common name	Survey method	Survey results	Species Polygon (ha) or count
Phascolarctos cinereus	Koala	• 2 nights call-playback and spotlighting • 15 – 16 November 21	Not detected	3.69 ha of PCT 732
Petaurus norfolcensis	Squirrel Glider	• 2 nights spotlighting • 15 – 16 November 21	Species detected	3.69 ha of PCT 732
Cercartetus nanus	Eastern Pygmy Possum	• Baited remote camera survey/Assumed present	Assumed present	3.69 ha of PCT 732
Petauroides volans	Greater Glider	• 2 nights spotlighting • 15 – 16 November 21	Assumed present	3.69 ha of PCT 732

Microchiropteran bats

Two microchiropteran bat species, Large-eared Pied Bat and Large Bent-winged Bat were identified as candidate species credit species for the subject land.

Survey method and effort

Ultrasonic call analysis was undertaken using Anabat Insight software and relevant published reference call guides (Pennay, Law, & Reinhold 2004). Analysis was run through custom filters/a decision tree to remove noise (frequencies below 7kHz) and files/passes with less than three pulses. The custom decision tree/filter was then run using characteristic frequency and duration to identify calls to genus, or species level where possible.

Any calls identified by the system as significant or uncommon species were checked manually against the NSW reference calls, by visual comparison of sonograms with published reference calls by an experienced bat expert, to ensure accurate results. In addition, calls were chosen for manual vetting from each species/genus grouping for quality assurance of data.

Targeted survey for the threatened microbat species included the use of three ultrasonic detectors over six nights (10 – 16 November 2021). The total survey effort of 18 nights meets the survey requirements specified in '*Species credit' threatened bats and their habitats* (OEH 2018). The detectors were set to record 30 minutes

before sunset and stop 30 minutes after dawn. Units were placed in a position that maximised the likelihood of recording bats in accordance with the guidelines (along waterways and in flyways).

Microbat surveys were undertaken by the Biosis ecologists and experienced bat expert as outlined in Table 17.

Table 17 Targeted microbat survey personnel and relevant experience

Staff member	Role	Relevant experience
Sarah Allison	Project Zoologist	Over 5 years' experience surveying and identifying microchiropteran bats. Two years' experience identification of bat calls.
Zoe Goold	Project Zoologist	One year experience surveying microchiropteran bats.

Sandstone outcrops containing potential caves, overhangs and crevices occur within 2 kilometres of the subject land. Call sequences containing characteristics consistent with those of the Large Bent-winged Bat were recorded during targeted survey and as such this species has been recorded as present within the subject land. Calls sequences displaying characteristic features consistent with those known for Eastern Cave Bat *Vespadelus troughtoni* were recorded by detectors during survey. As the calls of this species occur within a similar frequency range and contain characteristics consistent with other Vespadelus species which may also occur in the region, this species could not be identified with confidence based on call analysis alone. No suitable breeding habitat was identified for the Large Bent-winged Bat or Eastern Cave Bat within the development footprint or within 100 metres of the subject land. As such, in accordance with the guideline for species credit threatened bats (OEH 2018) no habitat important to breeding occurs within the subject land, species polygons have not been developed and further survey or assessment is not required for these species.

Potential calls with characteristics attributed to Little Pied Bat *Chalinolobus picatus* listed vulnerable under the BC Act, were recorded with low to moderate confidence. The low confidence assigned was due to the short sequence and interference of other bat calls in the recording. In addition, the species distribution is generally further west of the subject land. For confidence in this identification further assessment and analysis would be recommended, however, as there is no breeding habitat present within 100 metres the subject land for this species, it is not considered to be impacted and no further assessment is required for the Project.

Calls with characteristics attributed to a total of ten microchiropteran bat species and one species complex (*Vespadelus species*) were detected within and near the subject land. Species recorded include one species credit species listed vulnerable under the BC Act, Large Bent-winged Bat, and one ecosystem credit species listed vulnerable under the BC Act, *Saccolaimus flaviventris*. An additional potential four species were recorded, however, due to similarities in call characteristics including similar shapes and overlapping frequency these species have been grouped as *Vespadelus* species complex. The species included are Little Forest Bat *Vespadelus vulturnus,* Southern Forest Bat *Vespadelus regulus,* Large Forest Bat *Vespadelus darlingtoni* and Eastern Cave Bat *Vespadelus troughtoni*. Eastern Cave Bat is listed Vulnerable under the BC Act.

The Large Bent-winged Bat and Eastern Cave Bat are species credit species for breeding habitat only, suitable potential habitat for this species occurs in the locality (within 2 kilometres of the subject land) in the form of caves and overhangs associated with rocky escarpments and disused mines. No suitable breeding habitat occurs within 100 metres of the subject land and therefore, in accordance with species credit bat guidelines (OEH 2018), a species polygon has not been developed for this species. The habitat for the remainder of the

threatened microbat species are treated as ecosystem credits under the BAM and impacts to these species are assessed in conjunction with the impacts to PCTs. No further assessment of these species is required.

Table 18 provides a summary of the results of the microbat surveys completed.

Table 18 Summary of microbat survey method and results

Species name	Common name	Survey method	Survey results	Species Polygon (ha) or count
Chalinolobus dwyeri	Large-eared Pied Bat	• Ultrasonic recording • 10 – 15 November 2021	Not detected during survey	Not required, no suitable breeding habitat occurs within 100 m of the subject land.
Miniopterus orianae oceanensis	Large Bent-winged Bat	• Ultrasonic recording • 10 – 15 November 2021	Species recorded	Not required, no suitable breeding habitat occurs within 100 m of the subject land.

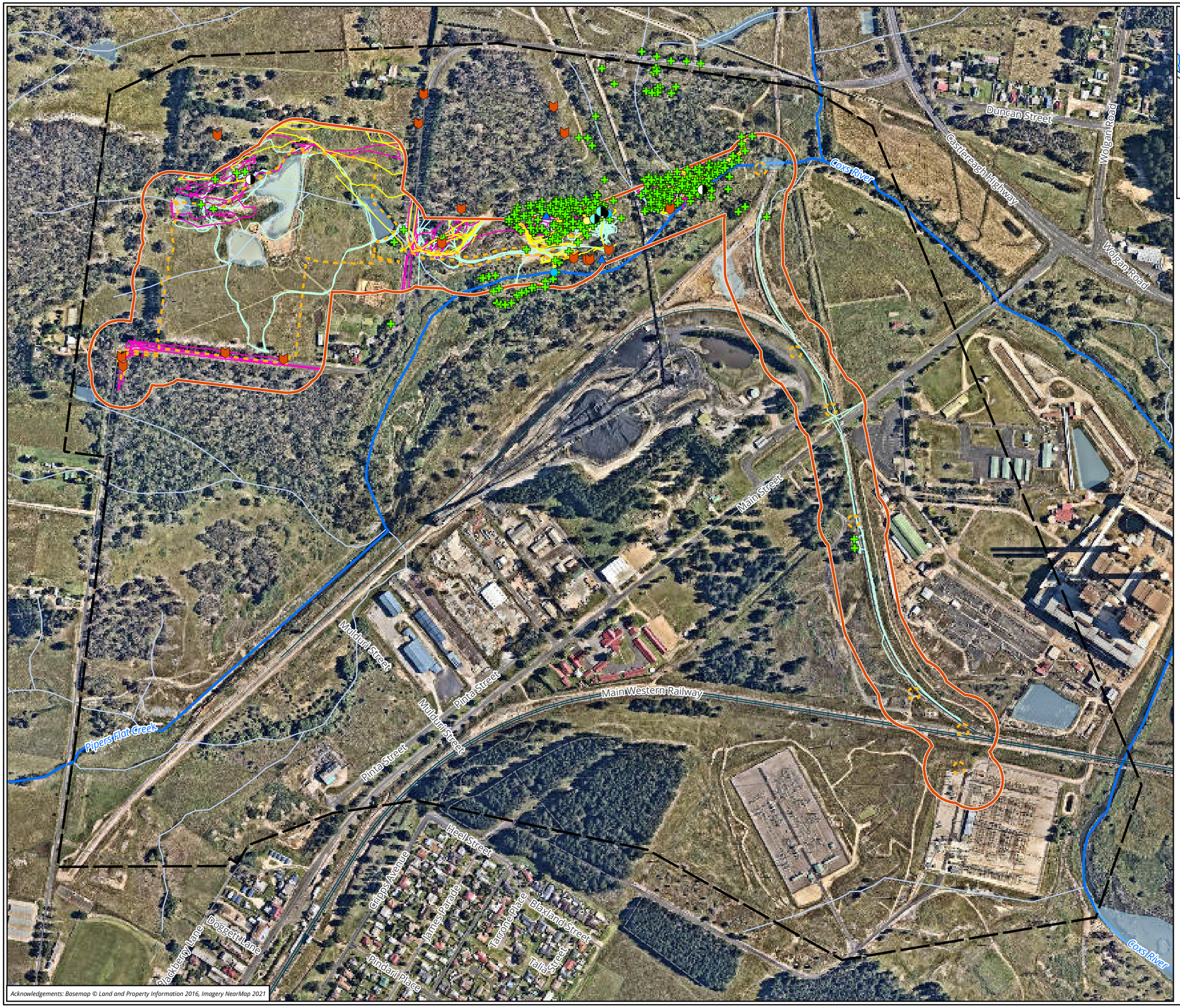
Invertebrates

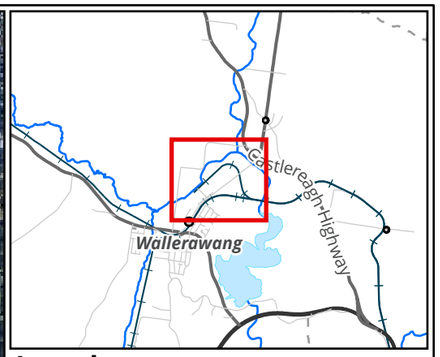
One invertebrate, Purple Copper Butterfly *Paralucia spinifera*, was identified as a candidate species for the subject land. Targeted survey could not be conducted for the species within the allowable surveyable period, and thus targeted survey was not performed. However, habitat mapping was carried out in March 2021 for the species, including mapping all areas containing Blackthorn *Bursaria spinosa* subsp. *lasiophylla* identified within the development footprint. The extents of the Blackthorn were then buffered by 40 metres. The species was assumed to be present within all suitable habitat identified and mapped. As such, a species polygon has been prepared for the Purple Copper Butterfly and discussed further in Section 4.4.

4.3 Incidental flora and fauna surveys

Fauna surveys undertaken on an ongoing basis throughout the field campaign included incidental diurnal bird surveys, active searches of woody debris and leaf litter, incidental aural observations of frog species and incidental observations of various mammal species. The following threatened species were recorded during incidental fauna surveys:

- Dusky Woodswallow *Artamus cyanopterus*
- Little Eagle *Hieraaetus morphnoides*





Legend

- Subject land
- Development site
- Development footprint
- Anabat
- Call playback
- Hollow-bearing tree

Threatened flora records

- Black Gum - *Eucalyptus aggregata* (BioNet record)
- Black Gum - *Eucalyptus aggregata* (Biosis record)

Threatened fauna records (Biosis)

- Dusky Woodswallow, *Artamus cyanopterus cyanopterus*
- Little Eagle, *Hieraaetus morphnoides*

Targeted surveys

- Initial habitat and vegetation survey
- Night targeted fauna survey
- Targeted flora survey

Figure 8 Targeted species mapping

0 50 100 150 200 250

Metres

Scale: 1:6,000 @ A3

Coordinate System:
GDA 1994 MGA Zone 56

N

biosis

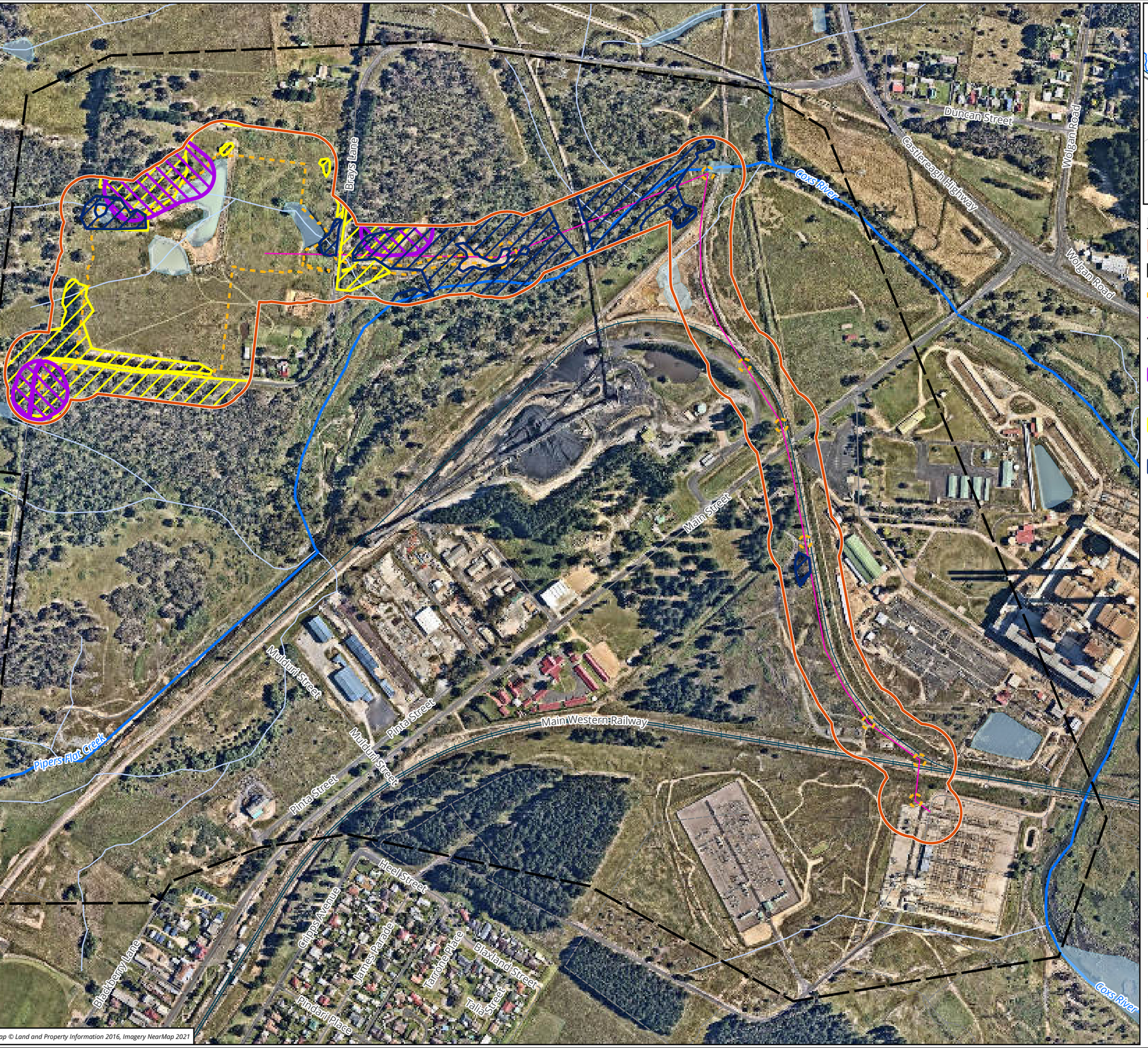
Matter: 34343, Date: 15 September 2022
Drawn by: AM, Checked by: PP, Last edited by: amackegard
Location: P:\34300s\34343\Mapping\34343_BDAR2020.aprx
Layout: 34343_F8_TargetedSurveys

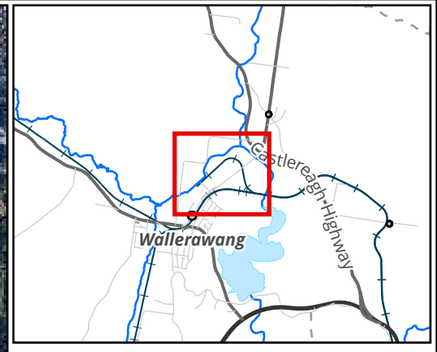
4.4 Threatened species summary and polygons

Table 19 provides details of threatened species and their habitat impacted by the Project and outlines the attributes that comprise the threatened species polygons. The presence of threatened species and their habitat impacted by the Project is illustrated on Figure 9.

Table 19 Threatened species polygons within the development footprint and impact assessment area

Threatened species	Impact (ha / No. indiv.)	Unit of measure	Biodiversity risk weighting	Polygon attributes
Flora				
Eucalyptus aggregata	2	Count	2	2 Individuals
Fauna				
Eastern Pygmy-possum ***Cercartetus nanus***	0.78	Area	2	0.78
Koala ***Phascolarctos cinereus***	0.83	Area	2	0.83
Squirrel Glider ***Petaurus norfolcensis***	0.73	Area	2	0.78
Invertebrates				
Purple Copper Butterfly ***Paralucia spinifera***	0.43	Area	2	0.43





Legend

- Subject land
- Development site
- Development footprint
- HDD and trenching

Threatened species polygons

- Purple Copper Butterfly habitat (including 40 m buffer)
- Squirrel Glider, Greater Glider, Eastern Pygmy-possum, and Koala habitat
- Black Gum habitat

Figure 9 Threatened species polygons

0 50 100 150 200 250

Metres

Scale: 1:6,000 @ A3

Coordinate System:
GDA 1994 MGA Zone 56

N

biosis

Matter: 34343, Date: 15 September 2022
GIS: AM, Checked by: PP, Last edited by: amackegard
Location: P:\34300s\34343\Mapping\34343_BDAR2020_part2.aprx
Layout: 34343_F9_ThrSpPolygon

Stage 2 – Impact assessment (biodiversity values)

5 Avoid and minimise impacts

This section demonstrates the efforts to avoid and minimise impacts on biodiversity values (including prescribed impacts) associated with the proposal location in accordance with BAM, including an analysis of alternatives:

- Modes or technologies that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed mode or technology.
- Routes that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed route.
- Alternative locations that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed location.
- Alternative sites within a property on which the proposal is located that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed site.
- Describe efforts to avoid and minimise impacts (including prescribed impacts) to biodiversity values through proposal design.
- Identification of any other site constraints that the proponent has considered in determining the location and design of the proposal.

5.1 Actions to avoid/minimise project impacts

The principal means to reduce impacts on biodiversity values within the development footprint and subject land is to avoid and/or minimise the removal of native vegetation and fauna habitat. Additional recommendations include measures to mitigate residual impacts after all measures to avoid and minimise impacts have been considered.

Site selection and planning

The development footprint has been selected, in part, to minimise impacts to native vegetation and flora and fauna habitats present within the broader subject land. Key design elements were altered in the early design phase to reduce direct impacts to native vegetation and focus impacts within the part of the subject land containing non-native vegetation and more heavily disturbed native vegetation.

The BESS footprint is located such that direct impacts to better condition native vegetation (e.g. in the north-west corner of the site) are avoided and the east /west fauna and riparian corridors are maintained.

The proposed eastern transmission line was selected in the final design as direct impacts to vegetation were originally considered to be less than within the proposed southern transmission line. In addition, the final design proposes to install the transmission line connection underground using trenching in less sensitive areas (predominantly the rail corridor) and underboring at environmentally sensitive locations (including watercourses GDEs and threatened species habitat). Thus, underboring native vegetation across the eastern transmission line will be an indirect impact, and all direct impacts to native vegetation will be avoided along the proposed transmission line corridor.

Figure 10 shows the proposed development footprint, while Figure 11 shows the alternative footprint including the southern transmission line that was initially considered.

Construction

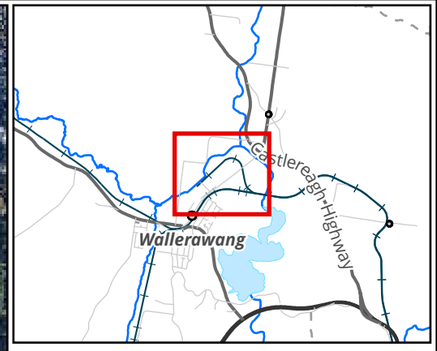
Direct and indirect impacts to biodiversity values retained within the subject land (e.g. winter flowering mature eucalypts and other canopy trees) and adjoining the subject land may occur if adequate mitigation and management measures are not in place during construction of the Project.

The following mitigation and management measures are to be implemented in order to mitigate and manage potential direct and indirect impacts during construction:

- Prior to construction, a Construction Environmental Management Plan (CEMP) is to be developed which includes standard measures, including:
  - Installation of appropriate exclusion fencing to the boundary of the retained vegetation and retained native trees in construction areas where there is some potential for accidental encroachment. This will include appropriate signage such as 'No Go Zone' or 'Environmental Protection Area'. Identification of any 'No Go Zones' in site inductions for all construction personnel.
  - All site perimeter fencing is to be of a design that excludes terrestrial fauna, so as to minimise the risk of Koala ingress to the construction site.
  - All material stockpiles, vehicle parking and machinery storage should be located within the areas proposed for clearing, and not in areas of native vegetation that are to be retained.
  - Sedimentation and erosion control measures including silt fencing, sediment traps, etc. to prevent sediment-laden stormwater exiting the construction areas and to prevent scouring and erosion of land beyond the development footprint. All erosion and sediment control measures are to be constructed and installed in accordance with relevant guidelines, are to be regularly maintained for the duration of the construction period and are to be carefully removed at completion of works.
  - Sediment and erosion control measures should follow recommendations of *The Blue Book – Managing Urban Stormwater: Soils and Construction* (Landcom 2004)
  - Dust suppression measures to ensure dust deposition beyond the construction area is minimised.
  - Weed and pathogen management including weed hygiene protocols for personnel, machinery and construction materials entering and exiting construction areas to minimise risk of weed and pathogen introduction and spread.
  - Waste management is to ensure food scraps and other organic waste that may attract introduced predators (e.g. fox, cats) or other pests (e.g. rats) is not stored for prolonged periods within the construction site.
- As far as practicable, all construction activities are to be undertaken during daylight hours to minimise noise impacts on fauna utilising adjacent habitats.
- Selection and retention of suitable logs (>10 cm diameter only) and hollows for placement within retained native vegetation adjoining the subject land.
- Where appropriate native vegetation cleared from the subject land should be mulched for re-use on the site to stabilise bare ground.
- Security lighting within the construction site is to be minimised and where required, is to be oriented such that light spill beyond the subject land and in to patches of retained vegetation is minimised.

Operation

- Stormwater generated and discharged from the site is not to be substantially different in volume relative to the pre-development regime to protect downstream communities from erosion impacts.
- All perimeter fencing and is to be of a 'fauna-friendly' design i.e. barbed wire free, which minimises potential impacts to flying and gliding arboreal mammals (e.g. sugar gliders) which may utilise retained trees within the subject land.



Legend

- Subject land
- Development site
- Development footprint
- Hollow-bearing tree
- Construction footprint
- HDD and trenching
- Pit

Fauna sightings (Biosis record)

- Dusky Woodswallow, *Artamus cyanopterus cyanopterus*
- Little Eagle, *Hieraaetus morphnoides*
- Squirrel Glider, *Petaurus norfolcensis*

Flora sightings (Biosis record)

- Black Gum - *Eucalyptus aggregata* (Biosis record)

Vegetation Zones

- 677-Low
- 677-Moderate
- 732-Low
- 732-Moderate
- 732-NOG
- 732-Scattered Trees

Figure 10 Final development footprint

0 50 100 150 200 250

Metres

Scale: 1:6,000 @ A3

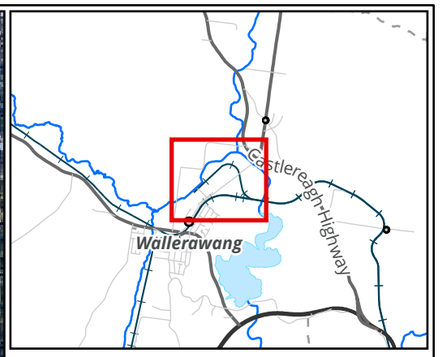
Coordinate System: GDA 1994 MGA Zone 56

N

biosis

Matter: 34343, Date: 15 September 2022,
GIS: AM, Checked by: PP, Last edited by: amackegard
Location: P:\34300s\34343\Mapping\34343_BDAR2020_part2.aprx
Layout: 34343_F10_DevFootprint

Acknowledgements: Basemap © Land and Property Information 2016, Imagery NearMap 2021



Legend

- Subject land
- Development site
- Development footprint
- HDD and trenching
- Hollow-bearing tree

Alternative development footprints

- Alternative 1
- Alternative 2

Fauna sightings (Biosis record)

- Dusky Woodswallow, *Artamus cyanopterus cyanopterus*
- Little Eagle, *Hieraaetus morphnoides*
- Squirrel Glider, *Petaurus norfolcensis*

Flora sightings (Biosis record)

- Black Gum - *Eucalyptus aggregata*

Vegetation Zones

- 677-Low
- 677-Moderate
- 732-Low
- 732-Moderate
- 732-NOG
- 732-Scattered Trees

Figure 11 Alternate options and avoidance

0 50 100 150 200 250

Metres

Scale: 1:6,000 @ A3

Coordinate System:
GDA 1994 MGA Zone 56

N

biosis

Matter: 34343, Date: 15 September 2022
GIS: AM, Checked by: PP, Last edited by: amackegard
Location: P:\34300s\34343\Mapping\34343_BDAR2020.aprx
Layout: 34343_F11_AlternateOptions

Acknowledgements: Basemap © Land and Property Information 2016, Imagery NearMap 2021

6 Impacts that are unable to be avoided

Assessment of direct and indirect impacts unable to be avoided has been undertaken in accordance with the BAM (DPIE 2020b). The following direct and indirect impacts are unable to be avoided in progressing the Project.

6.1 Direct impacts

Direct impacts include vegetation clearing calculated from the development footprint. Direct impacts arising from the Project include:

- 0.27 ha of PCT 677.
- 0.78 ha of PCT 732.
- 0.27 ha of Black Gum habitat and 2 individuals.
- 0.83 ha of Koala habitat.
- 0.78 ha of Squirrel Glider habitat
- 0.78 ha of Eastern Pygmy-possum habitat.
- 0.43 ha of Purple Copper Butterfly habitat.

These impacts will be permanent and will occur from the outset of the development. Mitigation measures outlined in Section 5.1 above will help to minimise the potential impacts to biodiversity values that remain present within the subject land.

Assessment of the above impacts is provided in Table 20.

Table 20 Summary of direct impacts to vegetation

Potential direct impact	Location / description of impact	Significance of impact
Removal of native vegetation and flora and fauna habitats	Removal of 1.05 ha of native vegetation from two PCTs throughout the development footprint, supporting habitat for a range of threatened and non-threatened flora and fauna species.	The majority of the vegetation and habitats impacted by the Project has undergone historical modification through clearing and other detrimental landuse practices, and all native vegetation identified within the development footprint is in low or moderate condition. Whilst the removal native vegetation and threatened species' habitats by the Project could be considered an impact, when considered in the context of the size of the Project Area, and the general landscape through which the development traverses, the impact of native vegetation removal are not considered to be significant. Substantial efforts have been made through the Project to reduce and minimise impact to native vegetation habitats, and this process has resulted in the residual impacts being largely comprised of degraded, fragmented, and edge effected ecological values.

