Eraring Battery Energy Storage System

Scoping Report

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Origin Energy Eraring Pty Limited

Eraring Battery Energy Storage System

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Executive Summary

Introduction

Origin Eraring Energy Pty Limited (Origin) is seeking regulatory and environmental planning approval for the construction and operation of a grid-scale battery energy storage system (BESS) with a discharge capacity of 700 megawatt (MW) and storage capacity of 2,800 megawatt hours (MWh) at the Eraring Power Station (EPS) site (the Project). The Eraring BESS would be among the largest battery projects in NSW and Australia in terms of peak power output and discharge duration. The Project would provide energy storage and key network services that would facilitate long term emissions reduction in the National Electricity Market (NEM) while supporting the delivery of secure and reliable electricity for consumers and businesses.

The proposed location of the Project is within the existing EPS site boundary (Lot 11 DP 1050120) in Eraring within the Lake Macquarie Local Government Area (LGA). The Project would be located close to the Eraring substation and existing TransGrid transmission network and include a short overhead connection between the BESS and substation within the EPS site.

The Project is aligned with the New South Wales (NSW) Electricity Infrastructure Roadmap, State and National decarbonisation objectives and would meet capacity demands from the rapid transition of the electricity grid to Variable Renewable Energy (VRE) sources. The Project would improve electricity supply reliability following the Liddell closure and would have key flexibility to discharge four hours of stored energy at peak output or provide longer duration at lower loads. The Project would contribute to Origin's and NSW's emission reduction commitments and provide network services to support reliable supply to the NEM at reasonable prices.

Project summary

The Project would include:

- Constructing a grid connected BESS with discharge capacity of up to 700 megawatts (MW) and storage capacity of 2800 MWh able to dispatch over variable durations from four hours to beyond eight hours
- Establishing High voltage (HV) and medium voltage (MV) transformers and associated infrastructure
- Connecting the BESS to 330 kV TransGrid switchyard by an approximate 400 metre overhead 330kV transmission line
- Installing safety protection systems and site ancillary facilities such as laydown areas, site offices.

Statutory framework

The Project area is zoned SP2 Infrastructure (Electricity generating works) with the purpose shown on the map permissible with consent, and energy storage included in the definition of Electricity generating works. The Project is as such permissible with development consent.

The Project is State significant development (SSD) as it meets the requirements of Clause 8 in conjunction with Clause 20 of Schedule 1 of the State Environmental Planning Policy (State and Regional Development) 2011 (SRD SEPP).

The assessment process for SSD requires a request for Secretary's Environmental Assessment Requirements (SEARs) to be made. These SEARs are then to be addressed in an Environmental Impact Statement (EIS) that would be publicly exhibited with any submissions received then responded to. The EIS and response to submissions would then be considered by the Department of Planning, Infrastructure and Environment in an assessment report. The Consent authority would then determine the development application either by approving or rejecting the application.

The Consent authority for Project is the Independent Planning Commission.

Relevant environmental matters

The assessment of the likely environmental consequences of the Project has involved:

- Consideration of the construction and operational stages of the Project
- Desktop review of relevant databases, historic aerial photography, reports associated with the existing development of the EPS and available background data
- Review of Draft for Exhibition Scoping an Environmental Impact Statement Guidelines issued by the Department of Planning, Industry and Environment (DPIE)
- Outcomes of stakeholder consultation to date.

The likely scope and extent of required assessment for each environmental matter has been identified as part of this Scoping Report in consideration of *State Significant Development Guide – Preparing a Scoping Report Exhibition Draft* (Department of Planning, Industry and Environment (DPIE), 2020). Issues identified for further assessment during the preparation of the EIS include:

- Biodiversity
- Aboriginal heritage
- Non-Aboriginal heritage
- Amenity – noise and vibration
- Traffic, transport and access
- Hazards and risks
- Water
- Social-economic
- Land and contamination
- Air and Greenhouse Gas.

As part of the EIS, additional assessment would be carried out in conjunction with further Project design development. In assessing the Project, the key focus would be to avoid and minimise potential impacts on the environment, where reasonable and feasible. The assessment would also identify mitigation and management measures to minimise impacts during construction and operation of the Project.

Stakeholder engagement

Origin has publicly announced the Project, informed direct neighbours and carried out preliminary consultation with their existing community forum and community consultation committee. Origin will continue to engage with public, community and agencies in the preparation of the EIS. Community engagement is expected to be targeted at keeping neighbours and key stakeholders informed of the assessment process and anticipated Project impacts such that concerns can be addressed and managed through the design process.

Summary and next steps

This document provides a description of the Project, existing information on environmental and strategic context and potential for environmental impacts and has been prepared in support of an application for the SEARs for the Project. An EIS will then be prepared addressing the SEARs. The EIS is intended to be placed on public exhibition in accordance with Division 4.7 of the EP&A Act.

1. Introduction

1.1 Proponent

Origin Energy Eraring Pty Limited (Origin) is a wholly owned subsidiary of Origin Energy Limited. Origin owns and operates the Eraring Power Station (EPS) in Lake Macquarie in the Hunter Region of NSW (refer to **Figure 1.1**). Origin was established in 2000 and acquired the coal-fired EPS in 2013, which is Australia's largest power station with a combined capacity of 2,880 megawatts (MW). Apart from Eraring, Origin also operates natural gas-fired power stations, cogeneration plants and pumped storage hydropower stations across Australia, with 6,010 MW in electricity generation capacity that can meet 13 per cent of consumption needs in the National Electricity Market (NEM) (Origin, 2018).

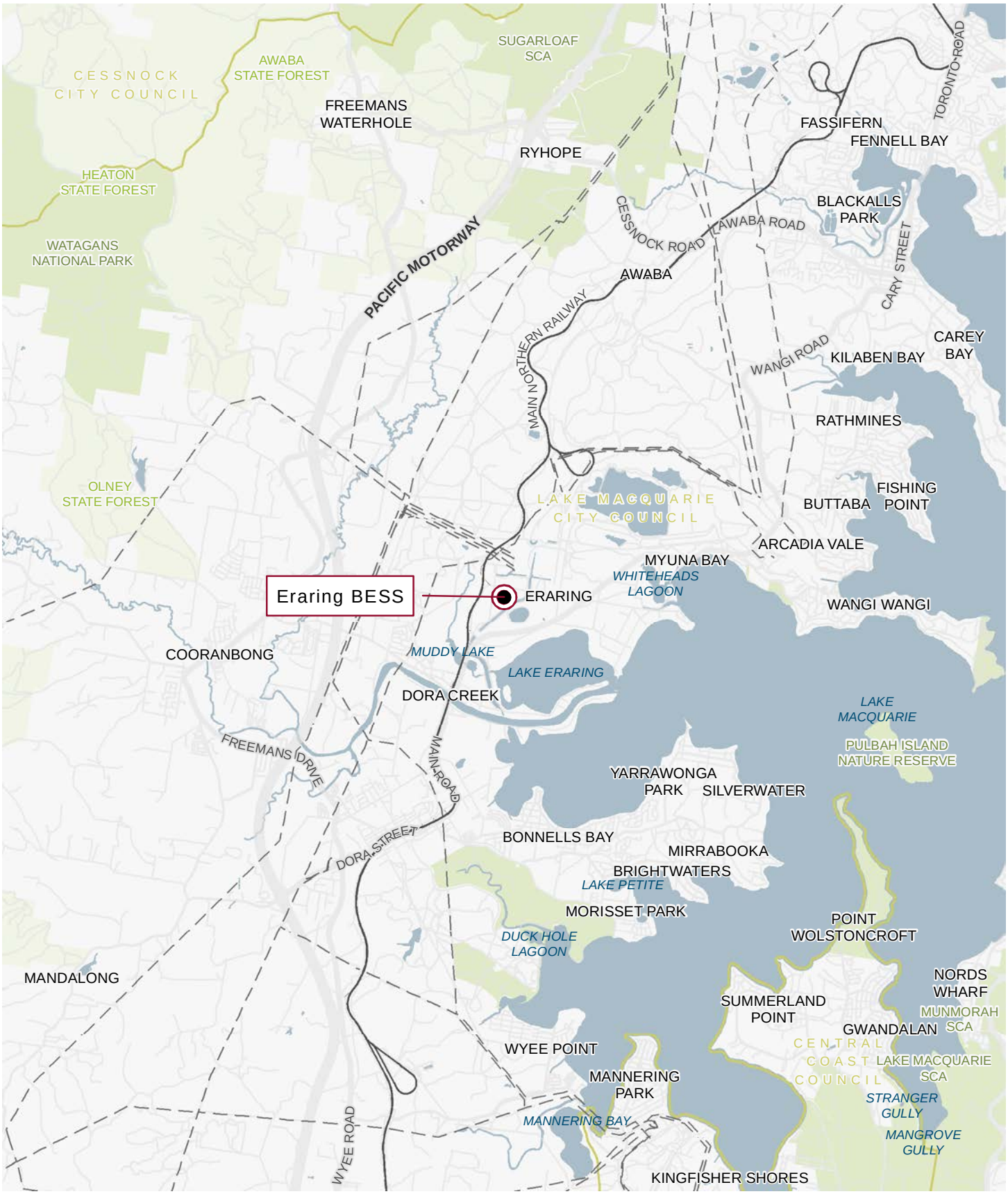
Eraring is scheduled to be among 14 gigawatts (GW) of coal-fired generation plants to be retired within the next few decades (AEMO, 2020). The retirement of Eraring will support Origin's carbon emission reduction goals and the strategic transition away from coal in NSW. In response to the transition away from coal, Origin is progressing State significant development (SSD) application for the development of a large-scale battery energy storage (BESS) Project to be located next to the EPS site (the Project). The Project would support the decarbonisation objectives of Origin and NSW government and maintain reliable electricity supply by having readily dispatchable long duration storage. The Project consists of the following:

- Eraring BESS: A grid connected battery system with discharge capacity of up to 700 MW and storage capacity of 2800 MW hours (MWh) able to dispatch over variable durations from four hours to beyond eight hours
- Power converter systems (PCS)
- High voltage (HV) step up transformers, including HV surge arrestors, HV disconnect switches and instrument transformers
- Medium voltage (MV) transformers, MV switchgear and MV cabling
- Interconnection equipment connecting the BESS to the TransGrid switchyard
- Earthing, lightning and fire protection systems
- Site works including foundations and buildings/enclosures/housings
- Oil containment systems and oil/water separator (for step up transformers)
- Lighting
- Site compound, parking, access roads
- Office area

1.2 Project overview

Origin is seeking approval for the SSD application of a grid scale BESS to be developed on land adjacent to the EPS and connected to the existing transmission lines. The proposed BESS would be developed in three stages to achieve installed capacity up to 700 MW and energy generation of 2800 MWh. The BESS would have potential for future expansion beyond 700 MW/2800 MWh.