Potential direct impact	Location / description of impact	Significance of impact
Removal of known mapped habitat for threatened flora species and individual plants	The Project will result in the removal of the following threatened flora individuals / habitat: • Black Gum – two individuals, 0.31 ha of known habitat.	As with impacts to native vegetation, impacts to threatened flora species and habitats are not considered significant when assessed in the context of the scale of the Project. Direct impacts to a total of two individual plants, and 0.31ha of known mapped habitat, are considered to be an acceptable outcome for a Project with impacts spanning such a large area. Again, it should be noted that significant efforts have been undertaken to minimise and avoid impacts to threatened flora over the course of the Project and underboring along the transmission line will avoid the majority of Black Gum habitat identified within the subject land.
Removal of known habitat for threatened fauna species	The Project will result in the removal of the following threatened flora individuals / habitat: • 0.78 ha of Squirrel Glider, Greater Glider and Eastern Pygmy Possum habitat. • 0.83 of Koala habitat. • 0.43 ha of Purple Copper Butterfly habitat.	As with impacts to native vegetation, overall direct impacts to threatened fauna habitats are not considered significant when assessed in the context of the scale of the Project. Targeted surveys and habitat assessments have concluded that the majority of the development footprint supports only marginal quality habitat for threatened fauna species, having undergone degradation through historical landuse. Removal of higher quality habitat in the north-west corner has been avoided. In addition, the underboring of the eastern transmission line will avoid all direct impacts to native vegetation in this area. Impacts to potential microbat habitat at the site have been assumed based on the presence of potential habitat within the subject land and the lack of targeted survey using ultrasonic call data. Whilst a mapped 0.43 ha of Purple Copper Butterfly habitat will be impacted as a part of the Project, all recorded locations of Blackthorn are outside of the development footprint and the impacts are not considered significant.

6.1.1 Loss of hollow-bearing trees

Three hollow-bearing trees were identified within the proposed development footprint i.e. within the transmission line easement and along Brays Lane (proposed vegetation trimming for oversized vehicle access). These trees have the potential to provide roosting habitat for Large-eared Pied Bat and Large Bent-winged Bat. Given the Project involves the installation of an underground transmission line in this portion of the development footprint, the hollow-bearing trees will not be removed. However, the indirect impacts from underboring native vegetation may occur here.

The two hollow-bearing trees located on Brays Lane potentially will be removed during the site construction phase of the Project through branch and vegetation trimming to make allowances for heavy-rigid plant and machinery accessing the site. The recorded hollows were considered low quality and provided limited roosting opportunities to microbat species.

6.2 Indirect impacts

Potential indirect impacts arising from the Project are outlined and addressed in Table 21. Indirect impacts have been assessed based on a number of factors, including:

- The presence of native vegetation and habitats directly adjacent to the development footprint, i.e. within the subject land, and the potential for those retained patches of vegetation and habitat to be negatively affected by the Project.
- The presence of biodiversity values on and adjacent to watercourses and the potential for impacts relating to changes to local hydrology.
- Landscape scale impacts to species habitat connectivity.
- The potential for the incidental impacts to the secondary root systems of Black Gum.

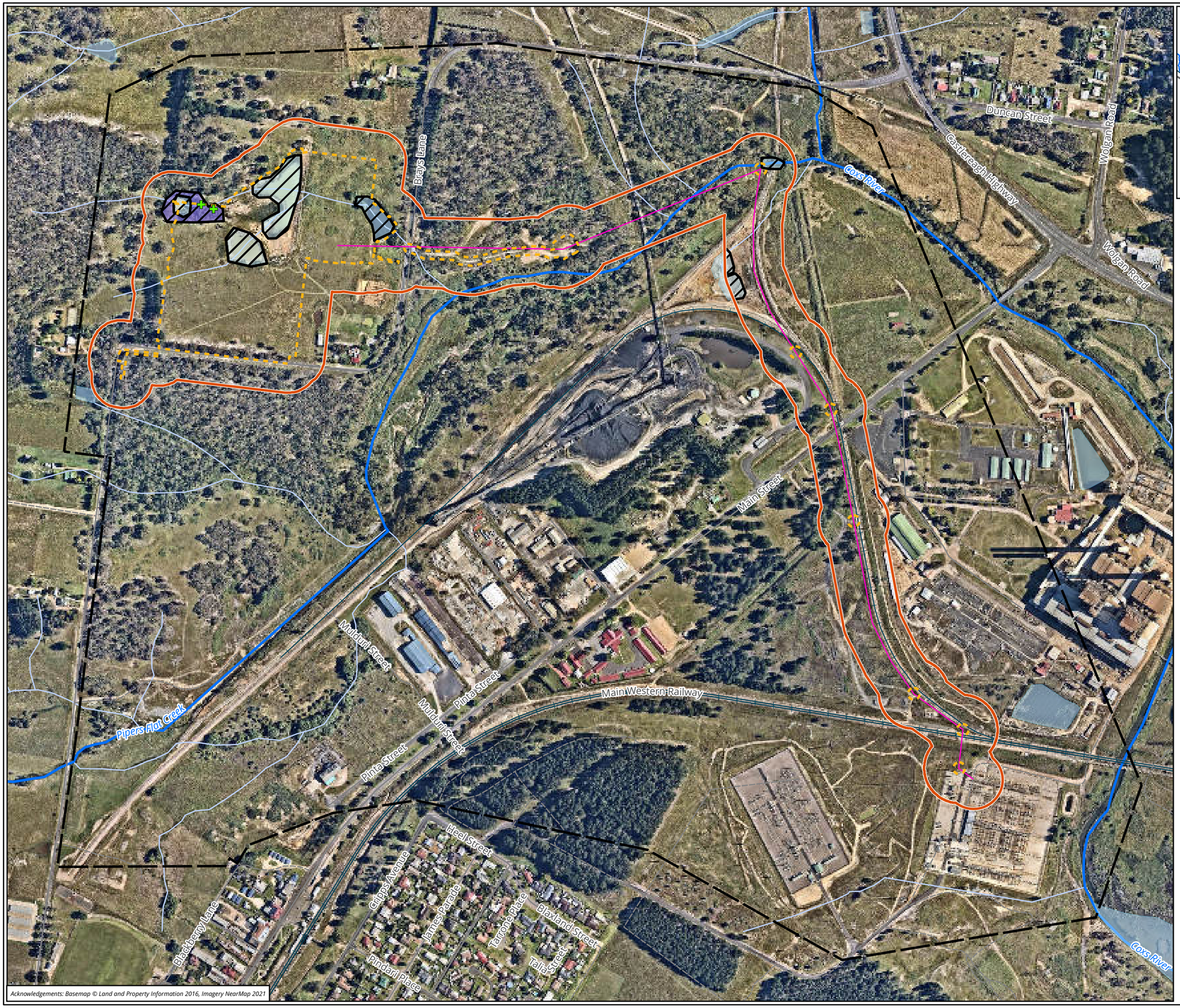
Table 21 Avoidance and minimisation of impact

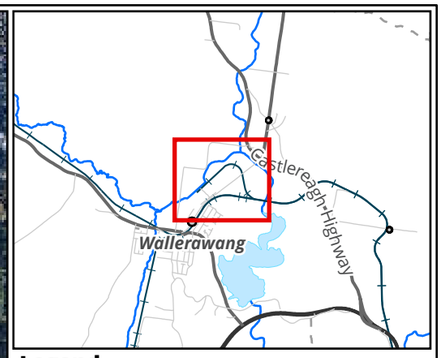
Indirect impact	Assessment / likelihood of occurrence
Inadvertent impacts on adjacent habitat or vegetation	Impacts to the vegetation associated with the transmission line are being prevented through the utilisation of an underboring method known as horizontal directional drilling (HDD). HDD would be used where required to avoid areas of sensitivity, including Aboriginal heritage, biodiversity, Pipers Flat Creek, and rail crossings. The remainder would be constructed using an open trenching methodology which will occur in areas of low conservation value. The vast majority of the new transmission line would be installed underground except where the line enters and connects to the Transgrid Wallerawang 330kV substation. Additional inadvertent impacts may potentially occur to adjacent vegetation during construction and operational phase can be prevented or minimised through appropriate exclusion fencing, implementation of a CEMP detailing environmental protection measures, strict water quality practices and stormwater controls, and by ensuring lighting is directed towards the developed area, rather than towards the surrounding remnant vegetation.
Reduced viability of adjacent habitat due to edge effects	Adjacent habitats are currently subject to a high degree of edge effects due to prior clearing and surrounding existing residential and agricultural land use. Since a small and localised patch of vegetation (0.93 ha) is to be directly impacted by the Project, an increase to edge effects is not expected to occur to the remnant vegetation surrounding the subject land, as a result of the proposed development. In addition, a large proportion of native vegetation within the subject land will be underbored, thus edge effects are not expected to be exacerbated as a result.
Reduced viability of adjacent habitat due to noise, dust or light spill	It is predicted that the adjacent habitat will be impacted in a small way by noise, dust and light spill, during construction and operation of the future development of the subject land. However, this will be managed via measures outlined in a CEMP. The development is expected to be periodically serviced by medium and light vehicular traffic. Currently, the majority of the site is zoned as RU1 - Rural. The Project may therefore result in a minor change to the functioning of the development site and the amount or type of vehicular traffic, noise

Indirect impact	Assessment / likelihood of occurrence
	and light pollution. Indirect impacts from lighting may affect foraging of threatened microbats, but impacts are not considered significant as it is highly unlikely that species abundance will be diminished.
Transport of weeds and pathogens from the site to adjacent vegetation	Weeds occurring within the subject land are common with those occurring within adjacent vegetation to be retained. Increased transport of pathogens and weeds is unlikely to occur but will be managed by biosecurity measures outlined in the CEMP.
Increased risk of starvation, exposure and loss of shade or shelter	The habitat present in the subject land considered marginal for most fauna species given the disturbed condition, however is potential habitat for Purple Copper Butterfly, Koala, Squirrel Glider, Greater Glider, Eastern Pygmy-possum and several threatened microbat species. The proposed future development will not result in an increased risk of starvation, exposure and loss of shade or shelter to native species due to the small total area of vegetation being removed, and it very small proportion of commensurate habitats available in the immediate vicinity.
Loss of breeding habitats	No specialist breeding habitat will be impacted by the proposed future development. Retained vegetation in adjacent lots and along riparian corridors within the local area provides higher quality habitat and will not be reduced by the proposed works.
Trampling/damage of threatened flora species	A population of the threatened flora species, Black Gum, was identified within both the site proposed for the BESS and along the transmission line corridor. Under the current proposal, it is anticipated that only two will be impacted as a part of the Project whilst the transmission line will be installed underground using underboring at environmentally sensitive locations. The Project will avoid direct impacts to the main Black Gum population and will minimise foot traffic where the threatened flora species is present. Thus, trampling of threatened flora species is unlikely. The HDD drilling alignment will be drilled to a variable depth that is cognisant of the Black Gum root systems. Prior to drilling activities, Black Gum within the HDD drilling corridor will be identified and assessed for root maturity. Following this preliminary assessment, the drilling depth will be augmented to minimise the potential impact to the relevant Black Gums, this may constitute a depth of down to 2 – 3 metres below natural ground level. Thus, impacting of the threatened flora species is unlikely
Inhibition of nitrogen fixation and increased soil salinity	The NSW DPIE Hydrogeological Landscape and Salinity Hazard Maps did not identify any areas of inland soil salinity risk. Any future excavations or soil disturbance resulting from the Project would be largely restricted to areas having undergone significant previous disturbance through cattle grazing and vehicular traffic. As such it is not considered likely that the future development of the subject land would result in substantial changes to the level of nitrogen fixation or soil salinity in the locality.
Fertiliser drift	The site has a long history of grazing over its total extent. Exotic species dominance within cleared areas indicates a pattern of pasture

Indirect impact	Assessment / likelihood of occurrence
	improvement. The proposal will cease these activities and not contribute to fertiliser drift into surrounding areas with future practices. No fertiliser is proposed to be used.
Rubbish dumping	Standard environmental controls for the development would ensure potential impacts are minimised. Works would follow an approved Waste Management Plan.
Wood collection	Future development proposed within the subject land is unlikely to increase access to any retained vegetation, beyond current access capacity. Based on the future industrial use of the subject land, future landholders are not expected to be likely to undertake wood collection within the retained vegetation to a level that it will have a detrimental effect. Unauthorised access and collection of wood is expected to be minimal.
Removal and disturbance of rocks, including bush rock	The subject land does not support bush rock.
Increase in predators	The subject land is already largely cleared and heavily fragmented. The vegetation clearance proposed from within the development footprint is unlikely to increase predatory species populations.
Increase in pest animal populations	The proposal occurs in a rural and semi-industrial area with impacts including introduced domestic pets such as cats *Felis catus* currently occurring within the locality. Pest animals such as Rats *Rattus rattus* and European Rabbit *Oryctolagus cuniculus* are also widely spread within the region and are likely to occur across the locality. The proposal will not result in an increase in available habitat for these species and is unlikely to lead to an increase in pest animal populations. Suitable waste disposal implemented during and post construction will further reduce the resources available for pest species.
Changed fire regimes	The subject land is largely cleared of vegetation. Appropriate APZs and fire mitigation systems will be implemented for the future development and the proposal will not result in an increased risk of fire.
Disturbance to specialist breeding and foraging habitat, e.g. Beach nesting for shorebirds	No specialist breeding and foraging habitat will be indirectly impacted by the proposed work. Direct impacts to breeding and foraging habitat for Koala and Squirrel Glider will be offset. The proposal is unlikely to constitute significant disturbance, to adjacent habitats as underboring will avoid the majority of vegetation clearing and once the works are completed minimal disturbance will be generated to adjacent areas (occasional maintenance if required).
Fragmentation of movement corridors	Movement corridors are currently restricted in width and availability through the locality. The occurrences of habitat connectivity occurs predominantly in east – west bands along drainage lines or roads. The development footprint crosses a number of features that provide opportunities for movement of biodiversity values across the landscape. However, most of these features will not be directly impacted by the Project (with underboring across the proposed eastern transmission line). The

Indirect impact	Assessment / likelihood of occurrence
	Project will result in the removal of 1.05 ha of native vegetation that fringes the subject land to the north and west. Remnant vegetation along Pipers Flat Creek and within the proposed eastern transmission line will remain intact and not be fragmented.





Legend

- Subject land
- Development site
- Development footprint
- HDD and trenching
- Prescribed impacts
- Black Gum - *Eucalyptus aggregata* (Biosis record)

Plant Community Type

- 677 - Black Gum grassy woodland of damp flats and drainage lines of the eastern Southern Tablelands, South Eastern Highlands Bioregion

Figure 12 Prescribed impacts

0 50 100 150 200 250

Metres

Scale: 1:6,000 @ A3

Coordinate System: GDA 1994 MGA Zone 56

N

biosis

Matter: 34343, Date: 15 September 2022
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Location: P:\34300s\34343\Mapping\34343_BDAR2020.aprx
Layout: 34343_F12_PrescribedImpacts

6.3 Prescribed impacts

Assessment of prescribed biodiversity impacts are outlined and addressed in Table 22 below and shown in Figure 12.

Table 22 Assessment of prescribed impacts

Prescribed impact	Assessment / likelihood of occurrence
Karst, caves, crevices, cliffs, rocks and other geological features of significance	No areas of geological significance occur within the subject land. The development will not impact on threatened species or ecological communities associated with karst, caves, crevices or cliffs.
Occurrences of human-made structures and non-native vegetation	Several human-made structures will be impacted by the development, however no threatened species or communities associated with human-made structures will be impacted by the development. Non-native vegetation has been mapped across the development footprint, however never in sufficient quantities, or suitable locations to provide valuable habitat to threatened species.
Corridors or other areas of connectivity linking habitat for threatened entities	As the subject land is already largely cleared, the removal of 1.05 ha of native vegetation is expected to have a limited impact on the connectivity of threatened species habitat, such as the Black Gum, Purple Copper Butterfly, Large Bent-winged Bat, Eastern Cave Bat, Dusky Woodswallow, Little Eagle, Koala, Eastern Pygmy-possum, Greater Glider and Squirrel Glider. Further, a large portion of the development footprint will be subject to underboring and thus the vegetation identified within this area will not be directly removed. The occurrences of habitat connectivity occurs predominantly in east – west bands along drainage lines or roads, and remnant vegetation along Pipers Flat Creek. Vegetation within the proposed eastern transmission line will remain intact and will not be fragmented. All flora and fauna species and ecological communities recorded as present within the subject land rely on habitat connectivity to some degree for persistence. Habitat connectivity is more important for species with reproductive strategies that require movement of individuals or reproductive material through the landscape.
Water bodies or any hydrological processes that sustain threatened entities	The proposed works are not expected to further impact hydrological process within the subject land. Several small dams and ephemeral drainage lines occur within the subject land. The dams appear to be of low foraging quality for fauna as they are highly modified due to the construction, and are heavily degraded due to previous agricultural use of the landscape. Removal of the dams within the development footprint are not considered likely to have a significant or substantial impact on threatened species. The dams within the development footprint will be decommissioned and backfilled as part of the Project and Biosis recommend that a dam dewatering is implemented, whereby all rescued fauna are relocated to adjacent dams and/or waterways. Pipers Flat Creek flows through the development footprint, however, underboring is proposed to be used to install the transmission line under

Prescribed impact	Assessment / likelihood of occurrence
	sensitive areas such as Pipers Flat Creek.
Protected animals that may use the proposed wind farm development site as a flyway or migration route	There are no wind turbines involved in this project.
Where the proposed development may result in vehicle strike on threatened fauna or on animals that are part of a threatened ecological community	The Project may result in increased vehicle traffic during the construction and, to a lesser extent, during the operational phase of the Project. This increased vehicle traffic has the potential to impact upon native fauna species that are active during the day, and generally with a higher potential for impact in areas where refuge/forage habitat exists immediately adjacent to areas where vehicle movements will occur. However, the majority of the development occurs in locations that are generally already cleared of native vegetation.

6.4 Impacts considered uncertain

There are no impacts considered uncertain for the current assessment.

6.5 Impacts to Groundwater Dependent Ecosystems (GDE)

Assessment of the potential for the subject land to support GDEs was undertaken using the Australian Government's Bureau of Meteorology Groundwater Dependant Ecosystems Atlas (BOM 2019). The subject land is mapped on the GDE Atlas as containing both Aquatic and Terrestrial GDEs (BOM 2021).

GDEs are defined as ecosystems that require access to groundwater to meet all or some of their water requirements in order to maintain their ecological components and processes. The dependence of GDEs on groundwater varies from seasonal or episodic, to continual. They can range in size from a few square metres to many square kilometres (DPIE 2021).

Impacts to GDEs will occur as a result of the Project through direct removal of vegetation comprising the surface expression of the GDE, and through indirect impact associated with impacts on groundwater through vectors such as drawdown and aquifer interference.

The potential for groundwater dependence has been mapped by the Australian Bureau of Meteorology (BOM) and included in the GDE Atlas. This data has been used to assess the potential for GDEs to be present within and surrounding the impact area, and to determine the PCTs to which these GDEs equate, which are likely to be subject to potential impacts. Two plant communities that are known to be GDEs are mapped as occurring within the development footprint. These include:

- PCT 677 - *Black Gum grassy woodland of damp flats and drainage lines of the eastern Southern Tablelands, South Eastern Highlands Bioregion*. This vegetation community occurs in a small pocket at the north-west of the development footprint and within the vegetated area east of Brays Lane.
- PCT 732 - *Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion*. This vegetation community occurs in small pockets at the north-west.

The groundwater is considered to be approximately 10 metres below ground level (bgl) where drawdown and aquifer interference are unlikely to be issues. As such it is not expected that the Project will not result in significant groundwater dewatering.

6.6 Aquatic habitat impacts relating Fisheries Management Act matters

There are no aquatic habitat impacts relating to the *Fisheries Management Act 1994*.

6.7 Impacts to Matters of National Environmental Significance (MNES)

An assessment of the impacts of the Project on Matters of National Environmental Significance (MNES), against heads of consideration outlined in Commonwealth of Australia (2013) was prepared to determine whether referral of the Project to the Commonwealth Minister for the Environment is required. MNES relevant to the Project are summarised in Table 23.

Table 23 Assessment of the proposed development against the EPBC Act

Matter of NES	Project specifics	Potential for significant impact
Threatened species	The following threatened species listed under the EPBC Act are predicted/known to occur within the subject land: • Black Gum (known) • Koala (predicted) • Purple Copper Butterfly (predicted) • Greater Glider (predicted)	Two Black Gum specimens will be removed for the Project, based on the significant population of Black Gum within the broader subject area, it has been deemed that there is no potential for significant impact. As a result of the Project's design to avoid higher quality vegetation within the subject land it has been deemed that there is no potential for significant impact to Koala, Greater Glider Purple or Copper Butterfly populations.
Threatened ecological communities	There are no TECs recorded within the subject land.	No potential for impact.
Migratory species	Migratory species are unlikely to occur within the subject land given in location in the landscape.	No direct impact is expected to any migratory listed species.
National Heritage Places	There are no National Heritage Places within the subject land.	No potential for impact.
Wetlands of international importance (Ramsar sites)	The closest Important Wetland to the subject land is Towra Point Nature Reserve, which is situated approximately 120 km south-east of the subject land.	No potential for impact.

7 Mitigation and management of impacts

Identification of measures to mitigate or manage impacts has been undertaken in accordance with the BAM (DPIE 2020a), including considerations such as:

- Techniques, timing, frequency and responsibility.
- Identification of measures for which there is risk of failure.
- Evaluation of the risk and consequence of any residual impacts.
- Documentation of any adaptive management strategy proposed.

Identification of measures for mitigating impacts related to:

- Displacement of resident fauna.
- Indirect impacts on native vegetation and habitat.
- Mitigating prescribed biodiversity impacts.
- Details of the adaptive management strategy proposed to monitor and respond to impacts on biodiversity values that are uncertain.

Table 24 Measures to mitigate and manage impacts

Measures to mitigate and manage impacts	Action	Outcome	Timing	Responsibility
Displacement of resident fauna	All vegetation is to be inspected immediately prior to removal, by a qualified ecologist, to confirm absence of resident fauna.	No direct impact to resident fauna during vegetation removal.	Immediately prior to vegetation removal.	Qualified ecologist and construction contractor.
Indirect impacts on native vegetation and habitat	Install appropriate stormwater and erosion controls on site (in accordance with a CEMP) to avoid impacts to nearby waterways via stormwater collection systems	No further degradation to retained vegetation and habitats.	Ongoing/throughout earthworks.	Construction contractor.
	The HDD drilling alignment will be drilled to a variable depth that is cognisant of the Black Gum root systems. Prior to drilling activities, the Black Gum within the HDD drilling corridor will be identified and assessed for root maturity. Following this preliminary assessment, the drilling depth will be augmented to minimise the potential impact to the relevant Black Gums, this may constitute a depth of down to 2 – 3 metres below natural ground level	No direct impact to the primary/structurally supportive roots systems of Black Gum.	During HDD drilling operation	HDD drilling contractor

Measures to mitigate and manage impacts	Action	Outcome	Timing	Responsibility
	Impacts resulting from light spill can be mitigated by adapting from Part 4 (good lighting design principles) of the Dark Sky Planning Guideline (DPE 2016), including: • Installing light fitting shields with an opaque cover, mounted horizontally across the top of the lighting module. These shielding attachments allow only the downward projection of light. • Direct lights downwards and avoid shining directly onto the public amenities, which have the potential to reflect light skywards. • Utilise low beam angles that are close to vertical where possible to minimise light glare.	No indirect impact to fauna in retained vegetation and habitats.	Ongoing	Construction contractor.
Mitigating prescribed biodiversity impacts	With scope for the required removal of the residing dam, dam dewatering is to be undertaken to ensure that any fauna within the dams is salvaged and relocated (an ecologist would only be required on site when dam water levels are below 1/5capacity).	No direct impact to resident fauna during dam dewatering.	Immediately prior to dam dewatering.	Qualified ecologist and construction contractor.
Adaptive management strategies proposed to monitor and respond to impacts on biodiversity values that are uncertain	Implementation of an appropriate CEMP during works.	Mitigate risk of impact to environmental controls during project construction.	Ongoing/throughout earthworks.	Construction contractor.

7.1 Adaptive management strategy

Construction and operational management plans will contain an adaptive management component. Adaptive management strategies will be receptive to any new and relevant data that may arise through ongoing assessment and monitoring and are key to the successful implementation of crucial objectives yet also allow flexibility to changing dynamics and ongoing feedback and results. This includes measures to monitor predicted and uncertain impacts which will trigger adaptive management actions and allow for effective and quick responses.

8 Impact summary

8.1 TECs and threatened species

This section outlines the impact summary for the Project which has identified and assessed impacts on TECs and threatened species that are at risk of a Serious and Irreversible Impact (SAII) including:

- Addressing all criteria for each TEC listed as at risk of an SAII present on the subject land.
- Addressing all criteria for each threatened species at risk of an SAII present on the subject land.
- Documenting assumptions made and/or limitations to information.
- Documenting all sources of data, information, references used or consulted.
- Clearly justifying why any criteria could not be addressed.
- Identification of impacts requiring offset.
- Identification of impacts not requiring offset.
- Identification of areas not requiring offset.

Figure 13 shows the location of impacts requiring offset, impacts not requiring offset and areas not requiring assessment.

8.2 Serious and irreversible impacts

In accordance with Clause 6.7 of the BC Regulation an impact is to be regarded as serious and irreversible if it is likely to contribute significantly to the risk of a threatened species or ecological community becoming extinct because:

a) *Principle 1: It will cause a further decline of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline.*

b) *Principle 2: It will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very small population size.*

c) *Principle 3: It is an impact on the habitat of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution.*

d) *Principle 4: The impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity and therefore its members are not replaceable.*

No vegetation communities or threatened species are considered to meet the above principles.

8.3 Identification of impacts requiring offset

8.3.1 Impacts to native vegetation (ecosystem credits)

As outlined in Section 9.2.1 of the BAM, the assessor must determine an offset for all impacts of proposals on PCTs that are associated with a vegetation zone that has a vegetation integrity score of:

a) ≥15, where the PCT is representative of an EEC or a CEEC.

b) ≥17, where the PCT is associated with threatened species habitat (as represented by ecosystem credits) or represents a vulnerable ecological community.

c) ≥20, where the PCT does not represent a TEC and is not associated with threatened species habitat.

On this basis, offsets are required for four vegetation zones as it has a vegetation integrity score greater than 20.

The offset requirement for the Project was calculated using the BAM Calculator. Table 25 provides a summary of the ecosystem credit offsets required for impacts from proposed development at the subject land.

Table 25 Offsets required (ecosystem credits)

Vegetation zone	Area (ha)	Impact	VI score	Offset required	TEC	HBTs	Credit requirement
677_Low		0.04	46.9	Yes	No	1	1
677_Moderate		0.23	51.9	Yes	No	1	7
732_Moderate		0.78	83.6	Yes	No	1	29

8.3.2 Impacts to threatened species and their habitat

As outlined in Section 9.2.2 of the BAM, an offset is also required for the impacts of the proposal on the habitat of threatened species assessed for ecosystem credits and associated with a PCT in a vegetation zone with a vegetation integrity score of ≥17.

The offset requirement for the Project was calculated using the BAM Calculator. Table 26 provides a summary of the species credit offsets required for impacts from Project at the subject land.