The BESS would be capable of providing energy, Frequency Control Ancillary Services (FCAS) and System Restart Ancillary Services (SRAS), as well as fast frequency response and synthetic inertia, which are security services currently under consideration in the NEM.



Project location
Transmission line
Railway
Freeway
Arterial road
Distributor road
Local road
Service maintenance track
Minor waterway
Waterbody
NPWS reserve
State Forest

0 5 km

1:100,000 at A4
GDA94 MGA56

Data sources

Origin 2021
Aerometrex 2020
© Department Finance, Services and Innovation Dec 2020

Figure 1.1 Locality

1.2.1 Project objectives

The overall Project objective is to take advantage of the EPS landholdings strategic location and importance in the NEM to deliver safe and reliable energy storage in NSW, dispatchable electricity and other network services to the NEM and support increased penetration of renewable power generation in the network.

1.3 Project background

1.3.1 Project history

EPS is Australia's largest power station and the only coal-fired generation plant in Origin's portfolio. The power station commenced operation in 1982 and currently consists of four 720 MW Toshiba stream turbines with a total output of 2880 MW. EPS was owned by Eraring Energy until 2013 when the company was sold to Origin. Origin also owns and operates over 3000 MW of other gas, pumped hydro as well as contracted solar and wind assets.

The Project area is wholly owned by Origin and currently has limited use as a rehabilitated area south of EPS and next to the EPS water inlet canal and attemperation reservoir. The Project area was previously disturbed during the construction of the attemperation reservoir and used as a borrow pit. Construction material and additional spoil were extracted from the borrow pit area to build the reservoir. The area has since been rehabilitated and remains unused.

The EPS coal-fired generation capacity remains the largest in Australia and represents approximately 14 per cent of capacity in the NEM. The NEM is undergoing rapid transition with increased uptake of renewable generation and retirement of thermal generation across NSW. EPS among other coal-fired power plants in NSW are scheduled to close within the next two decades, which would heighten challenges in the NEM to provide more renewable generation while maintaining system reliability and keeping electricity prices stable. Origin has invested and structured its energy generation portfolio to adapt to NEM requirements and support its own transition to higher renewables penetration in order to reduce emissions and contribute to long term sustainability in the energy sector. In order to demonstrate continued leadership in climate change advocacy, Origin has identified large scale energy storage as a significant technology required for achieving decarbonisation commitments.

EPS has played a significant role in the NEM since it was first commissioned and remains crucial to the security, reliability and affordability of power supply in the NEM. However emerging low emissions technology application such as battery storage are expected to contribute to flexible dispatchability needs of the NEM and "firm up" variable renewable energy. Origin will exit coal-fired generation by 2032 which requires considerable planning, and Origin is anticipating EPS's capacity will be replaced by a combination of renewables, gas and storage. Prior to Origin's exit from coal, the planned closure of Liddell Power Station in 2022-2023 would leave a gap of around 13 per cent of existing NSW energy supply. In line with projections from the AEMO and in response to the urgent need to replace the capacity gap left by Liddell Power Station, Origin has identified the Project would close this gap to reliably meet peak demand, provide grid security services and drive the transition away from coal towards renewables firmed by highly flexible energy storage.

1.3.2 Alternatives considered

Origin continues to consider all available technology and options for the decarbonisation transition in the NEM and accordingly, in Origin's own generation fleet. The Project is identified as a significant part of the response to phased coal-fire generation retirement in NSW, particularly to firm up renewables and provide immediate storage and dispatchability support following the exit of the Liddell Power Station. Alternatives to the Project are considered at the site level and overall Project level and would continue to be developed through the design stages to ensure the design meets best practice requirements and can avoid or minimise any potential environmental, social and economic impacts.

Origin has assessed alternatives for the following considerations:

- A base case, 'do nothing' approach
- Site selection alternatives
- BESS technology and provider alternatives.

Base case 'do nothing' approach

The 'do nothing' approach would involve not constructing and operating the Project or any BESS at the existing EPS site. The option would not meet the needs of the NEM to effectively fulfil the energy gap left by upcoming retirement of coal-fired plants. The 'do nothing' option is considered not acceptable as it would not contribute to Origin remaining as one of the largest energy providers in Australia. This option is also not a feasible alternative to achieving the Project objectives due to the following:

- Origin has committed to exiting coal-fire generation at EPS by 2032, with the existing 2880 MW capacity being replaced with technology such as battery storage being the most cost-effective use of existing site and infrastructure
- Origin has committed to net zero emissions by 2050 with interim targets for emission reduction by 2030, which would largely be supported by the entry of firming capacity and energy storage provided by the Project.

The consequences of not carrying out the Project would leave Origin with a diminished role in the future energy markets and is not in keeping with Origin's climate change commitments.

Site selection alternatives

An alternative site selection would involve constructing the Project at a location different to the site proposed, but within the existing Origin owned land around the EPS. There are several potential areas surrounding the EPS site that may potentially be able to host a BESS and associated infrastructure, however the chosen Project area is considered preferable on the following basis:

- The Project's current site is selected based on site size and availability, appropriate land zoning, land use compatibility, proximity to existing transmission infrastructure, established buffer to other sensitive receptors and land uses, as well as for avoidance of biodiversity impacts as far as possible
- The remainder of the EPS site is either vegetated, currently used for EPS operational purposes or reserved for other uses.

While Origin may pursue storage projects in other locations, the EPS site represents an efficient use of capital, is owned by Origin, close to network connections with available capacity and has a prior history of disturbance and as such represents a logical location for the Project.