Table 26 Offsets required (species credits)

Vegetation zone	Species	Habitat condition (vegetation integrity score) loss	Area (ha) / individuals	Biodiversity risk weighting	Credit requirement
677 Moderate	Black Gum	- 51.9	2 individuals	2	4
732 Moderate	Squirrel Glider	- 83.6	0.78 ha	2	33
732 Moderate	Koala	- 83.6	0.83 ha	2	34
732 Moderate	Purple Copper Butterfly	- 83.6	0.43 ah	2	18
732	Eastern Pygmy-possum	- 83.6	0.78 ha	2	33

Vegetation zone	Species	Habitat condition (vegetation integrity score) loss	Area (ha) / individuals	Biodiversity risk weighting	Credit requirement
Moderate					

Species polygons for the above 60 species credit species impacted by the Project are illustrated in Figure 13 below. Habitat for Koala, Squirrel Glider, Eastern Pygmy Possum and Purple Copper Butterfly has been avoided through project design, polygons for these species are shown on Figure 13, illustrating avoidance.

8.4 Identification of impacts not requiring offset

Following assessment, the following impacts do not require offsetting in accordance with BAM:

- Removal of 7.27 ha of NOG not requiring offsets.
- Removal of 0.05 ha of PCT 732 Scattered trees.

8.5 Identification of areas not requiring assessment

Following assessment, the following areas do not require assessment in accordance with BAM:

- Removal of 4.55 ha of cleared land/urban native exotic

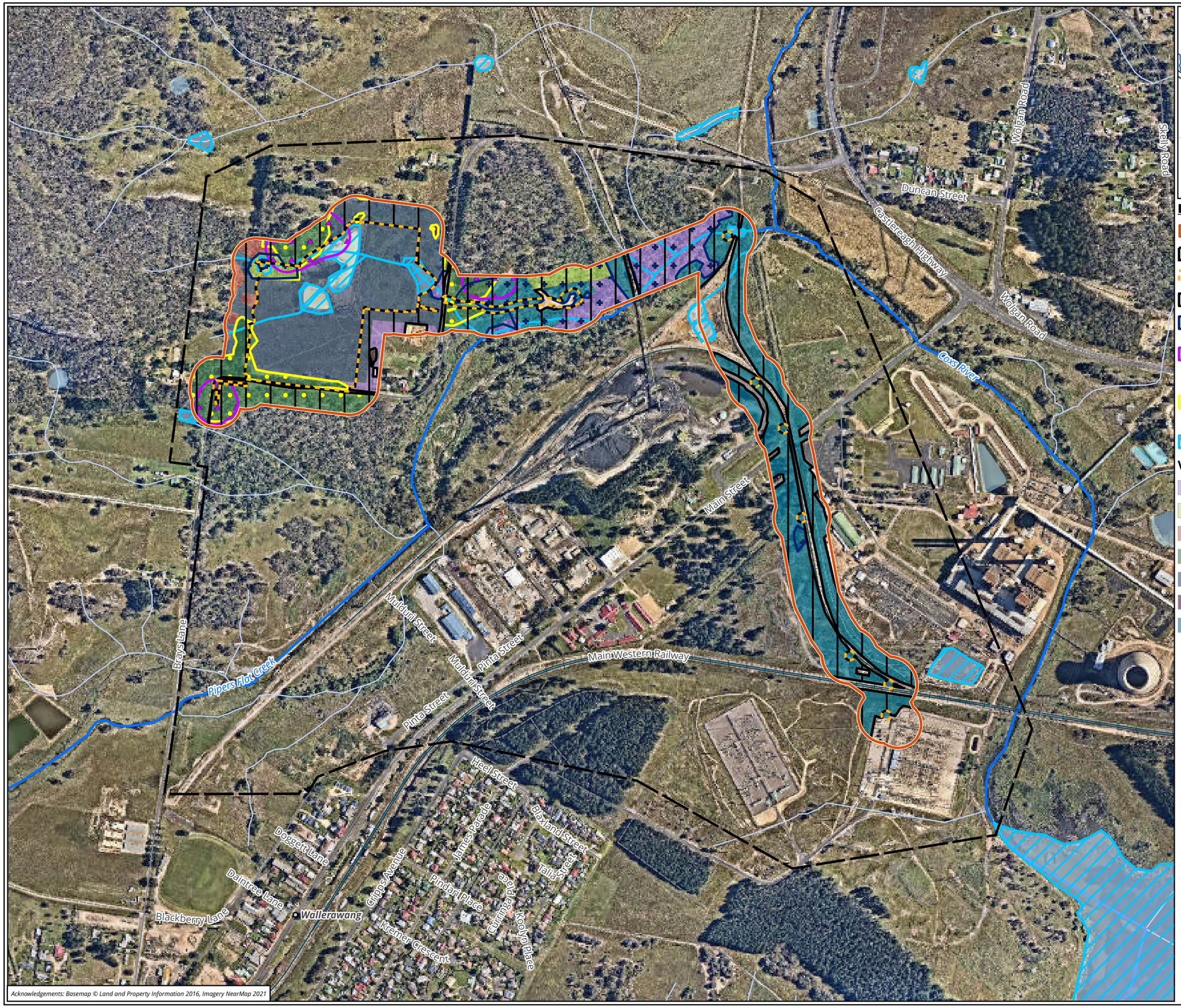
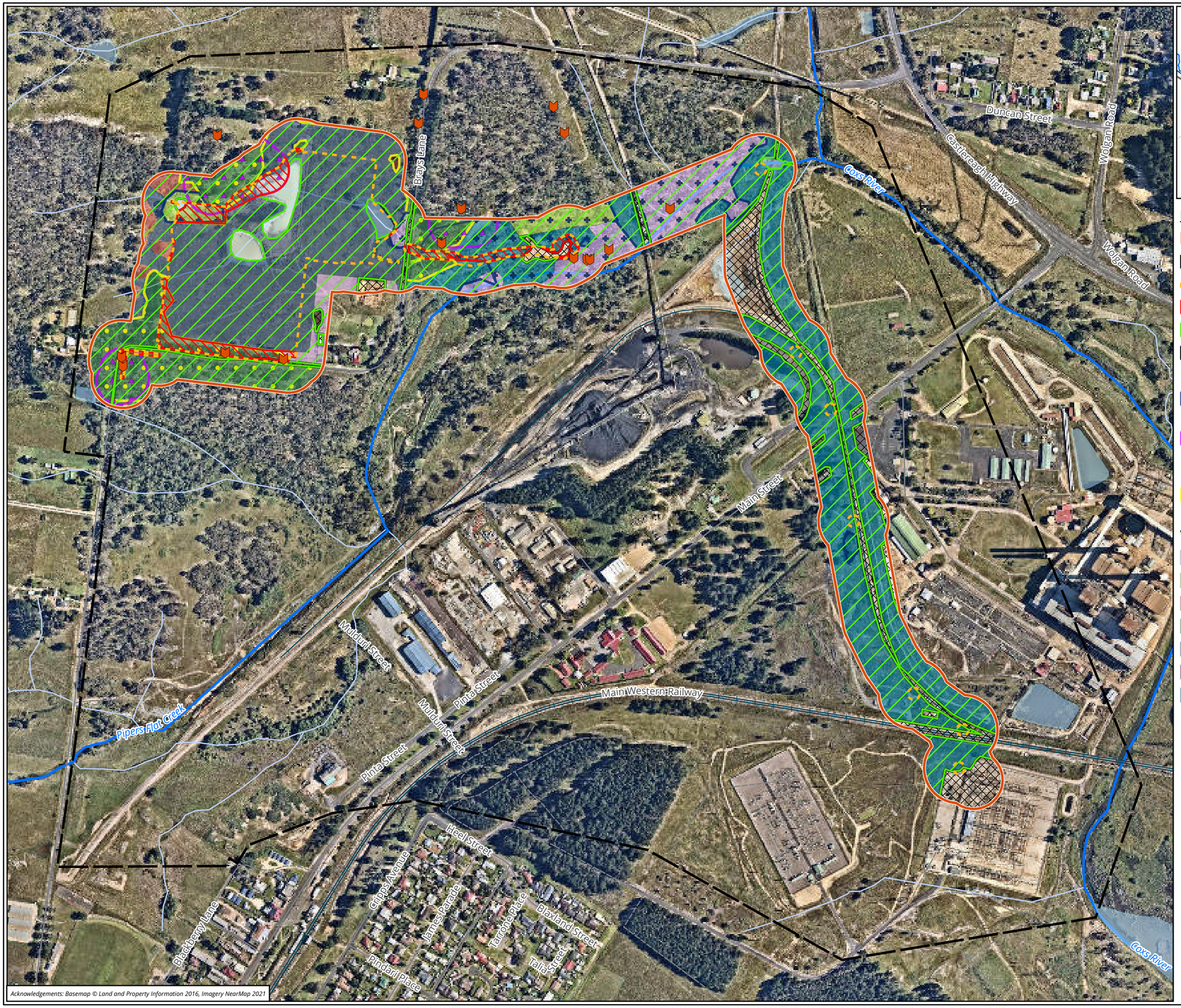
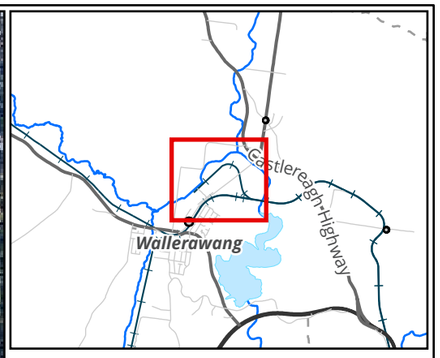


Figure 13 Estimated zones of indirect impact for the proposal

Matter: 34343, Date: 15 September 2022,
GIS: AM, Checked by: PP, Last edited by: amackegard
Location: P:\34300s\34343\Mapping\34343_BDAR2020_part2.aprx
Layout: 34343_F13_IndirectImpact





Legend

- Subject land
- Development site
- Development footprint
- Impacts requiring offset
- Impacts not requiring offset
- Area not requiring assessment
- Hollow-bearing tree
- Black Gum habitat
- Purple Copper Butterfly habitat (including a 40 m buffer)
- Squirrel Glider, Greater Glider, Eastern Pygmy-possum, and Koala habitat

Vegetation Zones

- 677-Low
- 677-Moderate
- 732-Low
- 732-Moderate
- 732-NOG
- 732-Scattered Trees
- Urban Native/Exotic

Figure 14 Impacts requiring offset

0 50 100 150 200 250

Metres

Scale: 1:6,000 @ A3

Coordinate System: GDA 1994 MGA Zone 56

biosis

Matter: 34343, Date: 15 September 2022
GIS: AM, Checked by: PP, Last edited by: amackegard
Location: P:\34300s\34343\Mapping\34343_BDAR2020_F14Offsets.aprx
Layout: 34343_F14_Offset

9 Biodiversity credit report

Offsetting through the transfer and retirement of biodiversity credits, or paying into the BCT Offset Fund, is required for the current assessment for impacts to three vegetation zones at the subject land. A biodiversity credit report is provided on the following pages.

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00024080/BAAS18089/21/00024081

Proposal Name
Confidential Lithgow SSD Southern Easement

BAM data last updated *
14/10/2022

Assessor Name
Paul Price

Assessor Number
BAAS18089

BAM Data version *
55

Proponent Names

Report Created
15/11/2022

BAM Case Status
Finalised

Assessment Revision
1

Assessment Type
Major Projects

Date Finalised
17/10/2022

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
Calyptorhynchus lathami / Glossy Black-Cockatoo

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
677-Black Gum grassy woodland of damp flats and drainage lines of the eastern Southern Tablelands, South Eastern Highlands Bioregion	Not a TEC	0.3	8	0	8
732-Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion	Not a TEC	8.1	29	0	29

677-Black Gum grassy woodland of damp flats and drainage lines of the eastern Southern Tablelands, South Eastern Highlands Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Subalpine Woodlands This includes PCT's: 677, 1191	Subalpine Woodlands >=90%	677_Low	Yes	1	Capertee Uplands, Capertee Valley, Hill End, Inland Slopes and Wollemi. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Subalpine Woodlands This includes PCT's: 677, 1191	Subalpine Woodlands >=90%	677_moderate	Yes	7	Capertee Uplands, Capertee Valley, Hill End, Inland Slopes and Wollemi. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

732-Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region

	Southern Tableland Grassy Woodlands This includes PCT's: 303, 312, 350, 654, 680, 703, 705, 731, 732, 1103, 1330, 1334, 1501	Southern Tableland Grassy Woodlands >=50% and <70%	732_Moderate	Yes	29	Capertee Uplands, Capertee Valley, Hill End, Inland Slopes and Wollemi. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Southern Tableland Grassy Woodlands This includes PCT's: 303, 312, 350, 654, 680, 703, 705, 731, 732, 1103, 1330, 1334, 1501	Southern Tableland Grassy Woodlands >=50% and <70%	732_NOG	No	0	Capertee Uplands, Capertee Valley, Hill End, Inland Slopes and Wollemi. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Southern Tableland Grassy Woodlands This includes PCT's: 303, 312, 350, 654, 680, 703, 705, 731, 732, 1103, 1330, 1334, 1501	Southern Tableland Grassy Woodlands >=50% and <70%	732_scattered01	No	0	Capertee Uplands, Capertee Valley, Hill End, Inland Slopes and Wollemi. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Cercartetus nanus / Eastern Pygmy-possum	**732_Moderate**	0.8	33.00

Eucalyptus aggregata / Black Gum	**677_moderate**	2.0	4.00
Paralucia spinifera / Purple Copper Butterfly, Bathurst Copper Butterfly	**732_Moderate**	0.4	18.00
Petaurus norfolcensis / Squirrel Glider	**732_Moderate**	0.8	33.00
Phascolarctos cinereus / Koala	**732_Moderate, 732_scattered01**	0.8	34.00

Credit Retirement Options

Like-for-like credit retirement options

Cercartetus nanus / Eastern Pygmy-possum	Spp	IBRA subregion
	Cercartetus nanus / Eastern Pygmy-possum	Any in NSW
Eucalyptus aggregata / Black Gum	Spp	IBRA subregion
	Eucalyptus aggregata / Black Gum	Any in NSW
Paralucia spinifera / Purple Copper Butterfly, Bathurst Copper Butterfly	Spp	IBRA subregion
	Paralucia spinifera / Purple Copper Butterfly, Bathurst Copper Butterfly	Any in NSW
Petaurus norfolcensis / Squirrel Glider	Spp	IBRA subregion
	Petaurus norfolcensis / Squirrel Glider	Any in NSW

Phascolarctos cinereus / Koala	Spp	IBRA subregion
	Phascolarctos cinereus / Koala	Any in NSW

BAM Credit Summary Report

Proposal Details

Assessment Id
00024080/BAAS18089/21/00024081

Proposal Name
Confidential Lithgow SSD Southern Easement

BAM data last updated *
14/10/2022

Assessor Name
Paul Price

Report Created
15/11/2022

BAM Data version *
55

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BAM Case Status
Finalised

Date Finalised
17/10/2022

Assessment Revision
1

Assessment Type
Major Projects

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits
Black Gum grassy woodland of damp flats and drainage lines of the eastern Southern Tablelands, South Eastern Highlands Bioregion												
1	677_Low	Not a TEC	46.9	46.9	0.04	PCT Cleared - 95%	High Sensitivity to Gain			2.50		1

2	677_moderate	Not a TEC	51.9	51.9	0.23	PCT Cleared - 95%	High Sensitivity to Gain			2.50		7
											Subtotal	**8**
Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion												
3	732_Moderate	Not a TEC	83.6	83.6	0.78	PCT Cleared - 65%	High Sensitivity to Gain			1.75		29
4	732_NOG	Not a TEC	0.2	0.2	7.3	PCT Cleared - 65%	High Sensitivity to Gain			1.75		0
5	732_scattered01	Not a TEC	3.9	3.9	0.05	PCT Cleared - 65%	High Sensitivity to Gain			1.75		0
											Subtotal	**29**
											Total	**37**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits
Cercartetus nanus / Eastern Pygmy-possum (Fauna)									
732_Moderate	83.6	83.6	0.78			Vulnerable	Not Listed	False	33
								Subtotal	**33**

Eucalyptus aggregata / Black Gum (Flora)									
677_moderate	N/A	N/A	2			Vulnerable	Vulnerable	False	4
								Subtotal	**4**
Paralucia spinifera / Purple Copper Butterfly, Bathurst Copper Butterfly (Fauna)									
732_Moderate	83.6	83.6	0.43			Endangered	Vulnerable	False	18
								Subtotal	**18**
Petaurus norfolcensis / Squirrel Glider (Fauna)									
732_Moderate	83.6	83.6	0.78			Vulnerable	Not Listed	False	33
								Subtotal	**33**
Phascolarctos cinereus / Koala (Fauna)									
732_Moderate	83.6	83.6	0.78			Endangered	Endangered	False	33
732_scattered01	3.9	3.9	0.05			Endangered	Endangered	False	1
								Subtotal	**34**

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Appendices

Appendix 1 Survey methods

Appendix 1.1 Nomenclature

The flora taxonomy (classification) used in this report follows the most recent Flora of NSW (Harden 1992, Harden 1993, Harden 2000, Harden 2002). All doubtful species names were verified with the on-line Australian Plant Name Index (Australian National Botanic Gardens 2007). Flora species, including threatened species and introduced flora species, are referred to by both their common and then scientific names when first mentioned. Subsequent references to flora species cite the common names only, unless there is no common name, for which scientific name will be used. Common names, where available, have been included in threatened species tables and the complete flora list in Appendix 3.

Names of vertebrates follow the Census of Australian Vertebrates (CAVs) maintained by the DEE (DSEWPaC 2009). In the body of this report vertebrates are referred to by both their common and scientific names when first mentioned. Subsequent references to these species cite the common name only.

Appendix 1.2 Permits and licences

The flora and fauna assessment was conducted under the terms of Biosis' Scientific Licence issued by EES (SL100758, expiry date 30 June 2023). The BAM Assessment and quality review of the BDAR was carried out by Accredited Assessor Paul Price (BAAS18089) and overseen by Accredited Assessor Rebecca Dwyer (BAAS17067).

Appendix 1.3 Limitations

Field surveys were undertaken in accordance with the BAM. Ecological surveys provide a sampling of flora and fauna at a given time and season. Factors influencing detectability of species during survey include species dormancy, seasonal conditions, ephemeral status of waterbodies, and migration and breeding behaviours of some fauna. In many cases, these factors do not present a significant limitation to assessing the overall biodiversity values of a site.

The field surveys were conducted in autumn, winter and spring. The range of survey seasons is considered substantial and suitable to determine the presence of a wide range of threatened flora species. All targeted flora and fauna surveys were completed within the allowable survey periods according to the TBDC.

Surveys undertaken, combined with habitat assessments and desktop analysis are considered sufficient to reach the conclusions herein in regard to this and all other species' likelihood of occurrence within the subject land.

Database searches, and associated conclusions on the likelihood of species to occur within the assessment area, are reliant upon external data sources and information managed by third parties.

Appendix 2 BAM Candidate species assessment

Table A. 1 Threatened flora species assessment

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
Eucalyptus aggregata **Black Gum**	V	V	Yes	Small to medium sized woodland tree that grows in the wetter, cooler areas of the Southern Highlands on the lowest parts of the landscape in poorly drained flats and hollows adjacent to creeks and small rivers. Associated with a variety of communities including Eastern Riverine Forests, Montane Bogs and Fens, Temperate Montane Grasslands, Subalpine Woodlands and Southern Tableland Wet Sclerophyll Forest. Grows in alluvial soils.	High	Yes	Yes - targeted survey undertaken June 2021, 14 – 15 July 2022	Yes	A population of this species was identified within the subject land. A total of 286 individuals were recorded.
Eucalyptus pulverulenta **Silver-leafed Gum**	V	V	Yes	Mallee or small tree that grows as an understorey plant in a variety of communities including Upper Riverina Dry Sclerophyll Forests, Southern Tableland Dry Sclerophyll Forests, Southern Tableland	Negligible	No	Yes - targeted survey undertaken June 2021, 14 – 15 July 2022	No	This species has been previously recorded on 2 occasions within 10 km of the subject land, with closest record being 2 km from the subject land. Potential habitat for this species in the development footprint is not

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
				Grassy Woodlands and Tableland Clay Grassy Woodlands. Grows in shallow, infertile soils.					present, as the species predominantly grows in rocky areas. Whilst suitable habitat was not present within the subject land, targeted surveys undertaken in conjunction with other TS, did not record individuals of Silver-leafed Gum.
***Leucochrysum albicans* var. *tricolor* Hoary Sunray**	E	-	Yes	Small perennial herb that grows in disturbed areas and inter-tussock spaces in grasslands, woodlands and forests. Grows in a variety of soils including clays, clay loams, stony and gravelly.	Moderate	No	Yes – targeted survey undertaken November 2021.	No	Hoary Sunray has been not been previously recorded within 10 km of the subject land. Whilst limited potential habitat for this species in the subject land is present, it was not was identified during targeted flora surveys within
***Prasophyllum petilum* Tarengo Leek Orchid**	E	E	No	Terrestrial orchid found growing in open sites and patchy forest in Natural Temperate Grassland, Box-Gum Woodlands, Temperate Montane Grasslands, Southern Tableland Grassy Woodlands, Subalpine Woodlands, Tableland Clay Grassy Woodlands, Western Slopes Grassy Woodlands. This species is cryptic and most visible when flowering between October and	Moderate	No	Yes – targeted survey undertaken November 2021.	No	The Tarengo Leek Orchid has been not been previously recorded within 10 km of the subject land. Whilst limited potential habitat for this species in the subject land is present, it was not was identified during targeted flora surveys.

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
				December. Grows in fertile soils.					
Swainsona sericea **Silky Swainson-pea**	V	-	No	Prostrate or erect perennial, growing to 10 cm tall. Has been recorded from the Northern Tablelands to the Southern Tablelands and further inland on the slopes and plains. There is one isolated record from the far north-west of NSW. Its stronghold is on the Monaro. Also found in South Australia, Victoria and Queensland. Found in Natural Temperate Grassland and Snow Gum Woodland on the Monaro. Also found in Box-Gum Woodland in the Southern Tablelands and South West Slopes.	Moderate	No	Yes – targeted survey undertaken November 2021.	No	The Silky Swainson-pea has been not been previously recorded within 10 km of the subject land. Whilst limited potential habitat for this species in the subject land is present, the Silky Swainson-pea was not was identified during targeted flora surveys.
Thesium australe **Austral Toadflax**	V	V	Yes	Small, straggling herb and root parasite found growing on damp sites in grassland, grassy woodlands and coastal headlands often in association with Kangaroo Grass *Themeda triandra* in a variety of communities including New England Dry Sclerophyll Forests,	Low	No	Yes – targeted survey undertaken November 2021.	No	This species has been previously recorded on 4 occasions within 10 km of the subject land, with closest record being 4.2 km from the subject land. Whilst marginal potential habitat for this species is located with the transmission line corridor within PCT 677 in a moderate condition,

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
				Western Slopes Grasslands, Northern Tableland Wet Sclerophyll Forests, Brigalow Clay Plain Woodlands, Subalpine Woodlands and Maritime Grasslands.					the species not recorded during targeted flora surveys. Targeted surveys were no undertaken within PCT 732 NOG as a result of the low condition and absence of suitable host species i.e. Kangaroo Grass
Veronica blakelyi	-	V	Yes	Occurs in eucalypt forest, often in moist and sheltered areas. Associated canopy species include *Eucalyptus dives, E. dalrympleana, E. rossii* and *E. pauciflora*. The species appears to re-sprout after fire, although an optimal fire regime (frequency, intensity, etc) is unknown.	Low	No	Yes – targeted survey undertaken November 2021.	No	This species has been previously recorded on 7 occasions within 10 km of the subject land, with closest record being approximately 3.2 km from the subject land. Whilst potential habitat for this species in the development footprint is present, no specimens were identified during targeted flora surveys.

Table A. 2 Threatened fauna species assessment

Species	Status		BAM predicted SCS	Habitat description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
Anthochaera Phrygia **Regent Honeyeater**	CE	CE	Yes	The Regent Honeyeater mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. Birds are also found in drier coastal woodlands and forests in some years. Once recorded between Adelaide and the central coast of Queensland, its range has contracted dramatically in the last 30 years to between north-eastern Victoria and south-eastern Queensland. There are only three known key breeding regions remaining: north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley and the Bundarra-Barraba region. In NSW the distribution is very patchy and mainly confined to the two main breeding areas and surrounding fragmented woodlands. In some years flocks converge on flowering coastal woodlands and forests. The	Moderate	No	No	Low	May forage on occasion as part of large broad-scale movements, however, the subject land is not within mapped important areas.

Species	Status		BAM predicted SCS	Habitat description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
				species breeds between July and January in Box-Ironbark and other temperate woodlands and riparian gallery forest dominated by River Sheoak. Regent Honeyeaters usually nest in horizontal branches or forks in tall mature eucalypts and Sheoaks. Also nests in mistletoe haustoria (DPIE 2020c). This species is relevant to the Cumberland and Wollemi IBRA subregions.					
Aprasia parapulchella **Pink-tailed Legless Lizard**	V	V	No	Fossorial species, which lives beneath surface rocks and occupies ant burrows. It feeds on ants, particularly their eggs and larvae. Thought to lay eggs within the ant nests under rocks that it uses as a source of food and shelter. Key habitat features are a cover of native grasses, particularly Kangaroo Grass (*Themeda australis*), sparse or no tree cover, little or no leaf litter, and scattered	Low	No	No	Low	The subject land provides limited surface rock with no areas of outcropping. The subject land does not contain microhabitats required by this species and as such the species is unlikely to utilise the subject land.

Species	Status		BAM predicted SCS	Habitat description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
				small rock with shallow embedment in the soil surface.					
Botaurus poiciloptilus **Australasian Bittern**	E	E	No	The Australasian Bittern is distributed across south-eastern Australia. Often found in terrestrial and estuarine wetlands, generally where there is permanent water with tall, dense vegetation including *Typha* sp. and *Eleocharis* sp. Typically this bird forages at night on frogs, fish and invertebrates, and remains inconspicuous during the day. The breeding season extends from October to January with nests being built amongst dense vegetation on a flattened platform of reeds.	Low	No	No	Low	The waterways and dams within the subject land are impacted by exotic grasses and livestock grazing. Potentially suitable waterways do not contain dense fringing or emergent aquatic vegetation, no records exist of this species within 10 km. The subject land does not contain microhabitats required by this species and as such the species is unlikely to utilise the subject land.
Calidris ferruginea **Curlew Sandpiper**	CE	E	No	Inhabits sheltered intertidal mudflats. Also, non-tidal swamps, lagoons and lakes near the coast. Infrequently recorded inland.	Low	No	No	N/A	There is no suitable habitat within the subject land for wading/ shorebird species.