BESS technology and provider alternatives

Origin is reviewing options for choosing the battery technology most viable for the EPS site and for capacity requirements. Origin has commenced an Expression of Interest process from which the preferred technologies would be selected. Currently the most feasible BESS option consists of lithium ion batteries offered in the form of containerised or otherwise enclosed battery arrangements. The layout of the BESS units would be confirmed during the EIS process and detailed design.

Origin would prioritise energy density, safety and compliance requirements when selecting the technology provider of the BESS during detailed design.

1.4 Strategies to avoid or minimise impacts

The key strategies that will be adopted during the Project EIS process and detailed design, through to construction and operation to minimise any potential impacts include:

- Site selection and Project footprint to minimise vegetation clearing and where practicable avoid land zoned E2 Environmental Conservation
- Project footprint would not intrude on sensitive land uses and would retain the established vegetation screening to the east which is an ecological corridor as well as a natural buffer to sensitive receptors
- Project design would consider hydrology and drainage to manage water run-off to neighbouring coastal wetlands to achieve relevant water quality standards
- Project design would consider need and sizing of asset protection zones and other forms of bushfire protection to reduce need for intrusion into E2 zoned woodland to the extent possible.

1.5 Related development

Related development refers to any existing or approved development that would be incorporated into the Project, or development that is required for the Project but would be subject to a separate approval process.

There are no related developments in relation to the Project. Any necessary network connection infrastructure or access upgrades would be incorporated into the EIS Project description and assessed.

The ongoing operation of EPS and ancillary upgrade would continue under separate existing approvals. Currently proposed upgrade works that may have cumulative impacts above existing background conditions are identified as including:

- Ash dam augmentation including main dam wall stability works and western area expansion
- Expansion of ash recycling operations to achieve 80% recycling required as condition of approval.

The existing transmission infrastructure including switchyard and transmission lines to the NEM are readily available to be connected to the Project once it is constructed and would not require any upgrades.

2. Strategic context

2.1 Project need

The NEM operates as a wholesale electricity market for all states in Australia apart from Western Australia and Northern Territory, incorporating a spot market that controls prices and the physical power system such as transmission lines and power stations. The NEM supplies around 80 per cent of Australia's electricity consumption and has experienced a rapid increase in renewable generation in the past decade. This rise is attributed to various policies and pricing incentives, as well as the need for variable renewable energy (VRE) to replace coal-fired generation, 63 per cent of which are set to approach end of design life and retire within the next few decades (AEMO, 2020). It is estimated that more than 26 GW of new VRE is needed, while 6-19 GW of new dispatchable resources such as battery storage are needed to back up the increased input of renewables in the NEM (AEMO, 2020).

To enable the expected rise in VRE now and into the future, flexible dispatchable electricity supply is needed to firm up the variable output from renewable sources such as wind, solar and hydro and provide storage of surplus generation to meet times of peak demand. Where previously gas-fired generation has supported peak demand, storage options such as using batteries are becoming favoured due to cost reduction and lack of geographic constraints (IHS Markit, 2020) such as gas supply infrastructure and gas availability. The Project would become one of the largest battery projects in Australia once operational, contributing to overall storage capacity in the NEM.

A BESS can mitigate against price volatility and smooth out the varying electricity supply from wind and solar power, potentially balancing out price increases expected during unanticipated outages as well as the closure or exit of large scale thermal plants (Australian Energy Council, 2020). Having long duration storage ready to dispatch into the grid as coal-fired generation gradually retires or when renewable sources are not readily available, can help stabilise the electricity grid as the NEM approaches higher renewable capacity.

The staged closures of large-scale coal-fired plants including Liddell Power Station, Vales Point Power Station, EPS, Bayswater Power Station and Mount Piper Power Station will begin in 2022 with first turbine to be shut at Liddell. The identified need for new capacity in NSW following Liddell closure is to cover peak demand events which coincide with periods where NSW cannot source electricity supply through its interconnection with other states. Origin is capturing this opportunity to support an orderly transition to renewables by aiming for Stage 1 of the BESS Project (subject to approval) to be operational prior to Liddell exit, and for Stage 3 to be completed in 2026, offering the full capacity of 700 MW to fulfil energy storage needs in NSW.

The BESS Project would make use of the existing infrastructure on the EPS site and connect to the electricity grid through existing switchyard and transmission lines. Effectively this mean no external transmission works are needed as part of the Project and would increase the speed of renewables penetration into the NEM while large interconnector transmission projects such as Energy Connect, Humelink and Victoria to NSW Interconnector West (VNI West) are still in the planning stage.

The BESS Project would strengthen electricity supply following the Liddell closure and would have key flexibility to discharge four hours of stored energy at peak output or provide longer duration at lower loads. The Project would contribute to Origin's and NSW's emission reduction commitments and provide crucial renewable energy with reliable supply at reasonable prices.

2.2 Strategic policy context

The strategic policy context underpins the Project objectives and the Project need, and includes plans, policies, key strategic directions and framework at the national, state and local levels. The Project would also directly respond to Origin's commitment to achieve net-zero emissions by 2050. These policies and commitment both respond to and facilitate the rapid transformation in the NEM towards less emission-intensive and more renewable options in power generation and are described in the sections below.