Species	Status		BAM predicted SCS	Habitat description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
Callocephalon fimbriatum **Gang-gang Cockatoo**		V	Yes	In summer, occupies tall montane forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. Also occur in subalpine Snow Gum woodland and occasionally in temperate or regenerating forest. In winter, occurs at lower altitudes in drier, more open eucalypt forests and woodlands, particularly in box-ironbark assemblages, or in dry forest in coastal areas. It requires tree hollows in which to breed.	Low	No	No	Low	No suitable hollows occur within the subject land. Areas adjacent to the subject land contained large hollows, however, these were considered of low quality for nesting due to the vertical position of the entrance which provides limited shelter from the weather. The subject land does not contain suitable microhabitats required for breeding by this species and therefore is unlikely to occur except on occasion as part of foraging or dispersal movements.
Calyptorhynchus lathami **Glossy Black-Cockatoo**		V	Yes	Inhabits forest with low nutrients, characteristically with key *Allocasuarina* species. Tends to prefer drier forest types. Often confined to remnant patches in hills and gullies. Breed in hollows stumps or limbs, either living or dead.	Low	No	No	Low	No suitable hollows occur within the subject land. Areas adjacent to the subject land contained large hollows, however, these were considered of low quality for nesting due to the vertical position of the entrance which provides limited shelter from

Species	Status		BAM predicted SCS	Habitat description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
									the weather. The subject land does not contain suitable microhabitats required for breeding by this species and therefore is unlikely to occur except on occasion as part of foraging or dispersal movements.
Cercartetus nanus **Eastern Pygmy-possum**		V	Yes	Patchily distributed from the coast to the Great Dividing Range, and as far as Pillaga, Dubbo, Parkes and Wagga Wagga on the western slopes. Inhabits rainforest through to sclerophyll forest and tree heath. Banksias and myrtaceous shrubs and trees are a favoured food source. Soft fruits are eaten when flowers are unavailable, and it also feeds on insects. Will often nest in tree hollows but can also construct its own nest. Because of its small size it is able to utilise a range of hollow sizes including very small hollows.	Moderate	Yes	Presence assumed	Moderate	The north-west section of the subject land (PCT 732) contains potential low-quality habitat for this species. Habitat is considered low quality due to the presence of hollows, limited understorey shrubby species and history of grazing of the land. The remainder of the subject land is degraded through exotic weed invasion and does not provide suitable microhabitat features (shrubby understorey with foraging/nesting resources) to support the species. The study area provides marginal habitat due to a low

Species	Status		BAM predicted SCS	Habitat description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
				Individuals will use a number of different hollows and an individual has been recorded using up to 9 nest sites within a 0.5 ha area over a 5 month period.					density of hollows and relatively degraded understorey lacking an abundance of foraging resources for this species. Records of this species in the locality occur in Newnes State Forest to the east.
Chalinolobus dwyeri **Large-eared Pied Bat**	V	V	Yes	Primarily found in dry sclerophyll forests and woodlands, but also found in rainforest fringes and subalpine woodlands. Forages on small, flying insects below the forest canopy. Roosts in colonies of between 3 and 80 in caves, Fairy Martin nests and mines, and beneath rock overhangs, but usually less than 10 individuals. Likely that it hibernates during the cooler months. The only known existing maternity roost is in a sandstone cave near Coonabarabran.	High	Yes	Targeted survey.	Low	Rocky outcrop and escarpments associated with the Great Dividing Range east of the subject land, occur within 2 kilometres of the development footprint and provide suitable roosting habitat for this species. Given the proximity of the subject land to suitable habitat features it is likely this species occurs on occasion as part of dispersal and foraging movements. This species was recorded during targeted survey. However, the subject land is not within 100 metres of suitable roosting habitat and therefore the proposed works will not impact

Species	Status		BAM predicted SCS	Habitat description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
									on breeding habitat for this species (OEH 2018).
Dasyurus maculatus **Spotted-tailed Quoll**	E		No	Quolls use hollow-bearing trees, fallen logs, other animal burrows, small caves and rock outcrops as den sites. Use communal 'latrine sites', often on flat rocks among boulder fields, rocky cliff-faces or along rocky stream beds or banks. Such sites may be visited by multiple individuals and can be recognised by the accumulation of the sometimes characteristic 'twisty-shaped' faeces deposited by animals.	Moderate	No	No	Low	Microhabitat such as woody debris is limited in the subject land and dense shrubs/ understorey are lacking across the impact area. Following detailed traverses, no potential den sites were identified during the field assessment. No cliff faces or rocky stream banks are present within the subject land, such features are used in breeding seasons to identify females within the area. The large areas of intact land to the south of the impact site and west of the subject land that is not being impacted, will remain as habitat for this species if present in the locality. The species is likely to forage across the subject land and may occur on occasion but is unlikely to be impacted by the

Species	Status		BAM predicted SCS	Habitat description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
									proposed works.
Grantiella picta **Painted Honeyeater**	V	V	No	Found mainly in dry open woodlands and forests, where it is strongly associated with mistletoe. Often found on plains with scattered eucalypts and remnant trees on farmlands.	Low	No	No	Low	No mistletoe were recorded within the impact area and this species is unlikely to occur within the subject land except on occasion as part of dispersal movements.
Haliaeetus leucogaster **White-bellied Sea-Eagle**		V	Yes	A migratory species that is generally sedentary in Australia, although immature individuals and some adults are dispersive. Found in terrestrial and coastal wetlands; favouring deep freshwater swamps, lakes and reservoirs; shallow coastal lagoons and saltmarshes. It hunts over open terrestrial habitats. Feeds on birds, reptiles, fish, mammals, crustaceans and carrion. Roosts and makes nest in trees.	Low	No	No	Low	No large stick nests were recorded during field investigation within or immediately adjacent to the impact area.
Heleioporus australiacus	V	V	Yes	Prefers hanging swamps on sandstone shelves adjacent to	Low	No	No	Low	This species is associated with hanging swamps on sandstone

Species	Status		BAM predicted SCS	Habitat description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
Giant Burrowing Frog				perennial non-flooding creeks. Can also occur within shale outcrops within sandstone formations. Known from wet and dry forests and montane woodland in the southern part range. Individuals can be found around sandy creek banks or foraging along ridge-tops during or directly after heavy rain. Males often call from burrows located in sandy banks next to water. Spends the majority of its time in non-breeding habitat 20-250m from breeding sites.					shelves adjacent to perennial non-flooding streams. The subject land does not support essential micro-habitat features required by this species. Waterways within the subject land are degraded by land clearing and livestock presence and are not suitable for this species.
Hieraaetus morphnoides **Little Eagle**		V	Yes	The Little Eagle is most abundant in lightly timbered areas with open areas nearby providing an abundance of prey species. It has often been recorded foraging in grasslands, crops, treeless dune fields, and recently logged areas. The Little Eagle nests in tall living trees within farmland, woodland and forests.	Low	No	No	Low	No large stick nests were present during field investigation in the breeding season. This species may forage on occasion as part of a large home range but is unlikely to be impacted by the proposed works.

Species	Status		BAM predicted SCS	Habitat description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
Hirundapus caudacutus **White-throated Needletail**	V		No	An aerial species found in feeding concentrations over cities, hilltops and timbered ranges. Migratory species that is usually seen in eastern Australia from October to April, with breeding occurring in Asia from June to August. Low pressure troughs and approaching cold fronts tend to lift insects away from the surface to be preyed upon by the White-throated Needletail. Typically, more common in coastal areas, less so inland.	Low	No	No	Low	Species migrates to Australia and is often seen from October to April. The White-throated Needletail forages aerially on insects and is more common in coastal areas, however this species may occur on occasion in the subject land. The proposed development will not significantly affect the foraging resources (insects) required by the White-throated Needletail for aerial foraging. The proposed works are not likely to impact on the species as no breeding habitat is present or will be impacted and aerial foraging will not be impacted. The vegetation directly outside the impact area and to the east provides larger patches of intact bushland that will sustain the insect resources, habitat and connectivity required by the White-throated Needletail.

Species	Status		BAM predicted SCS	Habitat description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
Hoplocephalus bungaroides **Broad-headed Snake**	V	E	Yes	Mainly occurs in association with communities occurring on Triassic sandstone within the Sydney Basin. Typically found among exposed sandstone outcrops with vegetation types ranging from woodland to heath. Within these habitats they generally use rock crevices and exfoliating rock during the cooler months and tree hollows during summer.	Low	No	No	Low	The subject land does not support essential micro-habitat features as there is no rocky outcrops, surface rock or suitable escarpments.
Lathamus discolor **Swift Parrot**	CE	E	Yes	The Swift Parrot occurs in woodlands and forests of NSW from May to August, where it feeds on eucalypt nectar, pollen and associated insects. The Swift Parrot is dependent on flowering resources across a wide range of habitats in its wintering grounds in NSW. Favoured feed trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted Gum *Corymbia maculata*, Red Bloodwood *C.*	Low	No	No	Low	Highly mobile species foraging across large areas of New South Wales and breeding in Tasmania. The subject land is not within any mapped important areas for this species and as such the proposed works are not likely to have an impact to the species.

Species	Status		BAM predicted SCS	Habitat description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
				gummifera, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens.* Commonly used lerp infested trees included Grey Box *E. microcarpa*, Grey Box *E. moluccana* and Blackbutt *E. pilularis*. This species is migratory, breeding in Tasmania and also nomadic, moving about in response to changing food availability.					
Litoria booroolongensis **Booroolong Frog**	E	E	Yes	The species is found in upland rivers, montane creeks and lowland rivers and creeks, particularly in permanent rocky western-flowing streams and rivers on the slopes and tablelands of NSW, with some fringing vegetation cover such as ferns, sedges or grasses. The Booroolong Frog is often found in daylight on rocks by the water's edge or sheltering under rocks or amongst vegetation. Breeding occurs in spring and early summer when eggs are	Low	No	No	Low	The subject land contains one waterway and multiple farm dams. The subject land occurs at the base of the foothills of the western side of the Blue Mountains. The waterway in the subject land is impacted by historic clearing of the surrounding area for livestock grazing and does not contain significant rocky features (outcropping, boulders etc). The subject land does not contain microhabitats required by this species and as such the species

Species	Status		BAM predicted SCS	Habitat description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
				laid in submerged rock crevices. Tadpoles develop in slow-flowing connected or isolated pools and metamorphose in late summer to early autumn.					is unlikely to utilise the subject land.
Litoria littlejohni **Littlejohn's Tree Frog**	V	V	Yes	Occurs in wet and dry sclerophyll forests and heath communities associated with sandstone outcrops between 280 and 1000 m. Littlejohn's Tree Frog prefers permanent and semi-permanent rock flowing streams, but individuals have also been collected from semi-permanent dams with some emergent vegetation. Forages both in the tree canopy and on the ground, and has been observed sheltering under rocks on high exposed ridges during summer. The species breeds in autumn but will also breed after heavy rainfall in spring and summer. The species has been recorded calling in all seasons with variously reported					The subject land contains one waterway and multiple farm dams. The waterway in the subject land is impacted by historic clearing of the surrounding area for livestock grazing and does not contain significant rocky features (outcropping, boulders etc). The subject land does not contain microhabitats required by this species and as such the species is unlikely to utilise the subject land.

Species	Status		BAM predicted SCS	Habitat description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
				peak calling periods. Eggs are laid in loose gelatinous masses attached to submerged twigs; eggs and tadpoles are most often recorded in slow-flowing pools that receive extended exposure to sunlight.					
Lophoictinia isura **Square-tailed Kite**		V	Yes	Typically inhabits coastal forested and wooded lands of tropical and temperate Australia. In NSW it is often associated with ridge and gully forests dominated by *Eucalyptus longifolia, Corymbia maculata, E. elata,* or *E. smithii.* Individuals appear to occupy large hunting ranges of more than 100 km^2. They require large living trees for breeding, particularly near water with surrounding woodland/forest close by for foraging habitat. Nest sites are generally located along or near watercourses, in a tree fork or on large horizontal limbs.	Moderate	Yes	Yes	Low	No large stick nests were observed during field survey, conducted during the breeding period.

Species	Status		BAM predicted SCS	Habitat description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
Macquaria australasica **Macquarie Perch**	E		No	Macquarie perch are found in both river and lake habitats, especially the upper reaches of rivers and their tributaries.	Low	No	No	Low	No recent records within the locality, microhabitats required are absent and habitat is degraded to the point the species is unlikely to use the subject land.
Miniopterus orianae oceanensis **Large Bent-winged Bat**		V	Yes	Forms large maternity roosts (up to 100,000 individuals) in caves and mines in spring and summer. Individuals may fly several hundred kilometres to their wintering sites, where they roost in caves, culverts, buildings, and bridges. They occur in a broad range of habitats including rainforest, wet and dry sclerophyll forest, paperbark forest and open grasslands. Has a fast, direct flight and forages for flying insects (particularly moths) above the tree canopy and along waterways.	Moderate	Yes	Targeted survey	Low	Rocky outcrop and escarpments associated with the Great Dividing Range east of the subject land, occur within 2 kilometres of the development footprint and provide suitable roosting habitat for this species. Given the proximity of the subject land to suitable habitat features it is likely this species occurs on occasion as part of dispersal and foraging movements. This species was recorded during targeted survey. However, the subject land is not within 100 metres of suitable roosting habitat and therefore the proposed works will not impact on breeding habitat for this species (OEH

Species	Status		BAM predicted SCS	Habitat description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
									2018).
Ninox connivens **Barking Owl**		V	Yes	Generally found in open forests, woodlands, swamp woodlands, farmlands and dense scrub. Can also be found in the foothills and timber along watercourses in otherwise open country. Territories are typically 2000 ha in NSW habitats. Hunts small arboreal mammals or birds and terrestrial mammals when tree hollows are absent.	Low	No	No	Low	Following detailed traverses and careful assessment of existing trees to determine the presence of hollow-bearing trees, no large hollows suitable for breeding for this species were recorded within the subject land. It was noted that areas adjacent to the development footprint contain large hollows, however these are not considered suitable for use by Barking Owl as entrances are vertical, in broken limbs and trunks. Large hollows recorded adjacent to the subject land will not be impacted and are not considered suitable for use due to the vertical position of entrances. The subject land does not contain microhabitats required by this species for foraging such

Species	Status		BAM predicted SCS	Habitat description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
									as small arboreal mammals or birds and as such the species is unlikely to utilise the subject land.
Ninox strenua **Powerful Owl**		V	Yes	The Powerful Owl occupies wet and dry eucalypt forests and rainforests. It may inhabit both un-logged and lightly logged forests as well as undisturbed forests where it usually roosts on the limbs of dense trees in gully areas. Large mature trees with hollows at least 0.5 m deep are required for nesting. Tree hollows are particularly important for the Powerful Owl because a large proportion of the diet is made up of hollow-dependent arboreal marsupials. Nest trees for this species are usually emergent with a diameter at breast height of at least 100 cm. It has a large home range of between 450 and 1450 ha.	Low	No	No	Low	Areas adjacent to the development footprint contain large hollows, however these are not considered suitable for use by Powerful Owl as entrances are vertical, in broken limbs and trunks. The subject land does not contain microhabitats required by this species and as such the species is unlikely to utilise the subject land.

Species	Status		BAM predicted SCS	Habitat description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
Numenius madagascariensis **Eastern Curlew**	CE		No	Occurs in sheltered coasts, especially estuaries, embayments, harbours, inlets and coastal lagoons with large intertidal mudflats or sandflats often with beds of seagrass.	Low	No	No	N/A	The subject land does not contain habitat suitable for this species.
Paralucia spinifera **Purple Copper Butterfly, Bathurst Copper Butterfly**	V	E	Yes	Commonly found in open woodland or open forest with a sparse understorey dominated by Blackthorn (*Bursaria spinosa* subsp. *lasiophylla*). Found in locations above 850 m altitude and is associated with exposure to full day sun, often with a west to north aspect. Also associated with extremes of cold.	Moderate	Yes	Species assumed present based on presence of suitable habitat, with an additional 40 meter buffer around the suitable habitat.	Low	Impacts to areas containing suitable habitat have been avoided.
Petauroides volans **Greater Glider**	V		No	The distribution of the Greater Glider includes the ranges and coastal plain of eastern Australia, where it inhabits a variety of eucalypt forests and woodlands. Presence and density of Greater Gliders is related to soil fertility, eucalypt tree species, disturbance history	Moderate	Yes	Assumed present.	Moderate	Suitable foraging habitat exists in the north-west of the subject land. The subject land does not contain a high density of large hollows and connected vegetation to the west provides larger more intact habitat. The species has been assumed present in the north-west of the

Species	Status		BAM predicted SCS	Habitat description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
				and density of suitable tree hollows. Feeds exclusively on eucalypt leaves, buds, flowers and mistletoe.					subject land in PCT 732, impacts to this habitat have been avoided.
Petaurus norfolcensis **Squirrel Glider**		V	Yes	The species is widely though sparsely distributed in eastern Australia, from northern Queensland to western Victoria that habits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range	High	Yes	Yes	Low	Suitable foraging habitat exists in the north-west of the subject land. The subject land does not contain a high density of large hollows and connected vegetation to the west provides larger more intact habitat. The species has been assumed present in the north-west of the subject land in PCT 732, impacts to this habitat have been avoided.
Petrogale penicillata **Brush-tailed Rock-wallaby**	V	E	Yes	Habitats range from rainforest to open woodland. It is found in areas with numerous ledges, caves and crevices particularly with northern aspects. The species forages on grasses and forbs.	Low	No	No	Low	The subject land does not contain rocky outcrops, escarpments or steep slopes. No suitable habitat occurs within the subject land for this species.
Phascogale tapoatafa		V	Yes	The Brush-tailed Phascogale	Low	Yes	No	Low	No records exist within 20 km

Species	Status		BAM predicted SCS	Habitat description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
Brush-tailed Phascogale				had a scattered distribution centred around the Great Dividing Range. It prefers open forests with a sparse ground cover, but also inhabits mallee and rainforests. It feeds on insects and nectar, particularly in rough-barked trees. Nests and shelters in tree hollows, tree stumps and occasionally birds nests, and can use more than 40 nests in a year.					of the subject land and this species is mainly found east of the Great Dividing Range. Suitable hollows occur within the subject land, however, the subject land does not contain a high density of hollows for use by this species which typically use a large number of nest sites. Spotlight survey did not detect this species, therefore this species is considered unlikely to occur in the subject land.
Phascolarctos cinereus **Koala**	V	V	yes	Koalas feed almost exclusively on eucalypt foliage, and their preferences vary regionally. Primary feed trees include *Eucalyptus robusta, E. tereticornis, E. punctata, E. haemostoma* and *E. signata*. They are solitary with varying home ranges.	Moderate	No	Yes	Low	Potential habitat for this species occurs in the north-west of the subject land. No impacts will occur to the vegetation as a part of the Project. Spotlight and call back survey did not detect this species, therefore this species is considered unlikely to occur in the subject land.
Pseudomys novaehollandiae	V		No	Across the species' range the New Holland Mouse is known to	Low	No	No	Low	Habitat within the subject land is not suitable for this species as

Species	Status		BAM predicted SCS	Habitat description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
New Holland Mouse				inhabit open heathlands, open woodlands with a heathland understorey, and vegetated sand dunes. The home range of the New Holland Mouse can range from 0.44 ha to 1.4 ha. The New Holland Mouse is a social animal, living predominantly in burrows shared with other individuals. The species is nocturnal and omnivorous, feeding on seeds, insects, leaves, flowers and fungi. It is likely that the species spends considerable time foraging above-ground for food. Breeding typically occurs between August and January, but can extend into autumn.					soil is alluvial clays and historical clearing has removed much of the mid-storey and native ground cover. Livestock grazing further impacts the suitability of land for this species due to compaction by hooved animals. No known populations occur within 10 km of the subject land.
Pteropus poliocephalus **Grey-headed Flying-fox**	V	V	Yes	Occurs along the NSW coast, extending further inland in the north. This species is a canopy-feeding frugivore and nectarivore of rainforests, open forests, woodlands, melaleuca swamps and banksia	Moderate	No	No	Low	No camps or individuals were recorded in the subject land or immediately adjacent during field investigations. May forage across the subject land on occasion on flowering eucalyptus species but it is not

Species	Status		BAM predicted SCS	Habitat description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
				woodlands. Roosts in large colonies, commonly in dense riparian vegetation.					considered essential foraging habitat for this species. As such, a Significant Impact Criteria (SIC) assessment has not been completed for this species.
Rostratula australis **Australian Painted Snipe**	E	E	No	Usually found in shallow inland wetlands including farm dams, lakes, rice crops, swamps and waterlogged grassland. They prefer freshwater wetlands, but have been recorded in brackish waters. Forages on mud-flats and in shallow water. Feeds on worms, molluscs, insects and some plant-matter.	Low	No	No	No	The subject land does not provide suitable areas for foraging or breeding by this species.
Tyto novaehollandiae **Masked Owl**	-	V	Yes	The Masked Owl is found in range of wooded habitats that provide tall or dense mature trees with hollows suitable for nesting and roosting. It is mostly seen in open forests and woodlands adjacent to cleared lands. Prey includes hollow-dependent arboreal marsupials and terrestrial mammals.	Low	No	No	Low	No hollows suitable for breeding for this species were recorded within the subject land or immediately adjacent to the subject land. Large hollows recorded adjacent to the subject land will not be impacted and are not considered suitable for use due to the vertical position of

Species	Status		BAM predicted SCS	Habitat description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
									entrances. Underboring in areas adjacent to where large hollows occur will provide temporary disturbance to these areas and is not expected to interrupt potential nest sites unless conducted during the breeding season.
Varanus rosenbergi **Rosenberg's Goanna**	-	V	Yes	Rosenberg's Goanna occurs on the Sydney Sandstone in Wollemi National Park, in Goulburn and ACT regions and near Cooma. It is found in heath, open forest and woodland areas, with individuals requiring large areas of habitat of hollow logs, rock crevices and burrows. Termite mounds are a critical habitat component for this species were they can lay up to 14 eggs in a mound, with the hatchlings digging themselves out.	Low	No	No	Low	Following detailed traverses, the impact area was not found to contain significant habitat features in the form of rock crevices, escarpments or steep slopes or hollow logs. In addition, no termite mounds were identified within the impact area. Therefore there is not likely to be any impact to a crucial component of the Rosenberg's Goanna habitat.

Appendix 3 Flora

Appendix 3.1 BAM plot field data

Table A. 3 Flora species recorded in the subject land from BAM plots

Scientific name	Common name	Plot 1		Plot 2		Plot 3		Plot 4		Plot 5		Plot 6		Plot 7	
		Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance
Acacia dealbata	Silver Wattle			0.1	5										
Acaena novae-zelandiae	Bidgee-widgee	0.2	100	0.1	50										
Acetosella vulgaris	Sheep Sorrel					0.1	10	0.1	100					0.2	1000
Agrostis capillaris	Browntop Bent					2	1000	15	3000	10	1000	10	1000		
Anthosachne scabra	Wheatgrass, Common Wheatgrass	0.3	100												
Anthoxanthum odoratum	Sweet Vernal Grass									0.5	100			40	5000
Aristida ramosa	Purple Wiregrass									0.1	10				
Asperula conferta	Common Woodruff			0.1	30										
Bromus catharticus	Praire Grass													1	60
Bossiaea buxifolia						0.1	20								
Bursaria spinosa subsp. *lasiophylla*	Native Blackthorn					5	20								

Scientific name	Common name	Plot 1		Plot 2		Plot 3		Plot 4		Plot 5		Plot 6		Plot 7	
		Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance
Carex appressa	Tall Sedge	0.1	2	0.2	5										
Carex inversa	Knob Sedge	0.1	100	0.2	1000	0.2	1000							0.1	30
Cassinia aculeata	Dolly Bush					0.1	1								
Cassinia sifton						0.1	1			0.3	5	0.1	1		
Centaurium tenuiflorum	Branched Centaury, Slender centaury	0.1	10	0.1	1	0.1	10	0.1	10					0.1	20
Cheilanthes sieberi subsp. *sieberi*	Rock Fern					0.1	30								
Chrysocephalum apiculatum	Common Everlasting	0.1	10												
Chrysocephalum semipapposum	Clustered Everlasting	0.1	10												
Cirsium vulgare	Spear Thistle	0.1	2	0.1	10	0.1	1							0.2	30
Conyza bonariensis	Flaxleaf Fleabane	0.1	100	0.1	20	0.1	10			0.1	2			0.1	20
Coronidium rutidolepis								0.1	10						
Coronidium scorpioides	Button Everlasting					0.1	5								
Crataegus monogyna	Hawthorn	0.2	10	3	10										
Cynodon dactylon	Common Couch	0.5	1000					5	1000	0.2	100	5	500	1	1000
Dactylis glomerata	Cocksfoot			0.5	200	2	1000							0.3	200

Scientific name	Common name	Plot 1		Plot 2		Plot 3		Plot 4		Plot 5		Plot 6		Plot 7	
		Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance
Deyeuxia quadriseta								20	1000			10	1000		
Dichelachne crinita	Longhair Plumegrass	0.1	1												
Dichelachne micrantha	Shorthair Plumegrass					0.1	10								
Dichondra repens	Kidney Weed	0.1	1000												
Echium plantagineum	Patterson's Curse	0.1	2	0.1	2									01	1
Eragrostis leptostachya	Paddock Lovegrass											0.1	1		
Eragrostis trachycarpa	A Lovegrass					0.1	1								
Eucalyptus aggregata	Black Gum	5	7	10	10										
Eucalyptus dives	Broad-leaved Peppermint					15	30								
Eucalyptus mannifera	Brittle Gum					0.5	2								
Eucalyptus pauciflora	White Sally					5	1							5	5
Eucalyptus stellulata	Black Sally	0.1	2												
Euchiton involucratus	Star Cudweed	0.1	20	0.1	1	0.1	30			0.1	5				
Gamochaeta purpurea	Purple Cudweed	0.1	2												
Geranium solanderi var. *solanderi*		0.1	100	0.1	5										

Scientific name	Common name	Plot 1		Plot 2		Plot 3		Plot 4		Plot 5		Plot 6		Plot 7	
		Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance
Gonocarpus tetragynus	Poverty Raspwort					0.5	1000								
Goodenia bellidifolia subsp. *bellidifolia*						0.1	1								
Haloragis heterophylla	Variable Raspwort			0.1	10			0.1	10			0.1	200	0.1	5
Hemarthria uncinata	Matgrass											0.2	10		
Holcus lanatus	Yorkshire Fog											0.1	1	0.3	20
Hydrocotyle laxiflora	Stinking Pennywort					0.1	10								
Hypericum gramineum	Small St John's Wort					0.1	50								
Hypericum perforatum	St. Johns Wort	0.4	1000	1	1000	0.5	1000			0.1	1	0.1	1	0.1	20
Hypochaeris radicata	Catsear	0.2	1000	0.5	1000	0.2	100	10	5000	10	5000	10	2000	0.2	30
Juncus cognatus								0.1	10						
Juncus spp.	A Rush							0.1	5						
Juncus usitatus												0.1	5		
Lactuca serriola	Prickly Lettuce			0.1	1										
Leptospermum continentale	Prickly Teatree					0.2	1								
Ligustrum sinense	Small-leaved Privet	0.1	1												
Lolium perenne	Perennial Ryegrass													0.2	40

Scientific name	Common name	Plot 1		Plot 2		Plot 3		Plot 4		Plot 5		Plot 6		Plot 7	
		Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance
Lomandra filiformis subsp. *coriacea*	Wattle Matt-rush	0.1	10			10	1000								
Lomandra longifolia	Spiny-headed Mat	0.2	2												
Lomandra multiflora subsp. *multiflora*	Many					0.1	20								
Lysimachia arvensis	Scarlet Pimpernel	0.1	1			0.1	2							0.1	5
Microlaena stipoides	Weeping Grass	5	1000	10	2000	60	3000								
Modiola caroliniana	Red-flowered Mat			0.1	10										
Nassella trichotoma	Serrated Tussock	0.3	10	0.1	50										
Oxalis corniculata	Creeping Oxalis	0.1	10	0.1	20										
Oxalis perennans		0.1	10			0.1	10								
Panicum effusum	Hairy Panic									30	5000				
Panicum gilvum								30	5000	0.1	5				
Panicum simile	Two-colour Panic	0.4	100												
Paspalum dilatatum	Paspalum	0.5	100	5	1000	0.1	10	10	1000			0.5	50	20	2000
Phalaris aquatica	Phalaris	1	500	60	5000							0.2	20	0.5	30
Plantago lanceolata	Lamb's Tongues	0.2	100	0.5	500	0.1	10	2	1000	1	500	0.5	1000	45	5000
Poa labillardierei var. *labillardierei*	Tussock	5	200	0.5	500										