2.2.1 AEMO and the National Energy Market

The Australian Energy Market Operator (AEMO) manages the NEM operates Australia's electricity and gas markets which allow energy to be priced, sold and delivered. AEMO has forecast in its latest Integrated System Plan (ISP) that Australia will need 26-50GW of additional grid-scale renewables by 2040 (AEMO, 2020). Currently the NEM has 2,000 MW of announced withdrawal in coal, and more than 45,200 MW of proposed solar, wind and hydro generation (AEMO, 2021). Enabling energy storage would help stabilise and increase reliability in this rapid growth and penetration of renewables. The key findings from the *Independent Review into the Future Security of the National Electricity Market 2017* (the Finkel Review) (Finkel, et al., 2017) became one of the key reports that contributed to energy policy development in Australia aiming to achieve Australia's emission reduction commitments while providing affordable, secure and reliable electricity. The Finkel Review recommended the NEM to transition early on towards emissions reduction trajectory and emphasised the need for stability solutions like battery energy systems to balance out the fluctuations of renewable energy.

Following the endorsement of the Finkel Review findings by the Council of Australian Governments (COAG) Energy Council, AEMO subsequently published ISPs for the NEM in 2018 and 2020. ISPs form whole-of-system roadmaps for the development of the NEM over the next 20 years. The 2018 ISP identified that 'retiring coal plants can be most economically replaced with a portfolio of utility-scale renewable generation, storage, DER, flexible thermal capacity, and transmission' (AEMO, 2018). This aim is further explored in the 2020 ISP which stated that the 'least-cost transition of the NEM will be a highly diverse portfolio consisting of Distributed Energy Resources (DER) and VRE and supported by multiple dispatchable resources', and at least 6-19 GW of new dispatchable resources such as battery storage are needed to back up renewables (AEMO, 2020).The 2020 ISP highlighted the need for strategic investments in low-cost firming resources to enable a cost-effective way to enable the expected rise in renewable energy.

The Eraring BESS Project would contribute to the storage and dispatchability requirements identified in the 2020 ISP.

2.2.2 The Paris Agreement COP 21

Australia is party to the Paris Agreement, which came into force in 2016. Parties to the Paris Agreement reached consensus at the 2015 United Nations Climate Change Conference (COP 21) to strengthen the global response to climate change by:

- Keeping the increase in global average temperature to well below 2°C above pre-industrial levels
- Pursuing efforts to limit temperature increase to 1.5°C.

Under the Paris Agreement, the Australian Government in 2015 committed to reduce emissions by 26–28% below 2005 levels by 2030. In 2020, Australia recommunicated the 2030 emissions reduction target and published the *Australia's Emissions Projections 2020* report which demonstrates Australia is on tract to meet and beat its 2030 target due to the continued strong growth in renewables uptake (Commonwealth of Australia, 2020).

The energy sector is a key part of the low emissions effort, as electricity generation contributes to a significant proportion of total carbon emissions and the growth of renewables is as such crucial in the transition to low emission future. As identified above, the Project facilitates the growth of renewables by shifting surplus energy generated to periods of higher demand and providing network services of increasing importance to the NEM.

Origin continues to support a national goal of net-zero emissions in the electricity sector by 2050 or earlier, and are proud of their ongoing contribution to the decarbonisation of the NEM. Origin believes that the electricity sector should be responsible for more than its proportional share of emissions reductions, and the proposed Project is part of Origin's decarbonisation strategy to help achieve its goal of exiting coal fired generation by 2032, while continuing to ensure a reliable energy supply for its customers, and the NSW community.

2.2.3 COAG Energy Council Post 2025 Market Design

The COAG Energy Council is a ministerial forum for Australian and New Zealand governments to pursue national energy reforms. The Energy Council initiated the Post 2025 project and tasked the Energy Security Board (ESB) to develop advice on long-term electricity market design and provide a framework for a changing NEM to better adapt to diversifying generation sources. After stakeholder consultation, the ESB released the *Post 2025 Market Design Directions Paper* in January 2021 (Schott, et al., 2021) and set out four reform directions as part of the Post 2025 project as follows:

- Resource adequacy mechanisms and ageing thermal transmission – ensuring the right mix of resources is available to the system through the transition to deliver reliable supply to customers
- Essential system services and scheduling and ahead mechanisms – ensuring those resources and services required to manage the complexity of dispatch and deliver secure supply to customers are available when needed
- Demand side participation – progressively unlock the potential of the demand side to compete in the wholesale market and deliver local benefits while maintaining system security
- Transmission and access – providing the network to meet future needs, arrangements for early implementation of renewable energy zones, and longer-term arrangements to ensure efficient use of the national network.

The ESB flagged the need for the construction of 26 GW to 50 GW of VRE over the next two decades which would need to be backed by storage capacity such as grid scale batteries and pumped hydro to ensure stability.

Given some uncertainties in the current policy and market context, the ESB will continue to explore development that can ensure flexible, dispatchable resources are valued in the market and have an incentive to be available when they are needed. The ESB also seeks to ensure timely entry of resources into the market and orderly exit of thermal generation as they retire from the system. Timely entry focuses on having new resources in operation when they are needed and costs are minimised by avoiding investment too early or too late. Orderly exit ensures reliability and security after a generator exits and price shocks are minimised.

The Project would facilitate the orderly transition following the expected closure of the first unit at Liddell in 2022. By providing services such as flexible dispatchability, frequency control and fast frequency response, the Project would specifically address the first two priorities identified in the Post 2025 Market Design Directions Paper.

2.2.4 Commonwealth context

The *Report of the Expert Panel Examining Additional Sources of Cost Abatement* (The King Review) (King, et al., 2020) builds a robust platform to expand and incentivise low cost abatement opportunities, with a focus on emission-intensive sectors and energy efficiency. The findings of the King Review indicated deeper renewables penetration is inevitable and requires additional storage capacity to decarbonise the economy. The Australia Government have agreed or agreed in principle with 21 of the recommendations from the King Review.