Scientific name	Common name	Plot 1		Plot 2		Plot 3		Plot 4		Plot 5		Plot 6		Plot 7	
		Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance
Poa sieberiana	Snowgrass					0.3	500								
Poranthera microphylla	Small Poranthera					0.1	10								
Pterostylis coccina						0.1	5								
Rosa rubiginosa	Sweet Briar			0.3	10	0.1	2								
Rubus fruticosus sp. agg.	Blackberry complex	0.1	10	10	50	4	10	0.1	1			15	5	15	100
Rytidosperma caespitosum	Ringed Wallaby Grass					3	200								
Rytidosperma erianthum	Wallaby Grass	2	1000	5	1000										
Schoenus apogon	Fluke Bogrush											0.1	10		
Senecio madagascariensis	Fireweed			0.1	1										
Senecio prenanthoides		0.1	10	0.1	10										
Setaria pumila	Pale Pigeon Grass							5	1000					0.2	100
Solanum americanum	Glossy Nightshade			0.1	5										
Solanum nigrum	Black-berry Nightshade	0.1	10	0.1	2										
Sonchus oleraceus	Common Sowthistle			0.1	1										
Sorghum leiocladum	Wild Sorghum	0.2	5	2	20										
Sporobolus elongatus	Slender Rat's Tail Grass	0.1	5												

Scientific name	Common name	Plot 1		Plot 2		Plot 3		Plot 4		Plot 5		Plot 6		Plot 7	
		Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance
Themeda triandra		15	1000	0.2	50	0.2	1000								
Trifolium repens	White Clover											0.1	10	0.1	20
Veronica plebeia	Trailing Speedwell	0.1	2			0.1	10								
Vulpia myuros	Rat's Tail Fescue					0.1	2	0.5	100	0.2	500			10	500
Wahlenbergia communis	Tufted Bluebell	0.1	2			0.1	10							0.2	100
Xerochrysum viscosum	Sticky Everlasting					0.1	10								

Appendix 4 Fauna

Table A. 4 Fauna species recorded at the subject land

Common name	Scientific name
Mammals	
Common Ringtail Possum	*Pseudocheirus peregrinus*
Common Brushtail Possum	*Trichosurus vulpecula*
Eastern Grey Kangaroo	*Macropus giganteus*
Rabbit	*Oryctolagus cuniculus*
Squirrel Glider	*Petaurus norfolcensis*
Sugar Glider	*Petaurus breviceps*
Gould's Wattled Bat	*Chalinolobus gouldii*
Little Pied Bat	*Chalinolobus picatus*
Chocolate Wattled Bat	*Chalinolobus morio*
Vespadelus species (Little Forest Bat/ Southern Forest Bat/ Large Forest Bat/ Eastern Cave Bat).	*Vespadelus vulturnus/ regulus/ darlingtoni/ troughtoni**
Little Broad-nosed Bat	*Scotorepens greyi*
Western Broad-nosed Bat	*Scotorepens balstoni*
South-eastern Free-tailed Bat	*Ozimops planiceps*
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*
White-striped Free-tailed Bat	*Austronomus australis*
Eastern Horseshoe Bat	*Rhinolophus megaphyllus*
Large Bent-winged Bat*	***Miniopterus orianae oceanensis***
Birds	
Australian Magpie	*Cracticus tibicen*
Australian Raven	*Corvus coronoides*
Black-eared Cuckoo	*Chalcites osculans*
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*
Brown Quail	*Coturnix ypsilophora*
Brown Thornbill	*Acanthiza pusilla*
Crested Pigeon	*Ocyphaps lophotes*
Crimson Rosella	*Platycercus elegans*
Dollarbird	*Eurystomus orientalis*

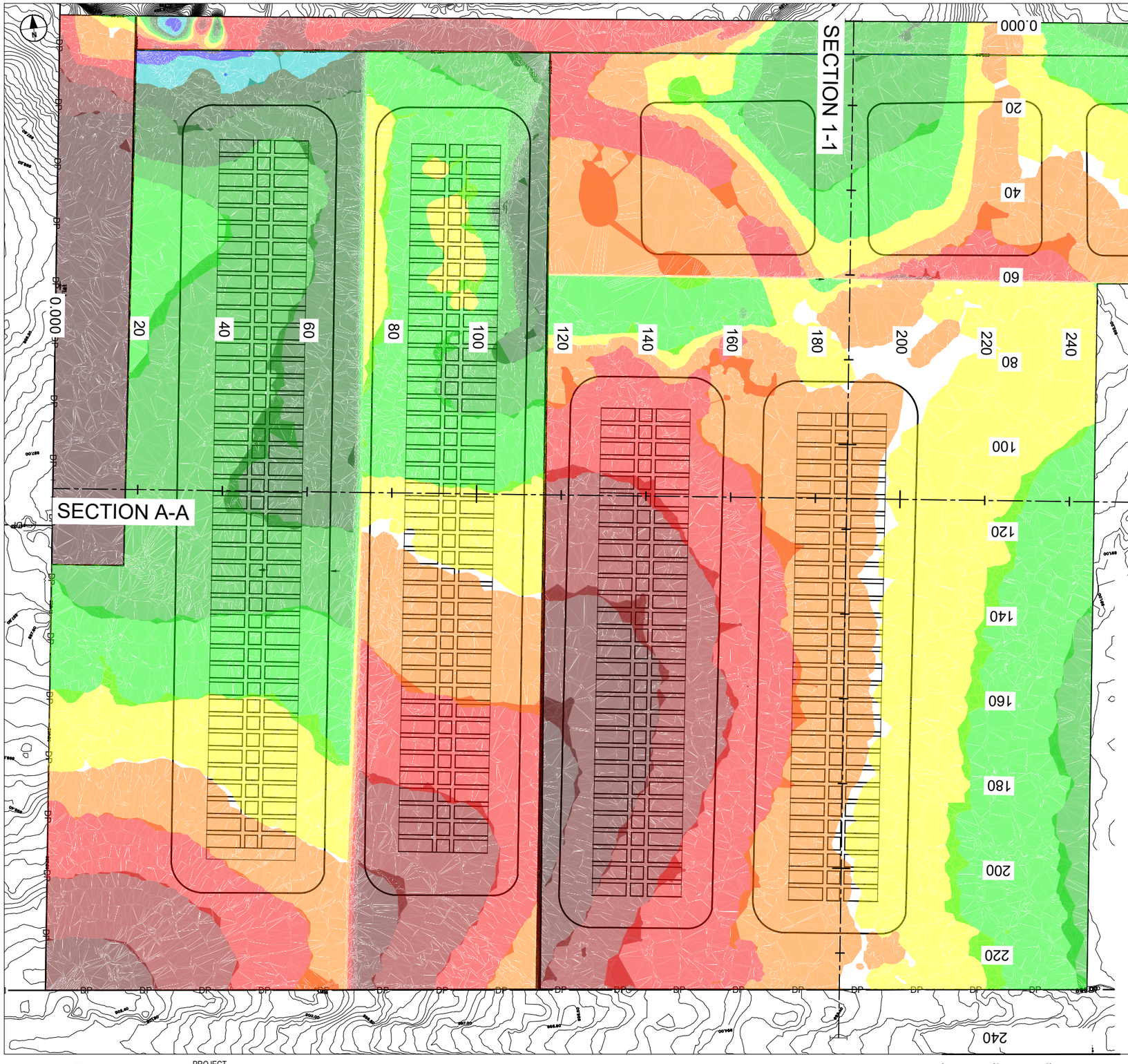
Common name	Scientific name
Double-barred Finch	*Taeniopygia bichenovii*
Dusky Woodswallow*	***Artamus cyanopterus cyanopterus***
Eastern Whipbird	*Psophodes olivaceus*
Eastern Yellow Robin	*Eopsaltria australis*
Fairy Martin	*Petrochelidon ariel*
Fan-tailed Cuckoo	*Cacomantis flabelliformis*
Grey Fantail	*Rhipidura albiscapa*
Grey Shrike-thrush	*Colluricincla harmonica*
Little Eagle*	***Hieraaetus morphnoides***
Little Pied Cormorant	*Microcarbo melanoleucos*
Magpie-lark	*Grallina cyanoleuca*
Noisy Miner	*Manorina melanocephala*
Pacific Black Duck	*Anas superciliosa*
Pale-flecked Garden Sunskink	*Lampropholis guichenoti*
Pied Butcherbird	*Cracticus nigrogularis*
Pied Currawong	*Strepera graculina*
Red Wattlebird	*Anthochaera carunculata*
Red-browed Finch	*Neochmia temporalis*
Red-rumped Parrot	*Psephotus haematonotus*
Restless Flycatcher	*Myiagra inquieta*
Sacred Kingfisher	*Todiramphus sanctus*
Silvereye	*Zosterops lateralis*
Superb Fairy-wren	*Malurus cyaneus*
Welcome Swallow	*Hirundo neoxena*
Whistling Kite	*Haliastur sphenurus*
White-browed Scrubwren	*Sericornis frontalis*
White-necked Heron	*Ardea pacifica*
White-plumed Honeyeater	*Ptilotula penicillatus*
White-throated Treecreeper	*Cormobates leucophaea*
Willie Wagtail	*Rhipidura leucophrys*
Yellow-faced Honeyeater	*Caligavis chrysops*
Frogs	
Bleating Tree Frog	*Litoria dentata*

Common name	Scientific name
Brown-striped Frog	*Limnodynastes peronii*
Common Eastern Froglet	*Crinia signifera*
Sign-bearing Froglet	*Crinia insignifera*
Spotted Grass Frog	*Limnodynastes tasmaniensis*
Brown Tree Frog	*Litoria ewingii*
Eastern Banjo Frog	*Limnodynastes dumerilii*

*denotes Threatened species recorded on site

Appendix E

Cut and fill heat map and cross sections



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-4	to	-3	m	
-3	to	-2	m	
-2	to	-1	m	
-1	to	0.00	m	
0	to	1	m	
1	to	2	m	
2	to	3	m	
3	to	4	m	
4	to	5	m	
5	to	6	m	
6	to	7	m	
7	to	8	m	

CUT FILL VOLUMES (m³)

CUT: 47,000
FILL: 52,000
BALANCE: 5,000 IMPORT

Last saved by: MCKENNAN (2022-07-20) Last Plotted: 2022-07-21
Filename: C:\USERS\MCKENNAN\DOCUMENTS\USEFUL INFO\LITHGOW BATTERY STORAGE AREA\60639954-REF-0000-RD-ROAD-PLAN.DWG

AECOM

PROJECT
LITHGOW BATTERY STORAGE AREA

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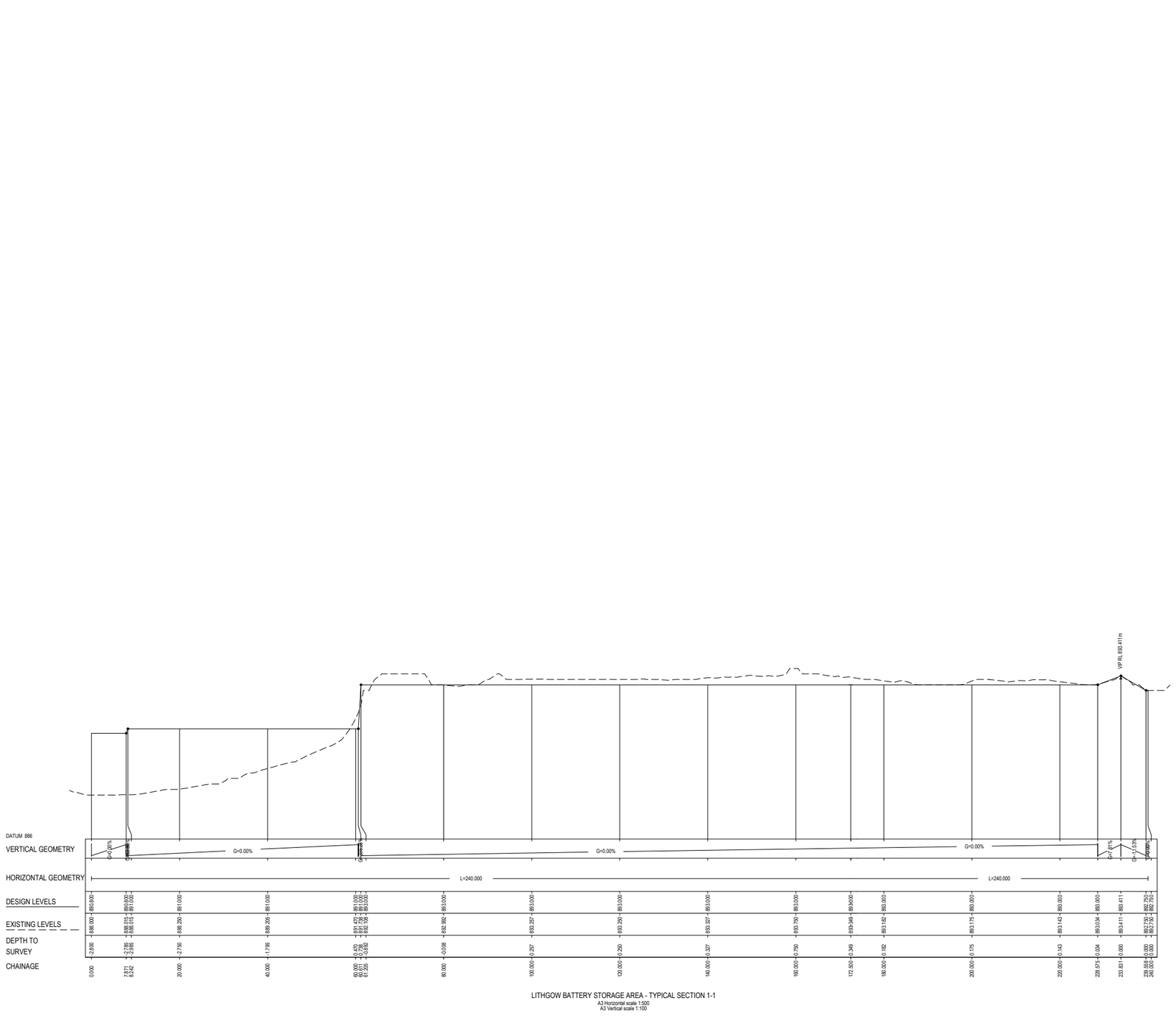
60639954

SKETCH TITLE
CUT FILL VOLUMES



LITHGOW BATTERY STORAGE AREA - TYPICAL SECTION 1-1
A3 Horizontal scale 1:500
A3 Vertical scale 1:100

CONSULTANT

AECOM Australia Pty Ltd
A.B.N 20 093 846 925
www.aecom.com

PROJECT

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SCALES

0 12.5 25 m
1:500

0 2.5 5 m
1:100

PROJECT NUMBER

.

SKETCH TITLE

12d Model Working Sketch Only
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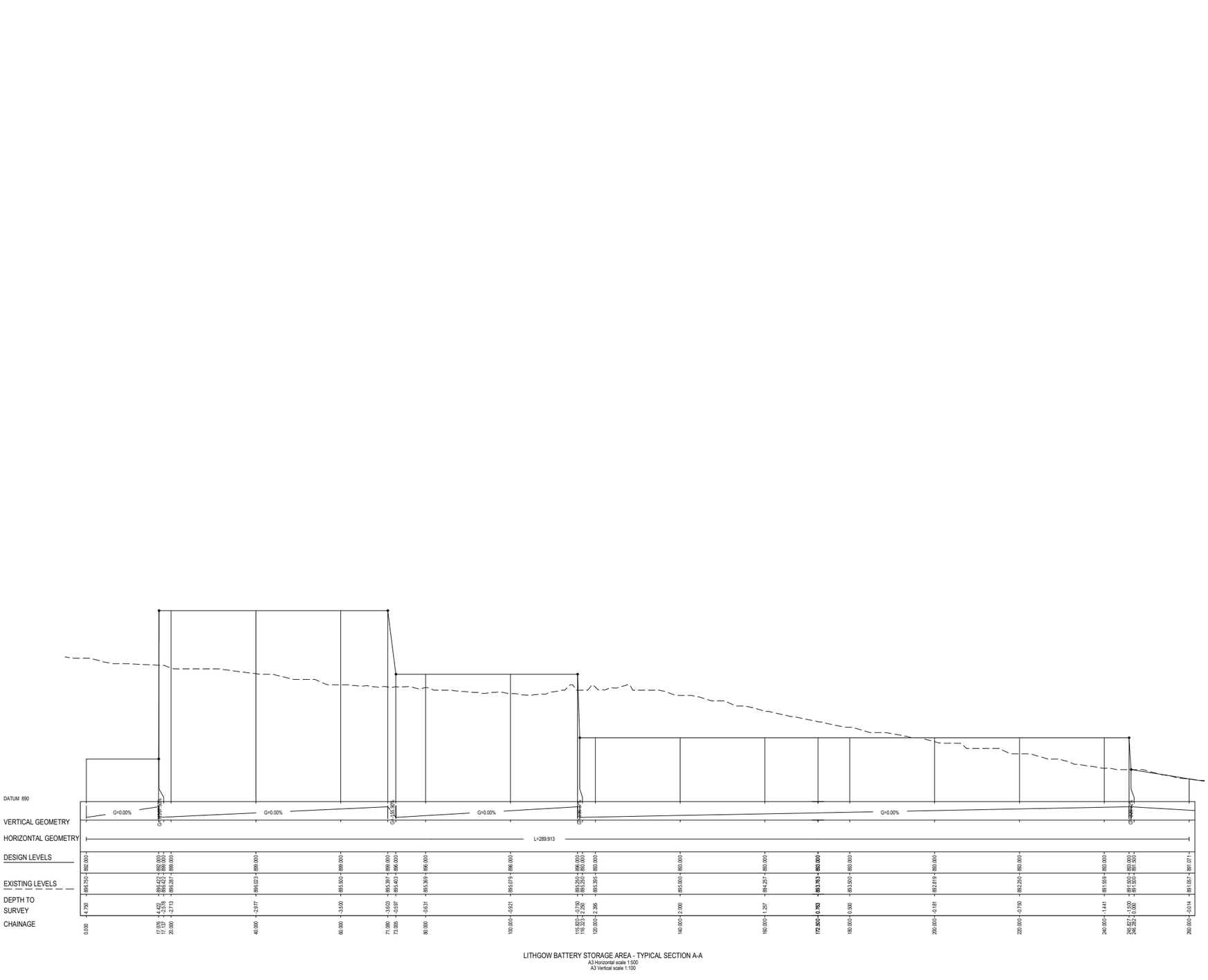
SKETCH NUMBER

.



LITHGOW BATTERY STORAGE AREA - TYPICAL SECTION A-A
A3 Horizontal scale 1:500
A3 Vertical scale 1:100

CONSULTANT

AECOM Australia Pty Ltd
A.B.N 20 093 846 925
www.aecom.com

PROJECT

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SCALES

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1:500

0 2.5 5 m
1:100

PROJECT NUMBER

.

SKETCH TITLE

12d Model Working Sketch Only
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SKETCH NUMBER

.

Appendix F

Landscape plan

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3 November 2022

Sébastien Roebben
Project Manager
Neoen Australia Pty Ltd
Level 10 - 227 Elizabeth Street
Sydney
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Dear Sébastien Roebben

Response to Transport for NSW submission for the Great Western Battery (SSD-12346552)

1.0 Introduction

AECOM Australia Pty Ltd (AECOM) was commissioned by NEOEN to prepare an Environmental Impact Statement (EIS) for the Great Western Battery project (the Project). The Project involves the:

- Construction, operation and maintenance of a battery energy storage system (BESS) of up to 500 megawatts (MW) and approximately 1000 megawatt-hour (MWh).
- A new transmission line to connect the existing Transgrid 330 kilovolt (kV) substation at Wallerawang to the proposed battery energy storage system (BESS).
- Ancillary elements including site access from Brays Lane, construction of permanent operations buildings, drainage features, and other related infrastructure.

The EIS was placed on public exhibition from 8 March 2022 to 4 April 2022. During this time, agencies and community members were invited to make submissions regarding the Project.

2.0 DPE request for additional information

The Department of Planning and Environment (DPE) issued a request for additional information on 8 May 2022. One of the items in this request was to provide further information relating to the visual impact assessment. In particular to *"provide details of proposed visual mitigation including landscape screening".* This additional information is provided below.

2.1 Proposed visual mitigation

The proposed landscape plan is provided as Attachment A. The purpose of the landscape planting is to minimise the visual impact that the BESS has on the surrounding residential area. The landscaped areas would assist in screening the 10 metre high noise walls within the Site, in order to mitigate sightlines from the south and east. Bioretention planting on the north of the Site would maximise pollutant removal whilst grass swales are introduced to the west of the BESS.

2.1.1 Species selection and screening

The proposed planting treatment draws upon the existing planting palette within the township and the wider Lithgow City Council region. Trees and shrubs that are native to the area will provide the appropriate heights and character to lessen the visual impact of the BESS.

The tree selection for site screening from the east includes *Eucalyptus blakelyi*, a hardy native tree that has a moderate to fast growth of up to 20 m tall. *Acacia obtusifolia* is a fast growing, bushy native tree that will assist in the screening of the noise walls and will grow up to 15 m tall. *Banksia integrifolia* is another hardy native tree growing at a moderate pace in full sun that will reach up to 15 m tall. Further emphasis on screening has been placed on the east boundary with the introduction of a large shrub planting mix. Southern and eastern large shrub planting has maximum maturity heights of up to 10 m. This combination of taller trees, shrubs and dense shrubs will help to mitigate the visual impact.

2.1.2 Establishment and Maintenance.

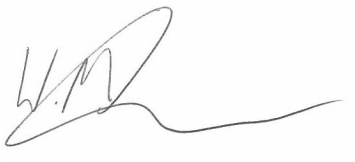
Due to the hardy nature of all proposed planting species, the landscape maintenance would be low, would not require a great deal of water once established and would grow quickly to minimise the potential for weeds. Species have also been chosen in accordance with their longevity in this

environment. Planting would be managed in line with Asset Protection Zone requirements to reduce bushfire risks.

3.0 Conclusion

The proposed landscape plan is considered to be a suitable visual mitigation strategy to provide sufficient screening of the BESS from nearby visual receivers.

Yours faithfully



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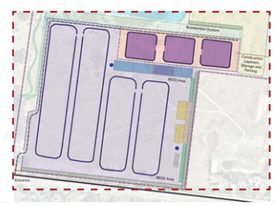
Attachment A – Landscape Plan

WALLERAWANG INDICATIVE SITE LAYOUT WITH LANDSCAPE PLAN

LEGEND

- Project boundary
- **Landscape Planting**
- Large shrubs
- Medium shrubs
- Swale planting
- Tree planting
- Paving
- Construction laydown, storage and parking
- Bioretention system
- Local road
- Proposed access road
- Security fencing
- Access gate
- Transmission line alignment
- Noise wall
- Large transformers
- 330 kV substation
- Control room
- Switch room
- BESS area
- O&M building
- Water tank
- Car park
- Asset Protection Zone

Note:
Vegetation within APZ to be managed in accordance with RFS Standards for Asset Protection Zone



Indicative Species List

Trees

Eucalyptus blakelyi	20.0m x 10.0m
Acacia obtusifolia	15.0m x 10.0m
Banksia integrifolia	15.0m x 6.0m

Large Shrubs

Acacia longifolia	9.0m x 6.0m
Banksia spinulosa	3.0m x 4.0m

Medium + Small Shrubs

Acacia hamiltoniana 'Madien'	3.0m x 2.0m
Grevilliea rosmarinifolia	2.5m x 3.0m
Ozothamnus diosmifolius	2.5m x 1.5m
Rhagodia spinescens	1.2m x 3.0m
Westringia fruticosa	2.0m x 2.0m

Grasses + Ground covers

Dianella revoluta

Hardenbergia violacea 'Meema'

Hibbertia scandens

Lomandra longifolia

Poa labillardieri

Bio-retention planting

Brachyscome microcarpa

Carex appressa

Dianella revoluta

Ficinia nodosa

Hibbertia obtusifolia

Juncus usitatus

Lomandra longifolia

Dianella revoluta

Hibbertia scandens

Poa labillardieri

Swale

Grassed

Planting specifications:

Installation container sizes:

Trees: 200L (minimum)

Large Shrubs: 25L (minimum)

Medium/Small Shrubs: 200mm

Grasses/Ground Covers: 50mm Tube

Spacing:

- Tree planting within APZ to be 10m spacing to avoid canopies touching.
- Large shrubs to be spaced 4-5m apart.
- Medium/Small shrubs to be planted in clumps, clumps to be spaced 2-3m apart.
- Grasses/Ground covers to be installed at 4 plants/m^2.

Not to scale

Project: 60639954

Prepared by: AECOM Pty Ltd ABN 20 093 846 925

Date: 3.11.2022

Revision: E

Appendix G

Contamination Assessment Review

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7 July 2022

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Contamination Assessment Review - Great Western Battery Energy Storage System (BESS) - Contaminated Land

1.0 Introduction

AECOM Australia Pty Ltd (AECOM) has been engaged by Neoen Australia Pty Ltd (Neoen) to complete the Submissions Report for the proposed Great Western Battery (GWB) (the Project), at 173 Brays Lane, Wallerawang, NSW (the Site) (refer to Figure F1 in Attachment A).

Following exhibition of the Environmental Impact Statement (EIS) for the Project (AECOM, 2022), a number of submissions were provided to Neoen for their consideration and response. A submission from Transport for NSW (TfNSW) dated 29 March 2022 requested a Preliminary Contamination Report for the rail corridor where works were proposed. Neoen and TfNSW agreed that this report could be provided following determination of the State Significant Development (SSD) application, should the Project be consented, given the likely contamination status of the rail corridor. However, the Department of Planning and Environment (DPE) have requested further confirmation that the rail corridor is likely to be suitable (given potential contamination risks), or will be able to be made suitable, for the installation of the proposed transmission connection for the Project.

This letter report builds on the contamination assessment provided in the EIS to confirm the likely contamination status of the land, the risks that may be present, the measures required to manage these risks, and that that the rail corridor is suitable or could be made suitable for the proposed transmission connection.

2.0 Project Background

The Project seeks development consent for the construction, operation and maintenance of a battery energy storage system (BESS) of approximately 500 megawatts (MW) and approximately 1000 megawatt-hour (MWh) at 173 Brays Lane, Wallerawang (the Site), as well as a new transmission line that would connect the Site to the existing Transgrid 330 kilovolt (kV) substation at Wallerawang. The Site and the route of the transmission connection are referred to as the Project Area. The Project would provide storage and firming capacity to the National Energy Market as well as additional services to assist grid stability including frequency control ancillary services.

The transmission connection would be installed underground using a combination of trenching and underboring methodologies. Where the transmission connection would be installed using trenching, a maximum excavation depth of 1.5 m below ground surface (m BGS) would be employed.