Technology Investment Roadmap 2020

The Australian Government released the *Technology Investment Roadmap 2020* to provide a national framework to accelerate low emissions technologies. The Technology Investment Roadmap Discussion Paper (Commonwealth of Australia, 2020) investigated long-duration energy storage as a cost-effective technology pathway and offered support to invest and build in various forms of storage including pumped hydro and large-scale batteries. This investment intends to balance the rapid rate of renewables deployment. Energy storage and backup technology is set as an immediate priority (to 2022) for the electricity generation sector to enable orderly management of increased variable supply to maintain security and reliability. Growing storage technology capacity and driving down the costs of such technology are observed as medium and long-term opportunities (2030 to 2050 and beyond).

Low Emissions Technology Statement 2020

First published in 2020 and set to be delivered annually thereafter, low emissions statements prioritise low emissions technologies and direct investment towards priority technology stretch goals. Energy storage is identified as one of the priority low emissions technology that will support employment and provide the highest abatement and economic potential in areas of comparative advantage for Australia. This priority stretch goal aims to bring such emerging technologies to economic parity with existing mature technologies. The 2020 low emissions statement also seeks to drive investor confidence and targe international partnerships in the private sector to ensure Australia stays at the forefront of low emissions technology investment in global markets (Commonwealth of Australia, 2020).

The Technology Investment Roadmap and first Low Emissions Statement will be the cornerstone of Australia's long term emissions reduction strategy, which will be presented at the 2021 UNFCCC COP26 in Glasgow.

The Project is consistent with the Commonwealth Government's low emissions technology priorities and overall investment roadmap to establish energy storage as a key technology that can respond to electricity market needs and reduce emissions in the energy sector.

2.2.5 NSW context

The *NSW Climate Change Policy Framework* (Office of Environment and Heritage, 2016) establishes the net zero emissions target for 2050 and represents the NSW Government position on responding to climate change. The *Net Zero Plan Stage 1: 2020-2030* is the current strategy to enable NSW to reach net zero emissions by 2050 and aligns with the Climate Change Policy Framework. Current NSW policies align with and support the implementation of the 2020 ISP (AEMO, 2020).

The NSW Government has established several Renewable Energy Zones (REZs) across the state and are currently in the early feasibility stages for REZs to be established in the Hunter-Central Coast and Illawarra regions, as set out under the *Electricity Infrastructure Investment Act 2020*. REZs will become hubs that connect multiple renewable energy generation with storage, such as batteries in the same location, in order to deliver affordable and reliable electricity (NSW Government, 2021). Three REZs have been planned for regional NSW and while the Hunter-Central Coast REZ is still under consideration, the proposed Eraring BESS would fulfil the storage and transmission needs established in other REZs and support the continued power generation in the Hunter region.

The Project would utilise existing transmission infrastructure and is not contingent on the development of REZs being completed. The Project can provide an advanced delivery schedule for energy storage and dispatchable firming while REZs are being built across NSW.

NSW Electricity Strategy 2019

The *NSW Electricity Strategy* was released in 2019 and sets out actions to address NSW electricity needs while supporting national solutions and reforms. One of the key propositions in the Electricity Strategy is that 'new generation, delivered by competitive markets, should reduce electricity prices and protect the environment'. In particular, renewables are the lowest cost form of reliable electricity generation when firmed by dispatchable technologies such as storage.

The Electricity Strategy emphasised that variable renewable energy needs to be complemented by firm and flexible power and batteries is becoming more feasible as a provider commercial firming services due to the downward trend in costs. The proposed Eraring BESS would provide important grid services that facilitate renewable energy input into the grid network, by enabling large scale storage that has flexible dispatchability to respond to real-time electricity demands.

NSW Electricity Infrastructure Roadmap 2020

The NSW Electricity Infrastructure Roadmap establishes the NSW government's 20-year plan to transition the electricity sector towards more renewable generation, transmission, long duration storage and firming within the system. One of the key principles of this roadmap is to deliver renewables and new firming resources to support stable, long-term energy storage in NSW. The Roadmap aims to provide confidence and encourage private investment to support the development of 12 GW of renewable energy assets and 2 GW of energy storage by 2030. Strategic planning is seen as crucial to this roadmap, to allow new generation, transmission and storage infrastructure to be built and come online before coal-fired power stations close over the next few decades, in order to replace the energy lost and avoid a rapid increase in electricity prices.

The Roadmap aligns directly with the 2020 ISP which identified that by mid-2030s NSW will need around 2.3 GW of energy storage with four to 12 hours of duration to maintain system reliability and security (DPIE, 2020). The Project would contribute to the identified requirements for energy storage capacity in NSW by providing peak capacity of 700 MW that can be dispatched as needed to boost reliability.

2.2.6 Origin policies

As Australia's largest energy retailer, Origin has committed to achieve net-zero emissions by 2050. As outlined in Origin Sustainability Report 2020, Origin's climate change targets include reducing Scope 1 and Scope 2 emissions by 50% by 2032 and Scope 3 emissions 25% by that year.

Origin has announced new short-term emissions targets in 2020, to reduce Scope 1 emissions over the next three financial years to FY2023 by an average of 10 per cent, compared to the FY2017 baseline. In FY2021, new climate change targets will be linked to executive renumeration. Origin continues to implement the recommendations by the Task Force on Climate-related Financial Disclosures (TCFD) to disclose climate-related risks and opportunities. The established emissions reduction goals and climate change reporting commitments align with Origin's strategic priority to effectively manage the transition to a low-carbon economy.