The Lots managed by TfNSW which the transmission connection passes through are as follows:

- Lot 8 DP252472 – The transmission connection would be horizontally directional drilled (HDD) under this lot. One HDD rig would be located on the Site (Lot 4 DP 751651) and the other would be located on the western side of the rail corridor lot (Lot 9 DP 252472) to south of the Pipers Flat Creek Rail Bridge and north of the rail junction turnout.
- Lot 9 DP252472 – The transmission connection would be installed using HDD and trenching within this Lot. The transmission connection would be installed using HDD from the location just south of Pipers Flat Creek Rail Bridge to a location approximately 150 m north of Main Street. The transmission connection would be installed using trenching for the southern part of this Lot for approximately 150 m. HDD would then be used to install the transmission connection under Main Street and under Lot 2 DP108089 to a location in Lot 1 DP108089, west of the rail line approximately 125 m south of Main Street.

- Lot 1 DP108089 – Within this Lot, the transmission connection would be installed to the west of the rail line for approximately 340 m heading south. Towards the southern and eastern part of this lot the transmission connection would be installed under the rail lines using HDD from this Lot to the north west corner of the Transgrid substation lot (Lot 91 DP1043967).

The new transmission line would connect the BESS to the Transgrid Wallerawang 330 kV substation. The length of the transmission connection within Lots managed by TfNSW land is approximately 1.55 km (hereafter referred to as 'the TfNSW land') where approximately 500 m of transmission connection would be installed using trenching.

With respect to land contamination, the EIS concluded that the land surrounding the Project Area includes potentially contaminating activities associated with industrial, electricity generating, and agricultural land uses.

3.0 TfNSW Submission and discussions

TfNSW provided a submission dated 29 March 2022 which included comments on transport related matters and also requested that a Preliminary Contamination Report be produced to confirm the presence of contamination that may be present within the rail corridor. This submission was informed by the road and rail teams in TfNSW as well as the team at UGL Regional Linx (UGLRL) who has been appointed by TfNSW to manage the Country Rail Network (CRN).

A meeting with TfNSW was held on 6 June 2022 to discuss the submission. At this meeting the conclusions of the contamination assessment within the EIS and the need for a Preliminary Contamination Report was discussed. AECOM provided an overview of the EIS assessment and noted that the risk of contaminants in the rail corridor was low, should contaminants of potential concern be present they are likely to be typical of rural rail corridors and as such whilst no investigations are required at this stage to understand the risk further, ground investigations would take place prior to the transmission connection being installed. In addition, appropriate mitigation measures were identified to manage and address potential contamination impacts, if present. This included commitments to remove excavated material that did not meet commercial / industrial land use criteria for disposal off-site and replacement of this material with backfill of an appropriate standard.

TfNSW confirmed that they did not need to have the Preliminary Contamination Report provided prior to determination of the SSD application but that they would like to have a copy of any contamination investigations that are completed prior to works commencing for their records.

Subsequent to the TfNSW meeting, Neoen also spoke with UGLRL to discuss the need for a Preliminary Contamination Report and they also agreed that this report could be provided following determination of the SSD application should the Project be consented.

The outcomes of these meetings were discussed with DPE. However, DPE has requested further confirmation that the rail corridor is likely to be suitable (given potential contamination risks), or will be able to be made suitable, for the installation of the proposed transmission connection for the Project. To provide further confidence regarding the conclusions of the contamination assessment in the EIS, it was agreed that Neoen would provide a letter to DPE which built on the previous assessment, confirmed the conclusions presented and was to be signed by a suitably qualified and experienced contamination consultant.

4.0 Objectives

The objectives of this letter report are to provide a review of the contamination assessment provided in the EIS to:

- Confirm the likely risk of encountering potential contaminated materials during the construction of the Project.
- Develop a Project Conceptual Site Model (CSM) which includes the potential contamination sources, receptors and exposure pathways for the Project.
- Re-assess the Source-Pathway-Receptor (S-P-R) linkages undertaken for the Project EIS to further confirm suitable management measures or identify other mitigation measures, if required.
- Confirm that that the rail corridor is suitable or could be made suitable for the proposed transmission connection.

5.0 Scope of Work

The approach and methodology to meet the objectives of these works comprised:

- Desktop review of historical and current aerial photographs and publicly available data to assess conditions of the Project and its vicinity. This review identified and confirmed the potential sources of contamination and human health/ecological receptors.
- Development of the preliminary CSM to assess complete and potentially complete S-P-R linkages by understanding the site conditions and the controls that would be put in place during the construction works and operation of the transmission line.

The scope of work specifically consisted of:

- Review of available site contamination reports relevant to the Project
- Review of the Lotsearch report (refer to Attachment B) prepared for the Project (Lotsearch, 2021) which comprises:
  - Historical aerial photographs for the years 2020, 2015, 2007, 1999, 1994, 1984, 1975, 1966, 1961, 1955, 1943
- Review of publicly available information from government database searches and maps:
  - Various NSW Environment Protection Authority (EPA) records
  - Historical topographic maps
  - Registered groundwater wells
  - Geology, soils, acid sulfate soil risk, dryland salinity potential
  - Lithgow Local Environmental Plan 2014 (LEP) land use zones
- Documentation of this letter to review the contamination impact assessment provided within the EIS for the Project construction and operation, in comparison to the searches undertaken above.

6.0 Site Environmental Setting

A summary of the environmental setting of the Project Area from the EIS and review of publicly available information is presented in **Table 1**.

Table 1 Summary of the Site Environmental Setting

Aspect	Description
Land Use zoning (refer to Figure F2, Attachment A)	The Site is located on land zoned as RU1 (Primary Production). The transmission connection passes through land zoned RU1 (Primary Production), IN1 (General Industrial) and SP2 Rail Infrastructure Facility.
Topography	Regionally, Wallerawang is located at the base of a valley which slopes from the north, east and south towards Wallerawang and Lake Wallace. The Site slopes to the southeast towards Pipers Flat Creek, with the land proposed for the BESS development ranging from approximately 902 m to 891 m AHD. The transmission connection alignment descends from the Site to around 875 m AHD close to Pipers Flat Creek before rising to generally around 880 m AHD to the Transgrid Wallerawang 330 kV substation. North of Main Street the transmission connection alignment follows a topographical spur which separates the catchments of Pipers Flat Creek to the west and Coxs River to the east.
Geology and Soils (refer to Figure F3 and Figure F4, Attachment A)	Soils within the Project Area and surrounds viewed on eSPADE, include Cullen Bullen, Pipers Flat (corresponding to the Piper's Flat Creek), Lithgow and Disturbed Terrain (associated with the areas of Wallerawang Power Station Lidsdale Siding and the Transgrid Substation). A review of the Lithgow LEP Acid Sulfate Soil Risk Mapping did not identify any risk of acid sulfate soils. The NSW DPE Hydrogeological Landscape and Salinity

Aspect	Description
	Hazard Maps (viewed through eSPADE) did not identify any areas of inland soil salinity risk. No risk of mine subsidence was identified from a review of the NSW Government Mine Subsidence District Mapping. Soil sampling was completed and documented in the AECOM (2022) EIS. a total of six samples were tested for erosivity within the BESS area and along the north western area of the transmission line alignment (excluding the area which aligns with the rail line). No information pertaining to contamination was recorded during the investigation. The 1:100,000 geological map sheet for the Western Coalfield (south) indicates that the surface geology of the Project Area is of Permian to Quaternary, underlain by Early to Later Permian Shoalhaven Group. Quaternary alluvium is present in the floodplains of the Pipers Flat Creek and Coxs River.
Hydrogeology (refer to Figure F5, Attachment A)	A review of available groundwater assessments undertaken within close proximity to the Project Area indicates that there is a shallow unconfined aquifer in the vicinity of the Project and new transmission line. A deeper regional aquifer is present in the region which outcrops to the north of the new transmission line location (RPS, Aquaterra, 2012). Based on the NSW Office of Water real-time continuous water monitoring network, the likely depth to the shallow unconfined aquifer was approximately 1.64m BGS, located approximately 120 m from Pipers Flat Creek. It is considered that the shallow unconfined aquifer may be associated with local recharge of the groundwater table from the creek. As creek lines within the area are identified to be ephemeral, seasonal variation in groundwater levels may occur. The floodplain for Pipers Flat Creek sits at an elevation of approximately 875 m AHD. As the Site is located approximately 13 – 17m above the flood plain of Pipers Flat Creek it is expected that the groundwater table would occur at depths greater than 10 m BGS. The underground installation of the transmission line between the Site and the Transgrid Wallerawang 330 kV substation would require the cable to be installed beneath Pipers Flat Creek and its flood plain. Groundwater in this location is likely to be closer to the surface with the closest borehole (GW110520) providing a standing water level of 1.64 m BGL. As such it is possible that groundwater could be intercepted during the installation of the transmission line. However, these activities are considered to be minimal impact activities under the *NSW Aquifer Interference Policy* (DPI, 2012). In the absence of site-specific data, it is considered that groundwater flow would be consistent with the topography of the Project Area, towards Pipers Flat Creek or Coxs River where the transmission alignment comes closer to the Transgrid Wallerawang 330 kV substation. A search of the Australian Groundwater Explorer available from the Bureau of Metrology identified seven registered groundwater bores present within a 1 km radius of the Project Area as summarised in **Table 2**. The EIS (AECOM, 2022) indicates that bore GW053071 located in the Project Area was no longer used for irrigation purposes.

Aspect	Description
	Table 2 Registered Groundwater Bores

Bore Number	Use	Approx. Distance from Project Area
GW053071	Irrigation	In the Project Area
GW110437	Test Bore	575 m
GW110520	Industrial	740 m
GW115011	Monitoring	750 m
GW115261	Not available	750 m
GW115010	Monitoring	830 m
GW115260	Not available	830 m

No standing water levels were available for the above registered groundwater bores. Other registered monitoring wells were used for monitoring or test bores.

A search for groundwater dependent ecosystems (GDEs) that may occur within the Project Area was undertaken using the Bureau of Meteorology's (BoM) Groundwater Dependent Ecosystems Atlas, as follows:

- Black Gum grassy woodland of damp flats and drainage lines of the eastern Southern Tablelands vegetation community. This vegetation community occurs in a small pocket at the north west of the Site, and within the vegetated area east of Brays Lane through which the transmission connection would traverse. This vegetation community is also listed as an Endangered Ecological Community (EEC) under the *Biodiversity Conservation Act 2016 (NSW)*.
- Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the South Eastern Highlands. This vegetation community occurs in small pockets to the north west and south west of the Project Area.

7.0 Contamination Assessment

7.1 NSW EPA Records

A review of the NSW EPA Contaminated Land Record of Notices and the List of Notified Sites was undertaken on 28 June 2022. The results of the review identified two contaminated sites notified to the EPA within a 5 km radius of the Project Area. These included:

- Wallerawang Power Station for other petroleum; and
- Lidsdale Coal Loading Facility for other industry.

Both sites were listed as "regulation not required" under the *Contaminated Land Management 1997 Act (NSW)*. Additional reviews of the NSW EPA and Department of Defence websites indicated there are no gasworks, no Department of Defence properties in which per and poly-fluoroalkyl substance (PFAS) investigations were being completed and no NSW EPA PFAS investigation sites within a 5 km radius of the Project.

7.2 Historical Mapping

A review of historical maps (Wallerawang Topographic Sheet from 1932 [Australian Survey Corporation]) did not identify any additional information pertaining to potential contamination sources in the vicinity of the Project. No historical parish maps were available for review.

7.3 Historical Aerial Imagery Review

A review of the historical aerial imagery provided by the Lotsearch Aerial report (Attachment B) and the Historical Image Index (NSW Government) was completed to understand the potential for current and historical contaminating land uses to have occurred within the vicinity of the Project. **Table 3** provides a summary of the review of the historical aerial images for the Project and surrounds.

Table 3 Historical Aerial Imagery Review

Year	Project Area	Project Area Surrounds
1954	The Site is cleared with the exception of vegetation in the northwest and southwestern corners and a small portion of the eastern boundary. Two drainage lines are present running west to east which appear to be tributaries of Piper Flat Creek. Both drainage lines converge at towards the centre of the Site. No riparian vegetation is apparent corresponding to the drainage lines. The transmission connection alignment appears to comprise a combination of native vegetation, rail line and cleared ground surface which may be potentially unsealed construction access tracks. The present day Transgrid Wallerawang 330 kV Substation is not apparent in the aerial image.	**North:** The area north of the Project area is primarily open space land (appears to be grassed) with heavily vegetated area to the northwest. **South:** Immediately southeast of the Site are buildings which appear to form a homestead. Further south is areas of cleared ground corresponding to the rail line and the present location of the Lidsdale Coal Loading Facility. Potential that this area may have been used as a construction yard during the construction of Wallerawang Power Station. The town of Wallerawang is apparent in the far south primarily comprising of low-density residential homes. **East:** Wallerawang Power Station appears to be under construction with a large portion of ground appearing to have been cleared. Eight buildings are located within the vicinity of the power station which appear to be industrial. **West:** The visible area primarily comprises of open space (grassed) and vegetated areas.
1969	The Site is generally consistent with the 1954 aerial image however some tree clearing has occurred. The transmission line alignment also appears generally consistent with the 1954 aerial image, however land clearing / earthworks is no longer apparent indicating potential construction works may have finished.	All areas surrounding the Project Area appear to be generally consistent with the 1954 aerial image with the exception of the following: • Wallerawang Power Station construction is now completed and appears to be operational. • Areas of vegetation clearing are now apparent in northern and southern surrounding areas. • The Wallerawang Sewage Treatment Plant is apparent approximately 900 m south west of the Site.

Year	Project Area	Project Area Surrounds
1972	Both the Site and transmission line alignment are generally consistent with the 1969 aerial image. Construction of the present day Transgrid Wallerawang 330 kV Substation appears to have commenced.	All areas surrounding the Project Area appear generally consistent with the 1969 aerial image with the exception of the following: • Further construction works is apparent at Wallerawang Power Station, however the image quality is too poor to determine specific activities. • A water reservoir has been constructed the north of the Project Area.
1984	The Site appears to now be split into three paddocked areas, with the dam adjacent to the eastern boundary now apparent. The rail corridor has been extended to the present-day alignment extending along the transmission line alignment in a north south direction.	**North and West:** are generally consistent with the 1972 aerial image. **East:** Construction appears to be finished within the Wallerawang Power Station and the Transgrid Wallerawang 330 kV Substation. **South:** The Lidsdale Siding coal handling facility is now apparent in its present-day location. To the south of this facility, a new tree plantation area is apparent however, trees appear to be immature. Additional development of low-density properties is also visible in Wallerawang to the far south.
1989	Generally consistent with the 1984 aerial image.	Generally consistent with the 1984 aerial image however, vegetation in the plantation area appears mature.
1998	The transmission line alignment is generally consistent with the 1989 aerial image. Earthworks and construction of a dam is apparent towards the centre of the Site with the surface water drainage channels no longer visible.	Generally consistent with the 1984 aerial image however, some additional development has occurred within Wallerawang and some structures have been removed at Wallerawang Power Station including one of the generators.
2001	Generally consistent with the 1998 aerial image.	Generally consistent with the 1998 aerial image.
2006	Generally consistent with the 2001 aerial image.	Generally consistent with the 2001 aerial image.
2019	Generally consistent with the 2006 aerial image.	Generally consistent with the 2006 aerial image however, Wallerawang Power Station appears to now be in the process of decommissioning.

Based on the historical aerial photo review, potential contaminating activities at the Project Area would likely to be related to historical agricultural activities and use of the land as a rail corridor from between 1972 and 1984. Industrial activities in the vicinity of the Project Area at the Transgrid Wallerawang 330 kV Substation, Wallerawang Power Station, Lidsdale Coal Loading Facility and Wallerawang Sewage Treatment Plant may have contributed to potential contamination of the Project Area.

7.4 Summary of Contamination Assessment

Based on the review provided herein from available site data, **Table 4** identifies the potential sources of contamination that were identified in and surrounding of the Project Area. Potential sources of contamination are presented on Figure F6, Attachment A. Overall the data review is consistent with the findings of the contamination study provided in the EIS.

Table 4 Potential Sources of Contamination and Impact on the Project Area

Potential Sources of Contamination	Potential Impact on the Project Area	Likelihood of Impact
Rail uses along the rail line corridor	Potential for contamination in surface soils due to historical ongoing operation of rail infrastructure in the transmission line corridor since the 1970s, including the historical use of fuel, grease, solvents and chemicals and the possible for trace asbestos from old train brake pads. No records of major incidents have been identified; therefore, it is considered that the risk of encountering contamination is low and if encountered can be managed during construction.	Possible
Potential presence of imported fill materials from an unknown origin	Imported fill material (often associated with disturbed terrain soil types) can be of unknown origin and composition, potentially containing contaminated materials. As no information is available the risk of encountering contaminated fill materials is considered to be low to moderate, noting that construction activities are expected to extend to a depth of 1.5m BGS. The contaminants of potential concern (CoPC) expected in fill materials can be managed during construction by an unexpected finds protocol and work health and safety procedures.	Possible
Wallerawang Power Station	Potential for contamination arising at the Wallerawang Power Station to leach to deeper groundwater and migrate to within the Project Area. The Project is unlikely to intercept ground water in deeper aquifers given the proposed excavation depths. Should the power station have contaminated shallower groundwater associated with alluvial soils of the Coxs River, and based on the topographical spur that forms a boundary between the Pipers Flat Creek catchment and the Cox's River catchment, it is likely that contamination in groundwater would have flowed to the northeast away from the Project Area and on to the Cox's River.	Unlikely
Lidsdale Siding (Coal Loading Facility)	Potential for contamination arising at the Lidsdale Siding to leach to deeper groundwater and migrate to within the Project Area. The Project is unlikely to intercept ground water in deeper aquifers given the proposed excavation depths. Should the Lidsdale Siding have contaminated shallower groundwater associated with alluvial soils of the Pipers Flat Creek, given the topographical spur that forms a boundary between the Pipers Flat Creek catchment and the Cox's River catchment, it is likely that this contamination in groundwater would have flowed to the northwest, away from the transmission connection alignment. As such the risk of encountering contamination is considered to be low as the excavation activities associated with installing the transmission connection are expected to extend to a maximum depth of 1.5m BGS.	Unlikely
Wallerawang Ash Repository	The Wallerawang Ash Repository is located, approximately 2.5 km to the northwest from the Project Area. Due to the distance of this source, the construction activities proposed and that the ash repository is not associated with the alluvial soils of Pipers Flat Creek or Coxs River, it is considered that	Unlikely.

Potential Sources of Contamination	Potential Impact on the Project Area	Likelihood of Impact
	the risk of encountering contamination from this source to be low.	
Septic Tanks on residential properties within the Project Area	Potential for contamination in surface soils and localised groundwater to be present due to historical and ongoing use of septic tanks at properties adjacent to the Project Area. Given that these properties have been occupied and Septic tanks are required to be maintained in accordance with local council regulations, it is considered that the risk of encountering contamination from this source to be low.	Unlikely
Hazardous materials (asbestos and lead paints) which may be present in building materials used to construct houses adjacent to the Project Area	Potential for hazardous materials (such as asbestos and lead paints) to be present in building materials on properties surrounding the Project Area, noting that properties immediately adjacent to the Site were constructed prior to 1954. Deterioration of these materials over time may potentially cause localised contamination to surface soils. Based on the vicinity of these sources to the Project Area it is considered that the risk of encountering contamination from this source to be low.	Unlikely
Storage and use of pesticides, fertiliser, herbicides, fuels and/or other agricultural chemicals within and adjacent to the Site.	Potential for contamination in surface soils and groundwater due to historical and ongoing agricultural land use within and adjacent to the Project Area. Based on the aerial imagery review, no intensive farming practices have been conducted within the Project Area. It is likely that the storage and application of chemicals within the Project Area would be limited and therefore the risk of encountering contamination from this source is considered to be low. Given the distance of the pine plantations at the Lidsdale coal loading facility, from the Project Area, the risk of encountering contamination from the potential use of pesticides and herbicides is considered to be low.	Unlikely
Wallerawang Sewage Treatment Plant	Potential contamination of surface waters and leaching to groundwater. Based on the proximity of this source to the Project Area and the expected depth of groundwater, it is considered that the risk of encountering contamination from this source is low.	Unlikely

Where there is a possible likelihood of encountering contamination from the identified potential sources, these sources have been carried forward into a preliminary CSM for further assessment.

8.0 Preliminary Conceptual Site Model

The preliminary CSM for the Project Area was considered in its current proposed configuration in context of future construction works and maintenance based on information obtained to date. Should the proposed Project Area change, reassessment of the preliminary CSM may be required.

8.1 Potential Sources of Contamination and Contaminants of Potential Concern

Based on the preliminary CSM developed, the following sources of contamination and corresponding CoPC have been identified:

- Current and historical rail uses along the rail line corridor which corresponds to the Project Area for the installation of the transmission line through TfNSW land. CoPC comprise asbestos, Total Recoverable Hydrocarbons (TRH), Benzene, Toluene, Ethylbenzene, Xylene (BTEX), Polycyclic

Aromatic Hydrocarbons (PAHs), Volatile Organic Compounds (VOCs), Semi-volatile Organic Compounds (SVOCs) and heavy metals.

- Potential presence of fill materials from an unknown origin and quality used during the development of the rail line corridor. CoPC comprise asbestos, TRH, BTEX, PAHs, VOCs, SVOCs, Polychlorinated Biphenyls (PCBs), Organochlorine and Organophosphorus Pesticides (OCPs and OPPs), heavy metals and foreign materials.

8.2 Transport Mechanisms

Based on the identified potential sources of contamination within the Project Area and the surrounding area, the following contamination transport mechanisms could potentially result from construction of the Project and/or during the future operation / maintenance of the transmission connection:

- Aerial dispersion of potentially contaminated soil derived dusts during construction works.
- Volatilisation of volatile CoPC within soil.
- Leaching of contaminants from disturbed soils to deeper soils and into groundwater and subsequent migration.
- The release of contaminants from soils to surface water-run off and subsequent migration through the surface water network.
- Sorption of contaminants from surface water to sediments and potential rerelease during high flow events or sediment disturbance.

Based on the nature of activities being undertaken during the construction it is considered unlikely that groundwater will be encountered in the Project Area with the exception of the location of under boring at Pipers Flat Creek. It is understood that minimal (if any) dewatering of groundwater is likely to be required during construction or during future operations based on the following:

- The majority of the proposed transmission connection (approximately 1 km of the 1.55 km alignment) would be installed by HDD which would minimise the amount of excavation required and the handling and management of soils.
- During the HDD work, drilling fluids would be used to create a low-permeability barrier in the hole and any aquifer that may be encountered. Positive pressures in the hole would maintain the stability of the walls and mud cake, which would only be required until pipes are inserted, and the aquifer is sealed off.
- The drilling methodology is only expected to exchange a small amount of water near the open section of the hole which would be collected and stored before being disposed of off-site to a licenced facility.
- The sections of the transmission connection which would be installed using trenching (approximately 550 m) are located away from the main watercourses of Pipers Flat Creek and Coxs River and are located on a topographical high point that separates these catchments. Given the shallow excavations proposed (up to 1.5 m BGS), it is unlikely that groundwater would be intercepted.
- During operation, the transmission connection is unlikely to require significant maintenance and as such disturbance of the soils within the transmission alignment and rail corridor is unlikely.

8.3 Potential Human Health Receptors

Based on this desktop review, the following potential human health receptors have been identified within the Project Area, which may be exposed to potentially contaminated environment media during construction activities:

- Construction and Maintenance workers conducting intrusive ground works during the development of the Project and future sub-surface maintenance work upon the completion of construction activities.
- Commercial workers who may be present during construction but undertake no intrusive works (this is considered to include site visitors).

Off-site receptors such as surrounding residents, commercial and agricultural workers and recreational users of creek lines fall outside the scope of this assessment as they are unlikely to be impacted by the construction of the transmission connection given their distance from the Project Area and works proposed. Therefore these receptors have not been considered further.

8.4 Potential Ecological Receptors

Based on this desktop review, the following potential ecological receptors have been identified within the Project Area, which may be exposed to potentially contaminated environment media during construction activities:

- Aquatic and terrestrial (riparian) ecosystems of the Pipers Flat Creek and Coxs River and associate tributaries.
- Terrestrial ecosystems present within the Project Area and surrounds.

Two GDEs were identified to occur within the Project Area comprising Black Gum grassy woodland of damp flats and drain lines (northwest of the Project Area) and Broad-leaved Peppermint – Red Gum grassy open forest (north west and south west of the Project Area).

It is however noted that potential risks to ecological receptors associated with construction activities would be managed as part of the Construction Environmental Management Plan (CEMP) which will include the following mitigation measures:

- The proposed HDD method of constructing the new transmission connection in areas of environmental sensitivity would allow the Project to avoid direct physical disturbance of the above mentioned GDEs.
- The certified products used for drilling fluid slurry would be inert (such as bentonite clay) or biodegradable (such as xanthan gum).
- Drilling fluids and cuttings are to be stored in a temporary lay down area to minimise leaching of potential contaminants to the environment, and subsequently disposed of to a licenced landfill facility.
- Handling potentially contaminating substances such as chemicals, fuels, oils and contaminated materials (such as excavated fill) in accordance with relevant Australian Standards and guidelines.
- Developing and implementing an adequate spill response plan which complies with regulations.
- The installation of passive containment measures such as silt fencing to capture potentially contaminated eroded soils from entering waterways.

Based on the mitigation measures that would be implemented, the risk to ecological receptors is considered to be low and therefore has not been further considered in this CSM.

8.5 Potential Exposure Pathways

The following potential pathways for contamination have been identified:

- Dermal contact, incidental ingestion and inhalation of contaminated soils / soil derived dusts in outdoor air.
- Dermal contact and incidental ingestion of potentially contaminated shallow groundwater at the HDD rig location close to Pipers Flat Creek.
- Inhalation of soil derived vapour in outdoor air and / or a trench.

It is understood that transmission connection is to be HDD under Pipers Flat Creek therefore, workers completing construction activities would not be in contact with surface waters or sediments of Pipers Flat Creek.

8.6 Source-Pathway-Receptor Linkage Assessment

Based on the data review, the following potentially complete source-pathway-receptor linkage (SPR) were identified in **Table 5**.

Table 5 SPR Linkage Assessment - Human Health

Exposure Pathways / Receptors	Dermal contact and incidental ingestion of soil	Inhalation of soil derived dust in outdoor air	Inhalation of soil and groundwater derived vapour in outdoor air	Dermal contact and incidental ingestion of groundwater
Construction and Maintenance Workers	×[1]	×[1]	×[1]	×[1]
Commercial Workers and Site Visitors	×[2]	×[1]	×[1]	×[2]

Notes:
[1]It is considered that works will be completed within the Project Area in accordance with relevant work health and safety legislation, the implementation of CEMP and permitting requirements.

[2] Commercial workers and site visitors are not expected to undertake intrusive works on-site where they may come in contact with soil and groundwater.

Overall, the risk to human health and ecological receptors from understanding of the site conditions, development of the CSM and information on the construction works along the transmission connection, is considered low and can be managed under the implementation of a CEMP and unexpected finds protocol.