Origin is a member of the We Mean Business coalition with the aim of accelerating corporate action on climate change. In 2015 Origin was the first energy company in the world to sign up to seven commitments as follows:

- Report climate change information
- Commit responsible corporate engagement in climate policy
- Adopt a science-based emissions reduction target
- Set measures to factor in a cost of carbon internally, to judge its effect on investment decisions to drive down carbon emissions
- Become Australia's leading renewable and low-carbon energy provider, helping customers to procure electricity from renewable sources and procure 100 per cent of energy from renewable sources for Origin's office premises, and where possible, all other operations by 2050
- Reduce short-lived climate pollutants (SLCPs) (that contribute to greenhouse gas emissions)
- Remove commodity-driven deforestation from all supply chains.

Origin has committed to phasing out coal with the scheduled closure of EPS in 2032. Origin is also focused on building battery storage capacity through the Eraring BESS Project which is set to become a significant part of emissions reduction commitments to deliver cleaner energy in the future.

2.2.7 Regional context

Hunter Regional Plan

The Hunter Regional Plan 2036 (Department of Planning and Environment, 2016) is a 20-year blueprint for the future of the Hunter region, which includes the City of Lake Macquarie. The overall vision for the region is to be the leading regional economy in Australia with a vibrant new metropolitan city at its heart.

This vision is supported by a range of goals, directions and actions. The Project would align with the Hunter strategic direction to 'diversify and grow the energy sector' and promote 'new opportunities arising from the closure of coal-fired power stations that enable long term sustainable economic and employment growth in the region'.

Greater Newcastle Metropolitan Plan 2018-2036

The City of Lake Macquarie is considered part of the Greater Newcastle region and the Metropolitan Plan establishes key strategies to support sustainable local and regional growth. Strategy 15 sets out to align with NSW Government plans to achieve net-zero emissions, and establishes the Plan for a Carbon Neutral Greater Newcastle by 2050. Specific actions of this strategy include that Greater Newcastle councils will align plans to encourage initiatives to re-use power generating sites for renewable energy generation and re-purposing of electricity distribution infrastructure in West Lake Macquarie and other suitable locations with existing infrastructure.

The Project would align with Strategy 15 in particular and is consistent with overall objectives and outcomes of the Metropolitan Plan.

Lake Macquarie Community Strategic Plan 2017-2027

The Lake Macquarie Community Strategic Plan sets out community visions and values such as the need to protect and enhance natural environments and to encourage an adaptable and diverse economy.

In particular, Lake Macquarie Council seeks to achieve the established values through actions such as supporting key industries to change and adapt to a diversifying economy, and to support businesses to build capability in using new technology in order to realise economic opportunities. Origin is capitalising on emerging technology in battery storage and facilitate industry transitioning away from coal towards renewable energy. The Project is not inconsistent with the community visions established in the Lake Macquarie Community Strategic Plan.

Lake Macquarie City Council Environmental Sustainability Strategy and Action Plan 2020-2027

The Council Environmental and Sustainability Strategy and Action Plan sets out how the council can approach and implement key strategic directions in the Community Strategic Plan. Key environmental concerns for the community include efficient use of energy and water and climate change mitigation and adaptation. Targets set for 2027 include creating sustainable city and communities that maximise the efficient use of energy and reduce reliance on non-renewable energy sources. The Lake Macquarie key community values also emphasise creative process and outcomes that bring together history, culture knowledge and expertise that support new technologies and ways of thinking.

The Project is consistent with the established environmental and sustainability strategies as it highlights the use of emerging low emissions technology such as battery storage to facilitate the transition towards renewable energy on a local and regional scale.

2.3 Key features of project area and surrounds

The Project is located on appropriately zoned land which is wholly owned by Origin as illustrated in Figure 2.1. The Project is within an industrial area with the primary land use being energy generation. There are no sensitive

receivers in the immediate vicinity of the Project and surrounding land consists of broad acre rural development and low density residential properties. The largest commercial centre and population centre nearby is Charlestown in Lake Macquarie LGA, and the closest residential suburb is Dora Creek. The closest sensitive receiver is 600 metres west of the Project.

The Project is not located near any national parks, scenic or conservation areas. The wetlands area adjacent to the western boundary of the Project footprint is identified as Fauna Key Habitats (NE NSW), with identified possible Squirrel Glider Crossing Zone around 230 metres west of the Project area. The Project is located within the Fauna Corridor for North East NSW area and habitat connectivity would be considered in the design and EIS. The wetlands area west and north of the Project is also identified partially as Flood Planning Area under the Lake Macquarie LEP, around 100 metres west and to the north of the Project area.

The Great Northern Railway alignment runs along the border of Dora Creek and Eraring suburbs, 250 metres west of the Project area. The Railway separates the Project from nearest sensitive receptors.

No major roads or pipeline infrastructure are located near the Project area. Access to the site is provided by designated heavy vehicle and oversize overmass load carrying vehicles network approved Roads.

The Project would connect to the existing TransGrid 330KV Eraring Switchyard via existing vacant transmission bays.

2.4 Other agreements

No other agreements have been entered into by Origin in relation to the Project.