9.0 Conclusion

Based on the preparation of EISs and Review of Environmental Factors (REFs) for historical land uses associated with rail use (such as Rozelle Rail Yards[1], numerous preliminary and detailed site investigations for the former State Rail Authority of NSW, and investigation and remediation of regional rail sidings for John Holland on behalf of Australian Rail Track Corporation [ARTC]), AECOM has knowledge of rail corridors and understands the potential contamination sources and associated CoPC that need to be considered in this Contamination Assessment. In the context of this Project, AECOM considers the proposed land use of the transmission line to have a low sensitivity in relation to other surrounding land uses in the area.

Based on the review of the Contamination Assessment within the EIS for this Project, development of the Preliminary Conceptual Site Model and revised S-P-R linkage assessment, it is considered unlikely that potential sources of contamination have significantly impacted the Project Area, inclusive of the transmission connection alignment within the rail corridor. The installation of a transmission line within the rail corridor would involve the installation of a land use with a low sensitivity to this land. As noted in Section 8.5, the potential exposure pathways are limited to the installation of the transmission line. The proposed land use does not promote continuous human occupation, with the exception to periodic maintenance activities. It is likely to be installed and maintained by contractors with experience working in rail corridors who understand how to install cables and other utilities in these areas. On this basis it can be concluded that the rail corridor is a suitable location for the proposed transmission connection. These findings are consistent with the findings of the EIS, including compliance with clause 4.6 of the *State Environmental Planning Policy (Resilience and Hazards) 2021*.

Whilst the risk of potential contamination from the identified sources is considered to be low, construction works within the Project Area should be undertaken under a CEMP, as stated in Section 7.4 and should also include the following:

- Soil and Water Management Plan (SWMP) to document the erosion and sediment controls across the Project and in the vicinity of Pipers Creek and Coxs River.

[1] RMS (2016) Rozelle Rail Yards – Site Management Works Review of environmental factors, dated November 2016

- Documentation of relevant work health and safety (WH&S) standards and controls for the works including the standard use of personnel protective equipment (PPE) to mitigate the risk of being exposed to potentially contaminated materials (such as long clothing).
- An unexpected finds protocol (UFP) as part of the CEMP, which should be used to manage any unexpected contamination which may be encountered during construction works.

Intrusive investigations of the shallow soils (to 1.5m BGS) as part of a Preliminary Contamination investigation are not warranted at this stage given that:

- The potential contamination sources, associated CoPC and preliminary CSM have been confirmed by this review and the potential impact to the Project Area is considered low; and
- Construction works can be managed by implementation of a CEMP.

Nevertheless, as agreed with TfNSW, intrusive investigations would be conducted, if required, prior to the commencement of the construction works if the Project is consented.

10.0 References

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Yours faithfully

Orla Ferguson
Associate Director - Environment

Brad Eismen
Industry Director CEnvP, CS

encl: Attachment A - Figures
Attachment B - Historical Aerial Photographs

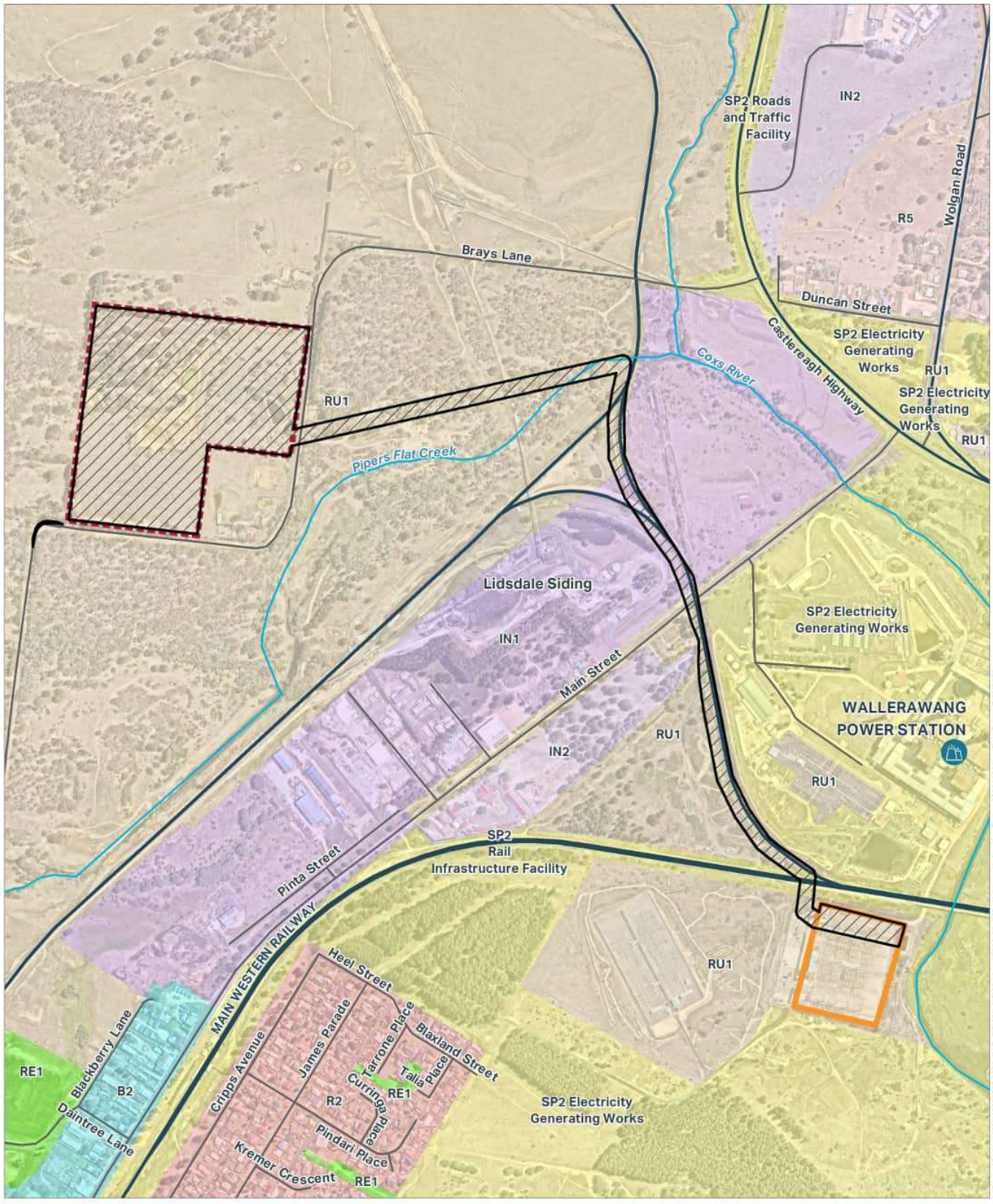
Legend

- The Site
- Transgrid 330kV Wallerawang Substation
- The Project Area
- Cadastre Boundaries
- Transmission Line
- Railway
- Watercourse

N 0 200 400 m

AECOM

Figure F1 - Site Location



Legend

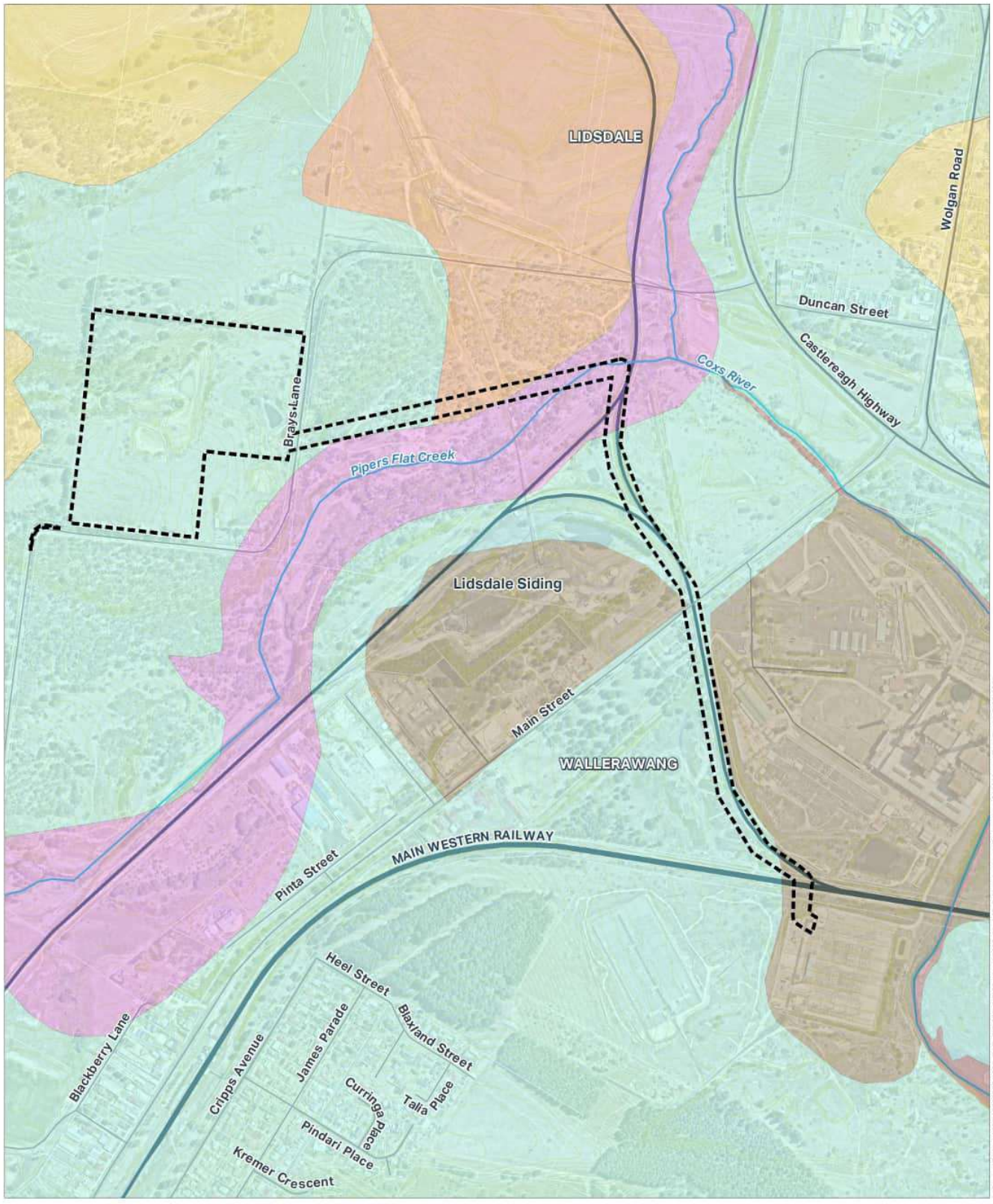
- The Project Area
- The Site
- TransGrid 330kV Wallerawang Substation
- Watercourse
- Primary Road
- Local Road
- Railway

LEP Land Zoning

- B2 Local Centre
- IN1 General Industrial
- IN2 Light Industrial
- R2 Low Density Residential
- R5 Large Lot Residential
- RE1 Public Recreation
- RU1 Primary Production
- SP2 Infrastructure

N 0 100 200 m AECOM

Figure F2 - Land Use



Legend

- Project Area
- Watercourse
- Railway
- Primary Road
- Local Road
- Contours

Soil Landscapes

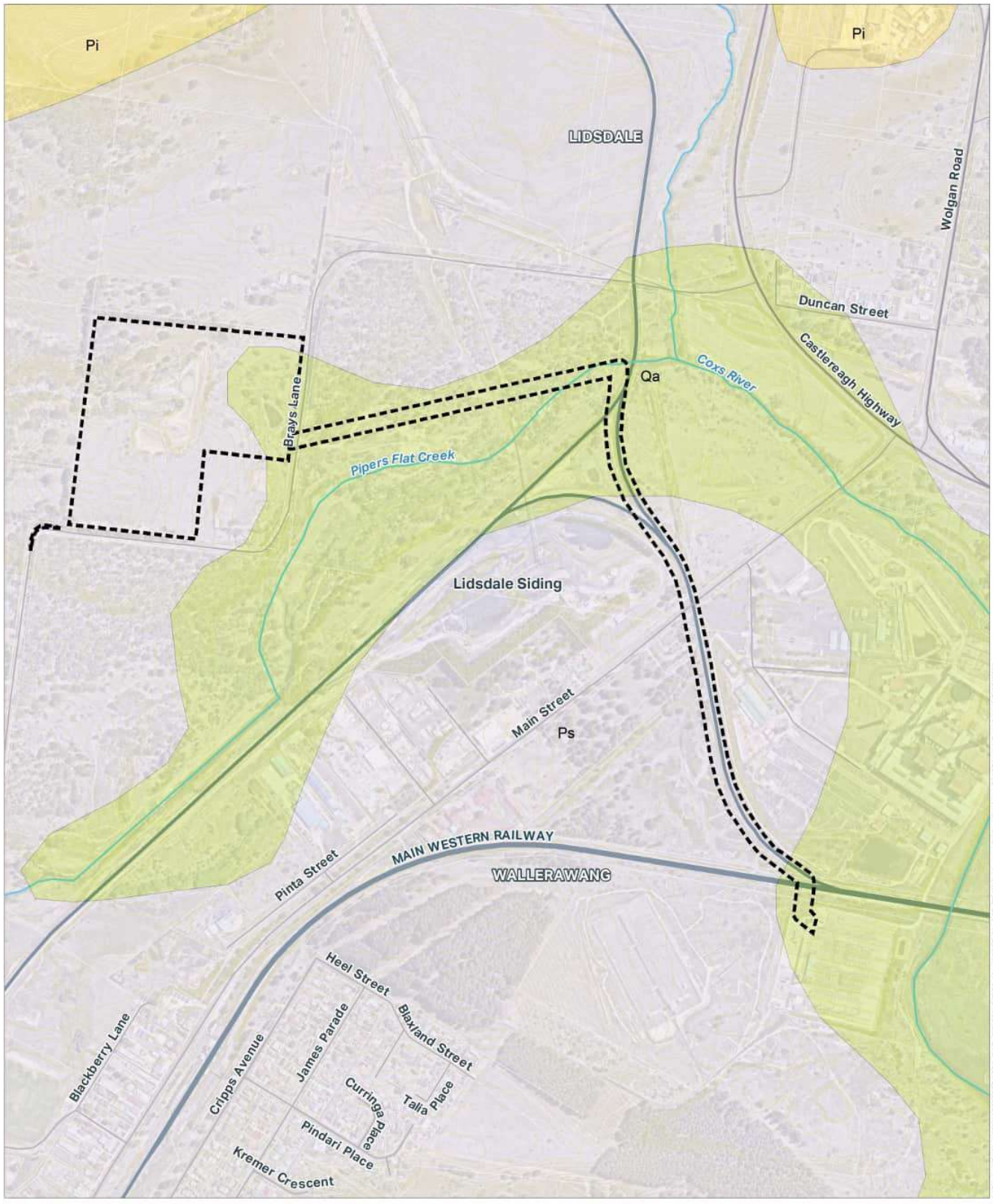
- Cullen Bullen
- Disturbed Terrain
- Hassans Walls
- Lithgow
- Pipers Flat
- Water

N

0 200 400 m

AECOM

Figure F3 - Soil Types



Legend

- Study Area
- Watercourse
- Railway
- Primary Road
- Local Road
- Contours

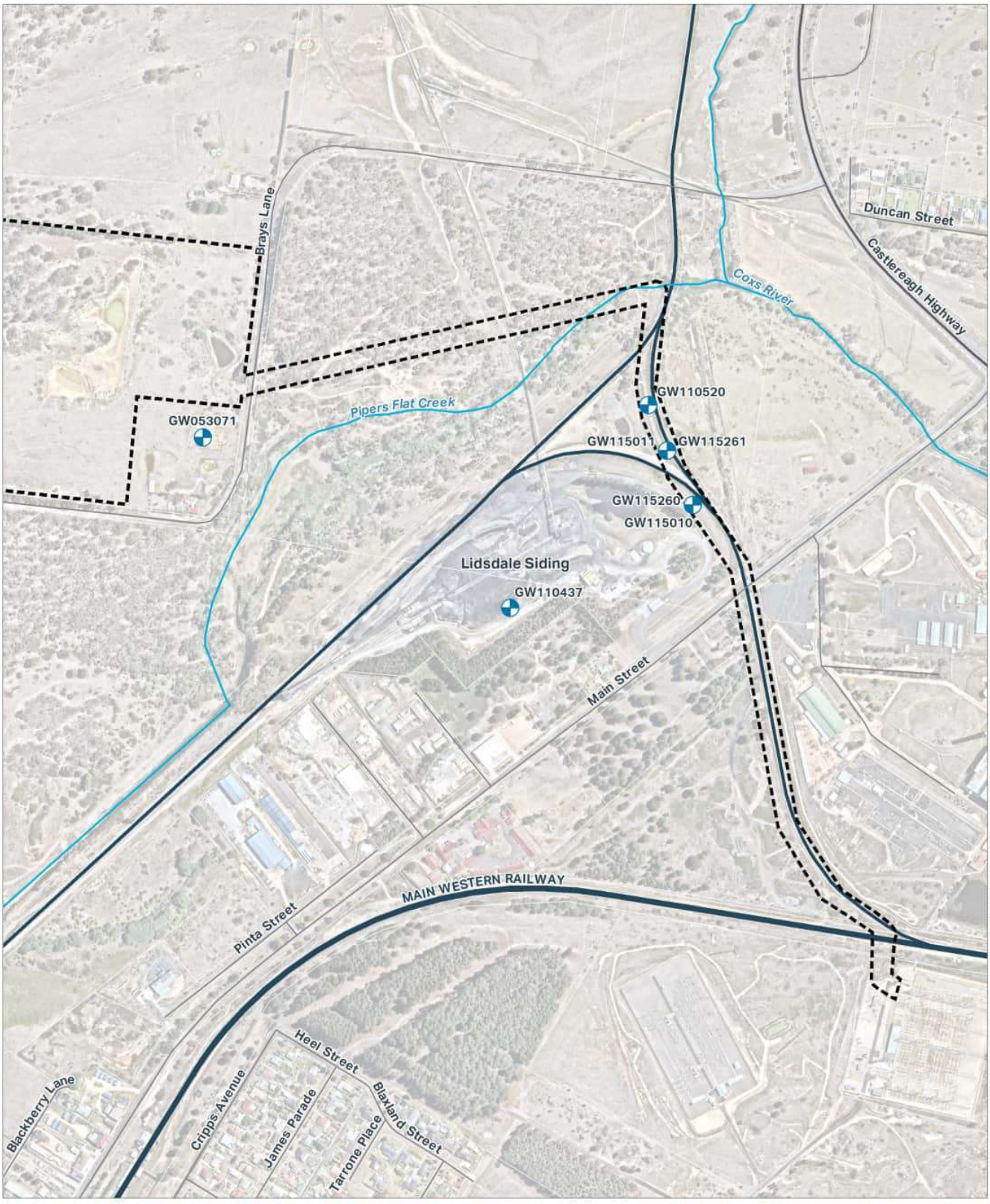
Surface Geology

- Pi
- Ps
- Qa

N 0 200 400 m

AECOM

Figure F4 - Surface Geology



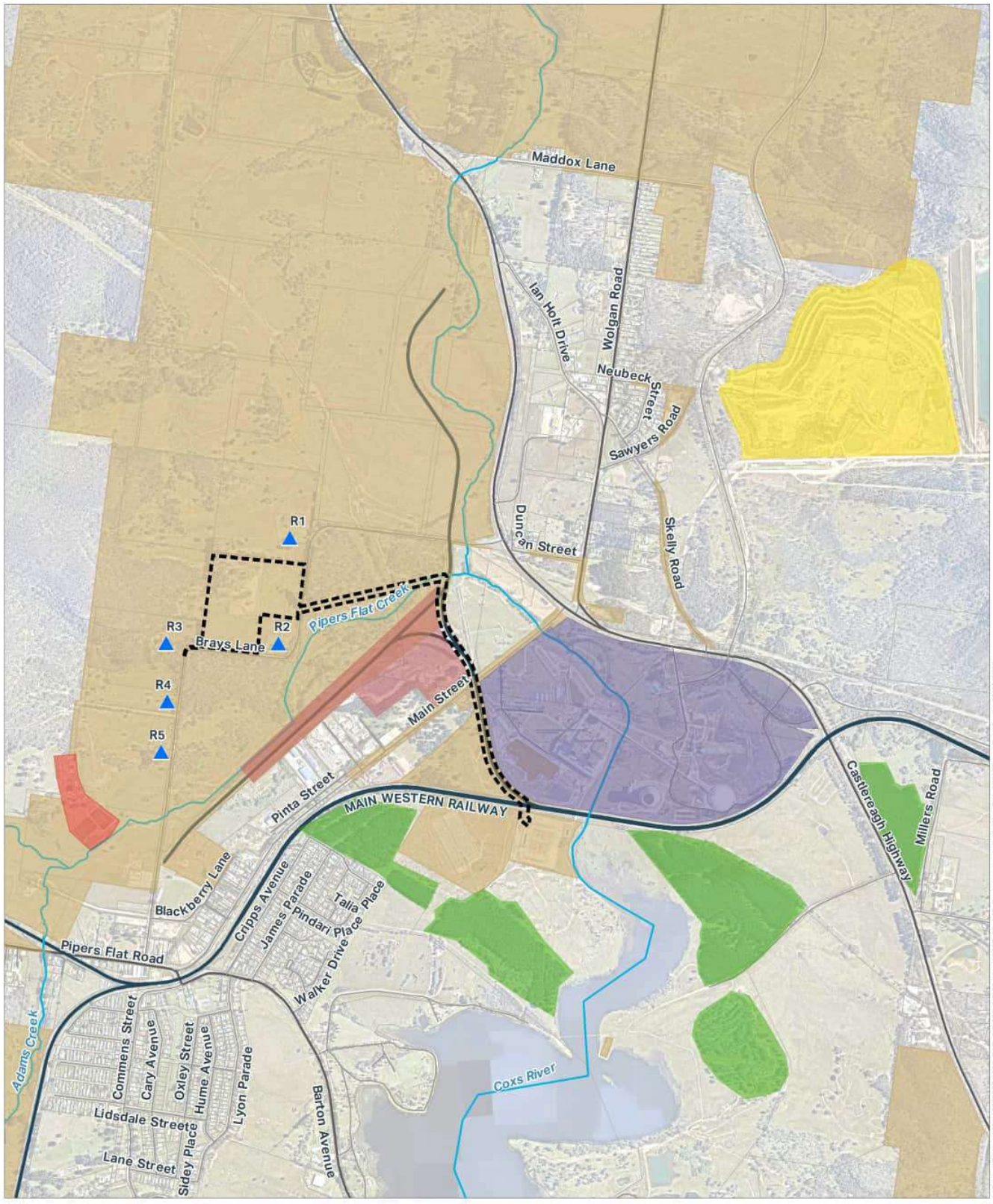
Legend

- Project Area
- Groundwater Boreholes
- Watercourse
- Railway
- Primary Road
- Local Road

N 0 150 300 m

AECOM

Figure F5 - Registered Groundwater Bores



Legend

- Project Area
- Tree Plantations
- Lisdale Coal Loading Facility
- Wallerawang Ash Repository
- Wallerawang Sewage Treatment Facility
- Wallerawang Power Station
- Agricultural Land
- Residential Properties
- Watercourse
- Primary Road
- Local Road
- Railway

N 0 0.5 1 km

AECOM

Figure F6 - Contaminating Activities

LOTSEARCH

LOTSEARCH AERIALS

Date: 31 Mar 2021

Reference: LS019212 EA

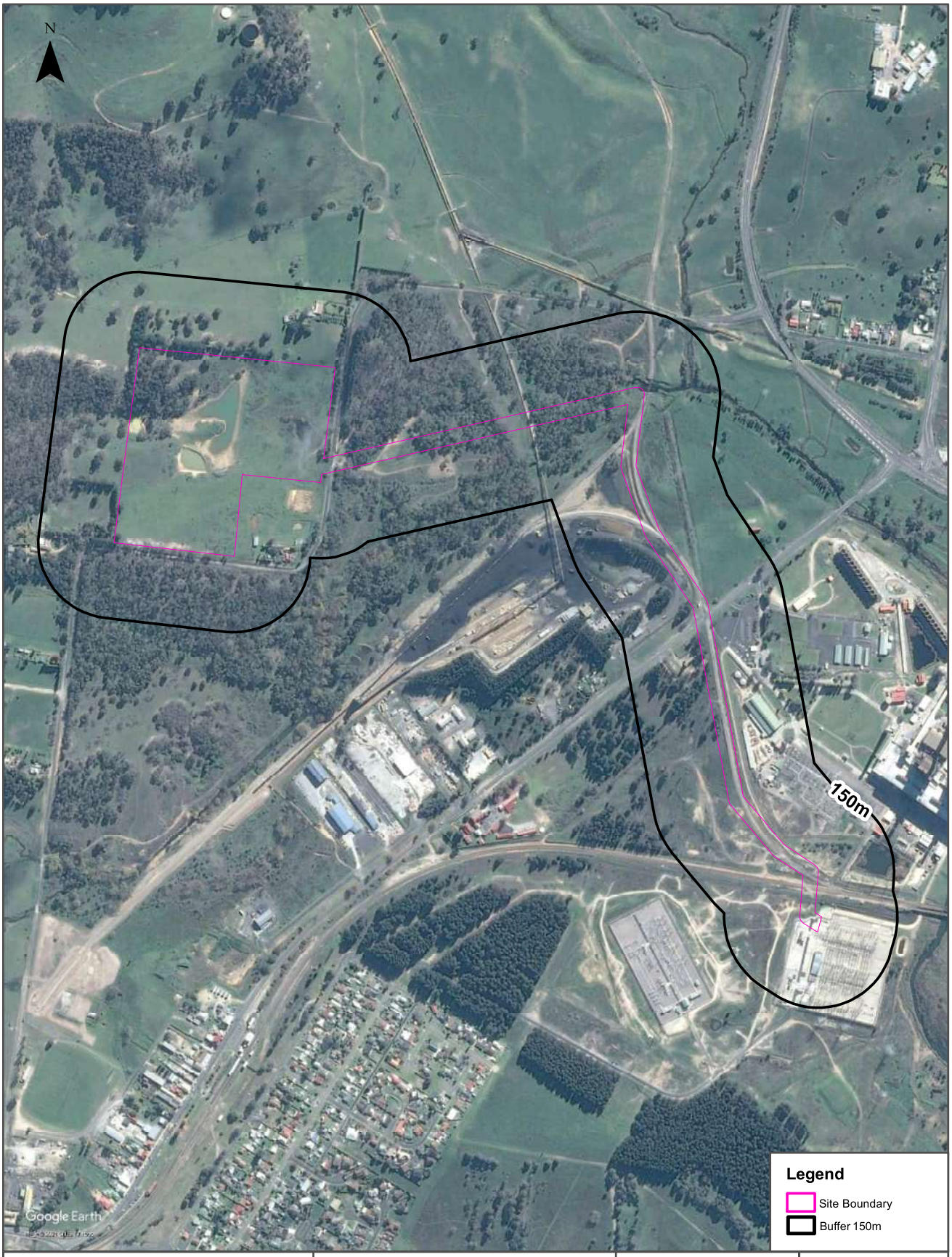
Address: Great Western Battery, Wallerawang, NSW 2845

Aerial Imagery 2019

Great Western Battery, Wallerawang, NSW 2845

Aerial Imagery 2014

Great Western Battery, Wallerawang, NSW 2845



Aerial Imagery 2006

Great Western Battery, Wallerawang, NSW 2845

Scale: 0 120 240 360 480 Meters

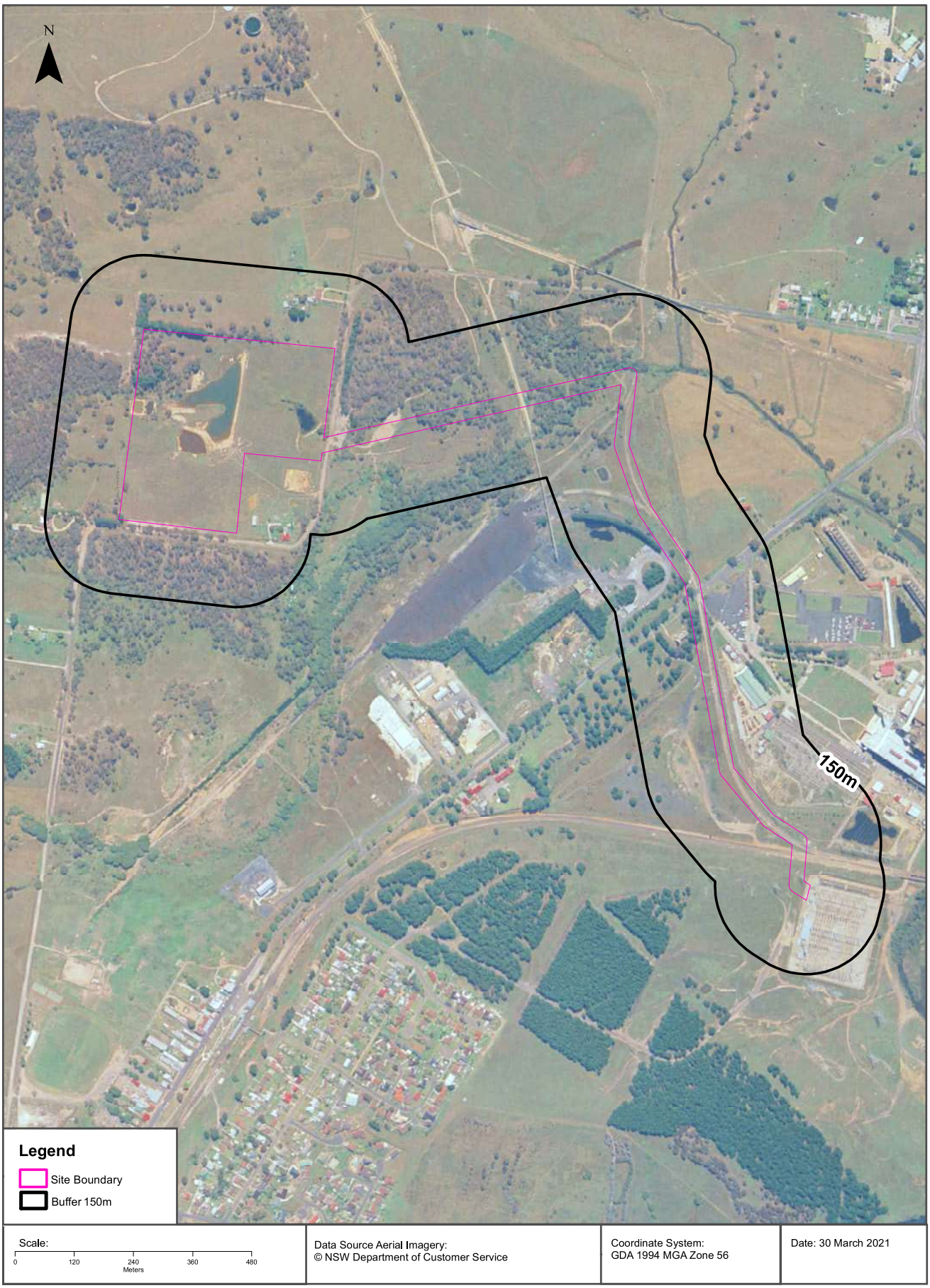
Data Source Aerial Imagery: © 2021 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.

Coordinate System: GDA 1994 MGA Zone 56

Date: 30 March 2021

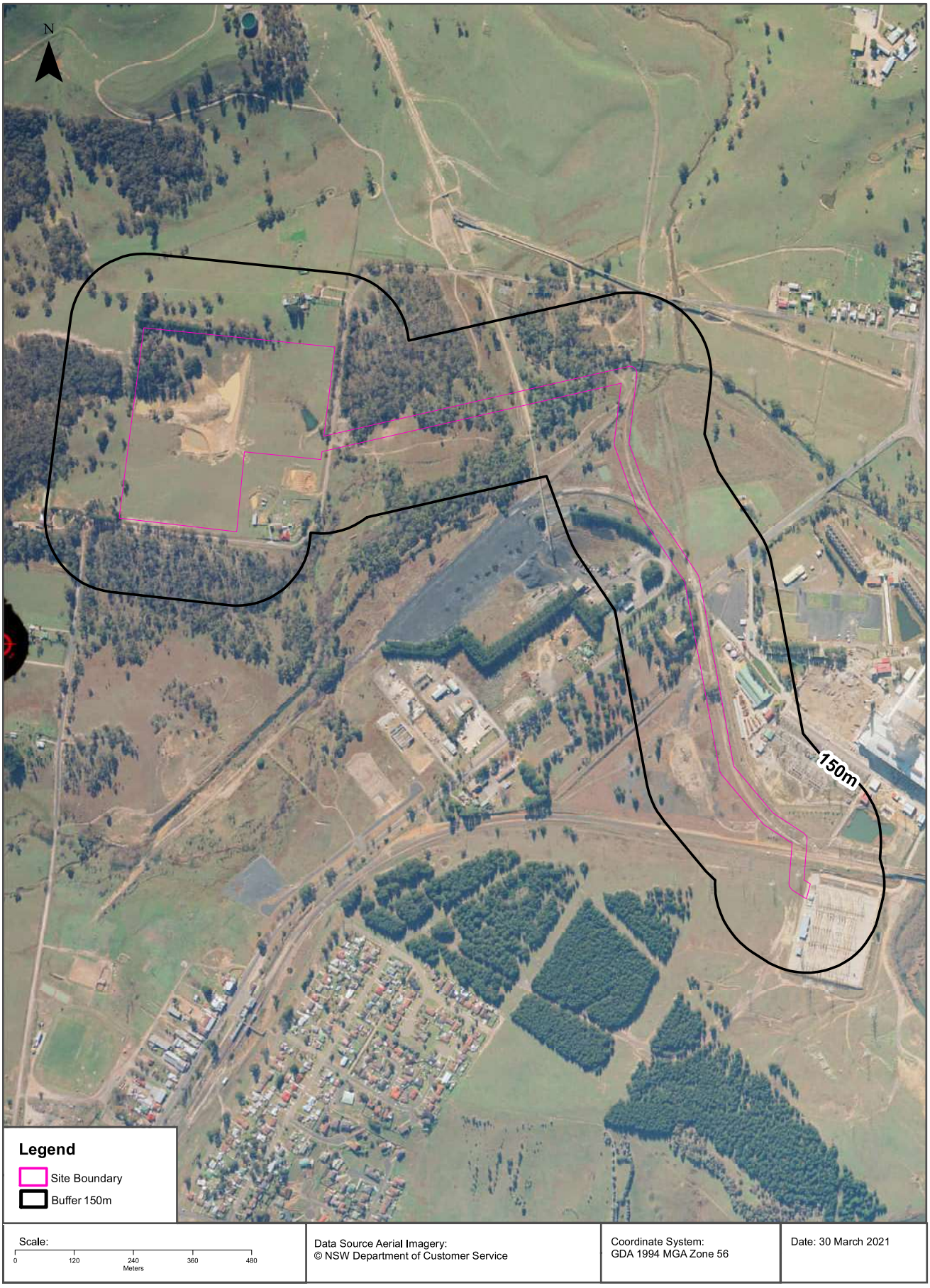
Aerial Imagery 2001

Great Western Battery, Wallerawang, NSW 2845



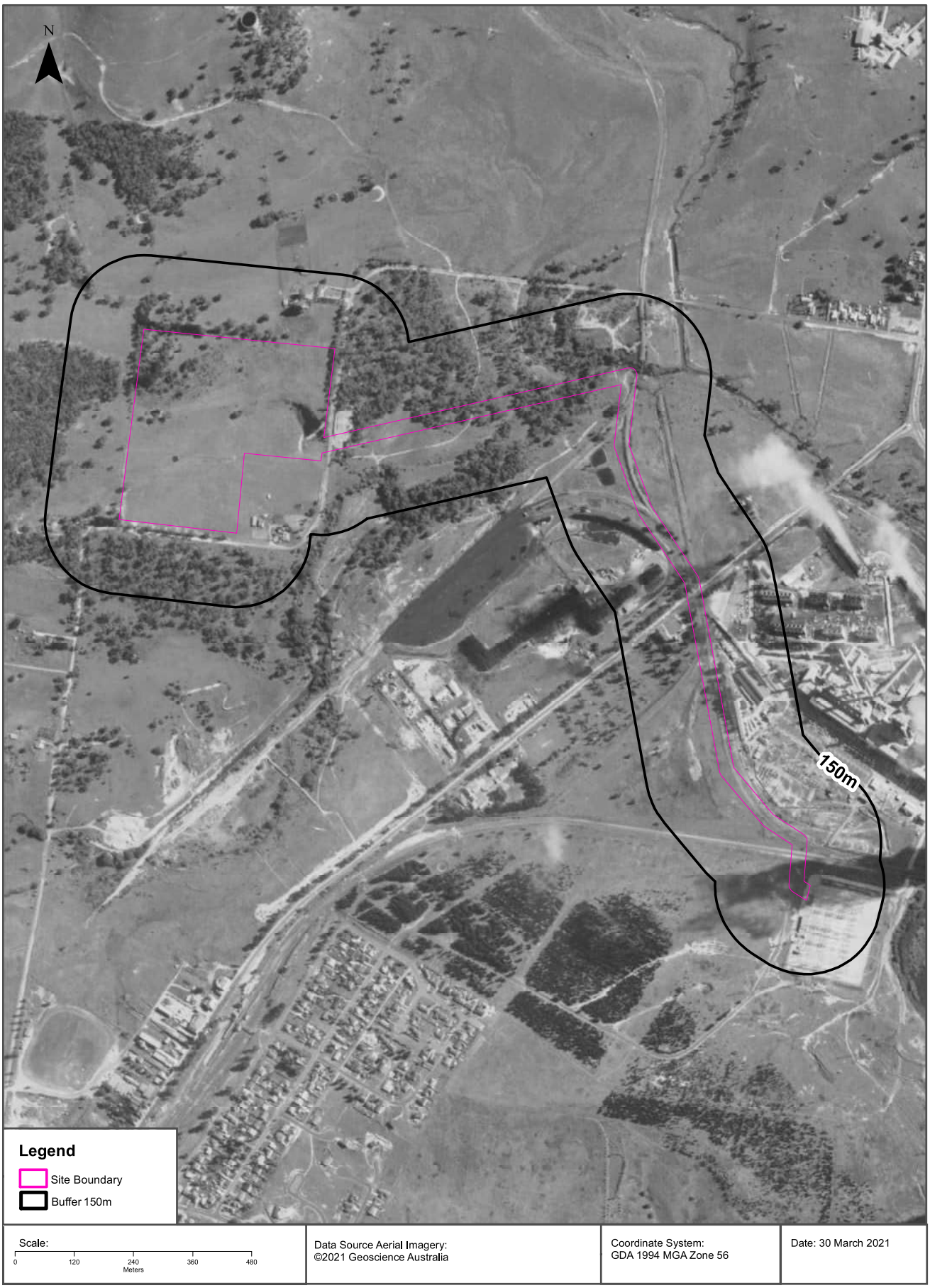
Aerial Imagery 1998

Great Western Battery, Wallerawang, NSW 2845



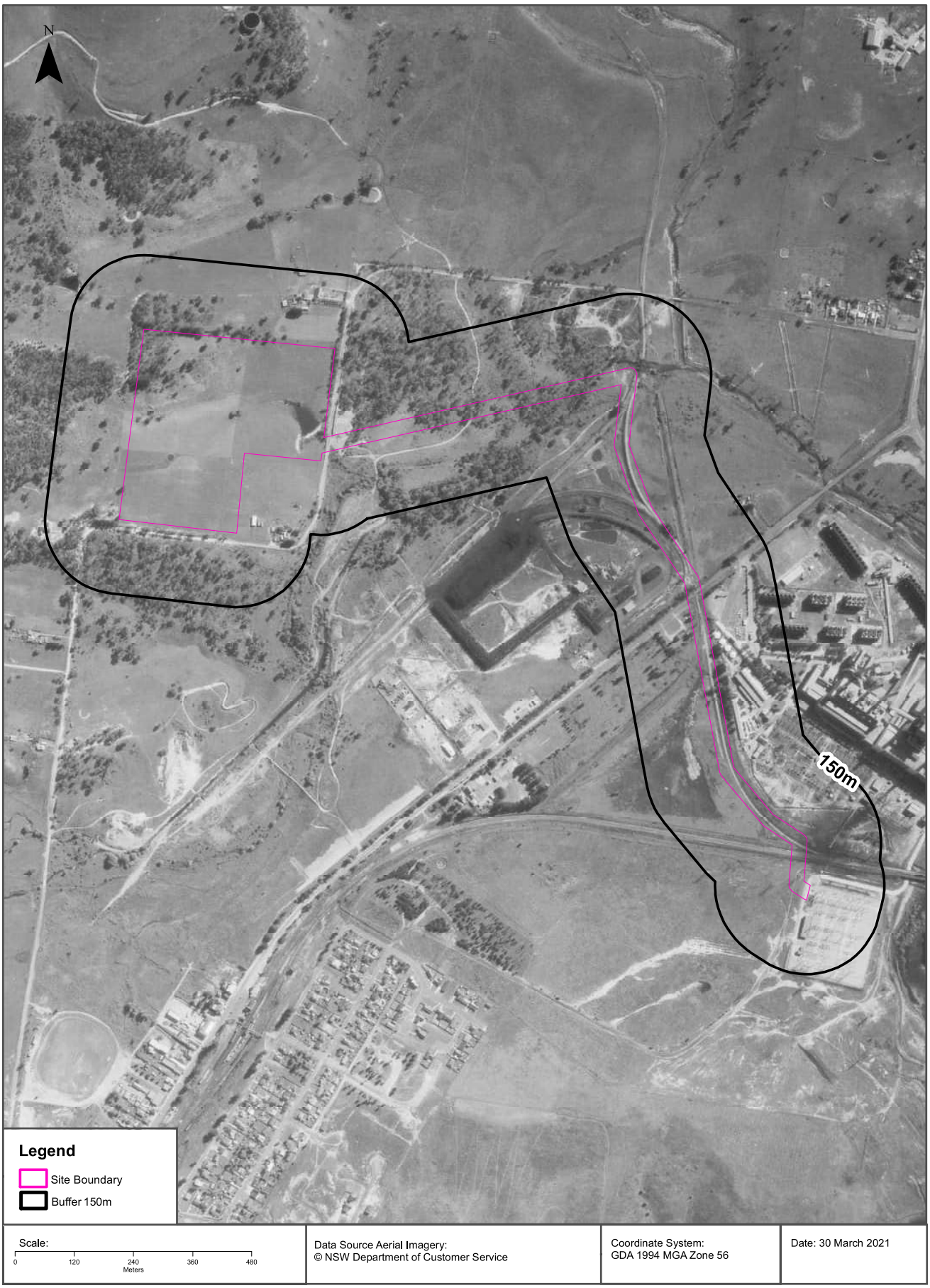
Aerial Imagery 1989

Great Western Battery, Wallerawang, NSW 2845



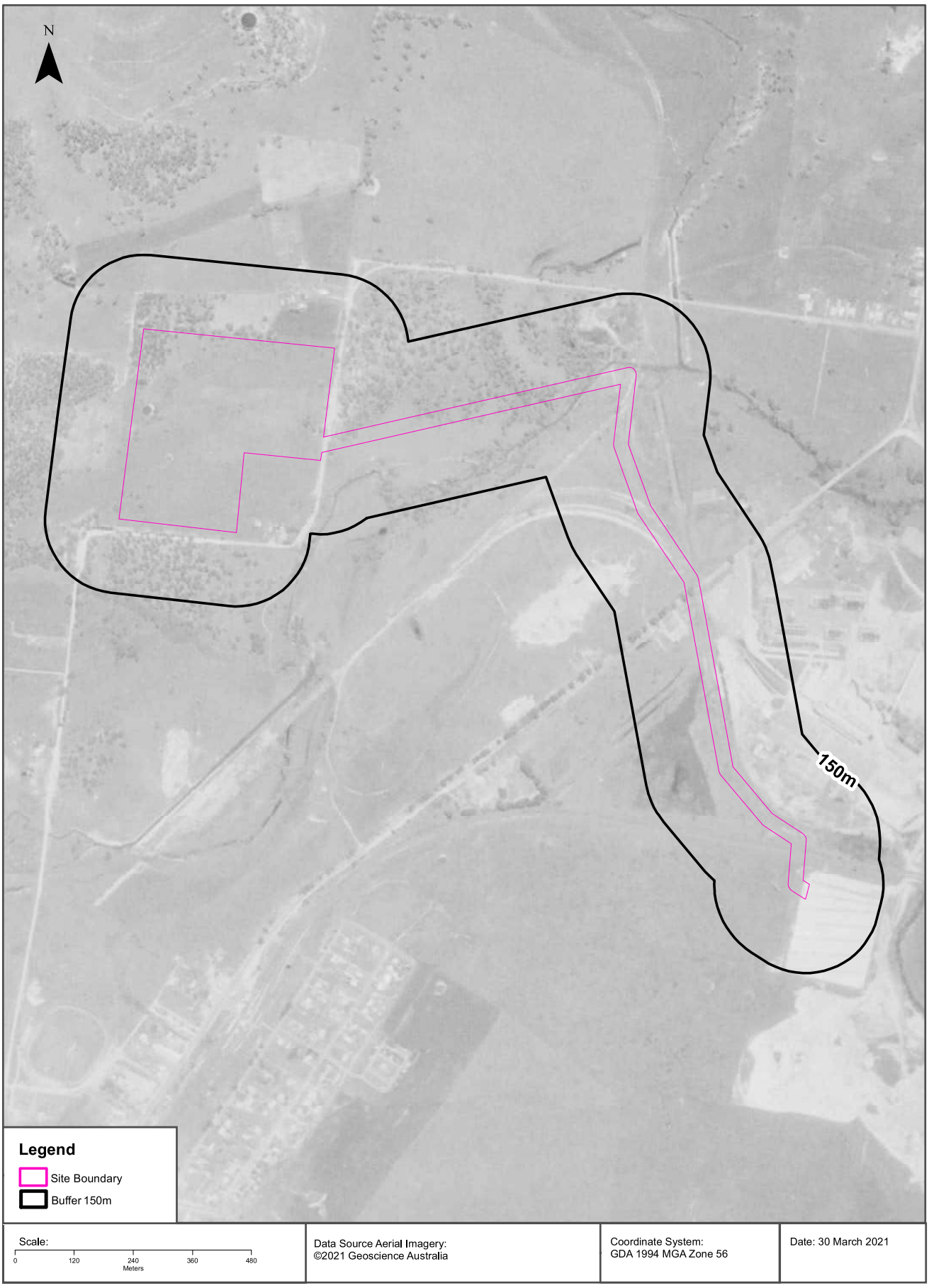
Aerial Imagery 1984

Great Western Battery, Wallerawang, NSW 2845



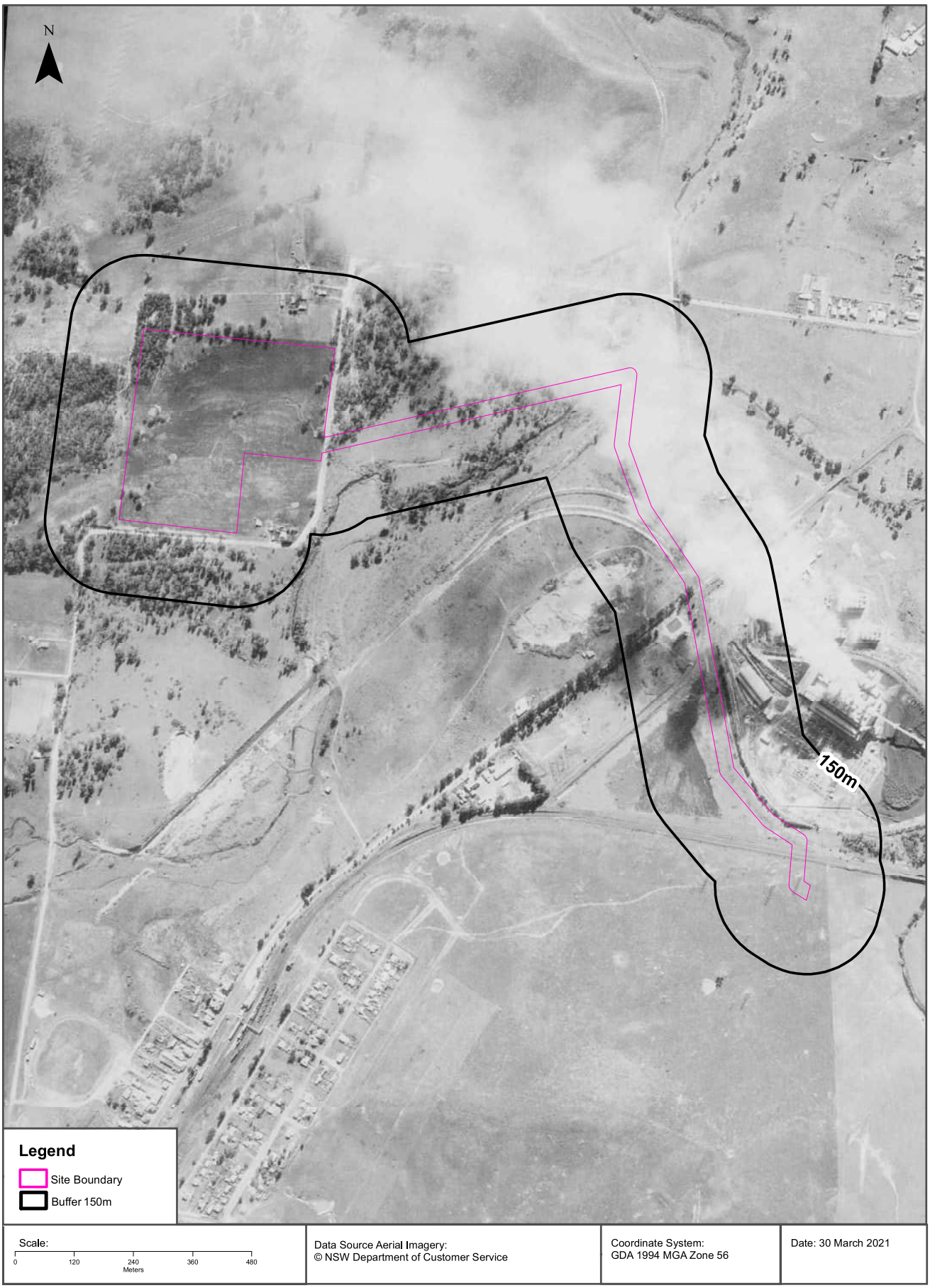
Aerial Imagery 1972

Great Western Battery, Wallerawang, NSW 2845



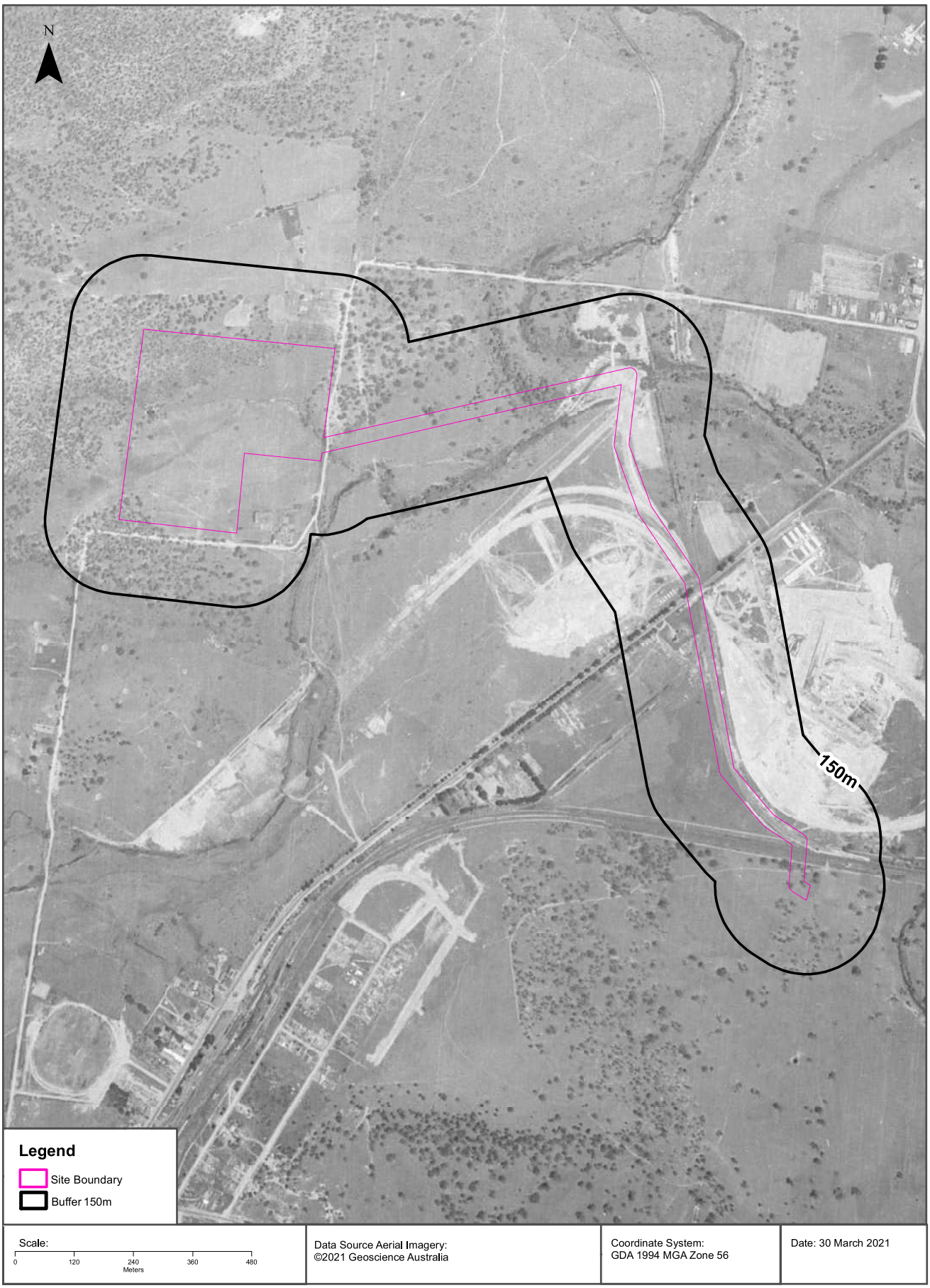
Aerial Imagery 1969

Great Western Battery, Wallerawang, NSW 2845



Aerial Imagery 1954

Great Western Battery, Wallerawang, NSW 2845



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