Site layout

- Site access point
- Node
- Cable connection
- Project footprint
- Battery footprint
- Store
- Eraring Power Station
- Eraring site boundary

Lake Macquarie LEP 2014

- E2 Environmental Conservation
- E4 Environmental Living
- R2 Low Density Residential
- RE1 Public Recreation
- RU2 Rural Landscape
- RU4 Rural Small Holdings
- SP1 Special Activities
- SP2 Infrastructure
- W1 Natural Waterways

Surrounding context

- Transmission line
- Railway
- Conveyor
- Switchyard
- Arterial road
- Local road
- Service maintenance track
- Easement
- Minor waterway
- Waterbody
- Lot boundary

0 100 200 300 400 m

1:15,000 at A4

GDA94 MGA56

Data sources

Origin 2021
Aerometrex 2020
© Department Finance, Services and Innovation Dec 2020
DPE 2020

Figure 2.1 Zoning and land use context

3. Project

3.1 Project overview

Origin is proposing to develop a major grid-scale battery Project at the existing EPS site. The battery will use lithium ion technology and will have a peak generation output of 700 MW. The battery configuration will offer significant operational flexibility being capable of providing 700 MW for up to 4 hours with lesser loads able to be maintained for longer periods (such as 200 MW over 14 hours, or even longer at lower loads).

The Project design would target four aspects vital for meeting NSW demand requirements and provide grid security including:

- The capacity to deliver additional energy supply at peak times of up to 700 MW, sustained over approximately 4 hours dispatch duration
- The ability to flexibly shift 2,800 MWh of energy from low demand periods to higher demand periods such as the evening peak, or overnight as renewable energy penetrates further into the NSW market
- Potential to provide intra-regional transmission services which could support the development of the Central West Orana and New England Renewable Energy Zones (REZs) at lower costs than alternatives
- Ability to provide grid security services to support reliable energy supply, which are of increasing importance as NSW moves towards the retirement of coal-fired generation over the decade ahead. The range of grid security benefits include Frequency Control Ancillary Services (FCAS), Fast Frequency Response, Black Start and Synthetic Inertia.

3.2 Project location

The Project will be situated on land zoned SP2 Infrastructure for electricity generating purposes and within an area previously disturbed by power station activities. No re-zonings or land acquisitions are required. The Project is located within, Lots 10 and 11 DP 1050120, Rocky Point Rd Eraring, within the Lake Macquarie City Council LGA, as shown on Figure 1.1.

The Project area is located south west of the EPS operational area and west of the EPS attemperation reservoir and EPS water intake canal. The site is currently undulating in nature having been used as a borrow pit for extracting material for the construction of the attemperation reservoir and has been subsequently rehabilitated.

The nearest private receptors to the Project area are located as follows:

- Rural residential dwellings approximately 600 metres to the west on Gradwells Road
- Dora creek township approximately 1.2 kilometres to the south
- Properties on Boarder Street approximately 600 metres to the east which are screened by the EPS inlet canal and attemperation reservoir
- Dwellings to the north of Project are limited and located over 4 kilometres away beyond the EPS and mining operations.

3.3 Project layout

3.3.1 Project area

The target Project footprint as shown on Figure 3.1 is approximately 20 ha. This represents the maximum BESS footprint. Temporary construction compounds or laydown areas might be required outside this footprint for latter stages of Project construction and if so would target existing vacant areas of the EPS site. The location and indicative footprint of these areas would be determined during design development and assessed as part of the Environmental Impact Statement for the Project.

No other works off-site are required to facilitate the Project construction or operation.

Site facilities would also include office or control room and parking suitable for vehicles and equipment required to operate and maintain the Project.

Site access will be via Rocky Point Road and the B53 Wangi Road.

3.3.2 Battery system

While the BESS technology provider is yet to be determined, the batteries are likely to consist of modular Lithium-ion type batteries with associated control systems, inverters, heating, ventilation and air conditioning units, transformers, and control rooms. The power conversion systems would be a four quadrant bidirectional type, and would be grid forming and provide black start functionality.

The battery would have the following key design features:

Key plant characteristics	Parameter
Power output at facility connection point	700 MW
Energy storage capacity	2,800 WMh
Transmission voltage	330 kV
Storage technology	Lithium ion
Charge and discharge cycle	365 days per year / one cycle per day
Design life	25 years (components replacement or upgrade may be required).

3.3.3 Network connection

The Project is seeking to take advantage of the existing under-utilised transmission, substation, switching and other infrastructure assets associated with the TransGrid owned 330 kV switchyard to which the EPS connects. The Project will be connected directly to the grid within the power station site and will operate independently of any coal-fired generation.

The following components are required to connect the battery to the NEM:

- Power conversion systems
- 630A/33 kV and 33/330 kV transformers
- Network connection cable in above ground configuration
- Overhead tie-in to TransGrid 330 kV network.

Site layout

- Site access point
- Node
- Cable connection
- Project footprint
- Battery footprint
- Store
- Eraring Power Station
- Eraring site boundary

Surrounding context

- Transmission line
- Railway
- Conveyor
- Switchyard
- Arterial road
- Local road
- Service maintenance track
- Easement
- Minor waterway
- Waterbody
- Lot boundary

0 500 m

1:15,000 at A4

GDA94 MGA56

Data sources

Origin 2021
Aerometrex 2020
© Department Finance, Services and Innovation Dec 2020

Figure 3.1 Indicative Project Layout

3.4 Construction activities

3.4.1 Construction works

The construction methodology for the Project would be developed in more detail during the preparation of the Environmental Impact Statement (EIS). The construction of the Project is expected to involve the following:

- Installation and maintenance of environmental controls
- Upgraded construction access track from existing internal access road to battery location
- Clearing of vegetation
- Cut and fill to create level areas and establishment of a hardstand pad and construction laydown areas
- Structural works including establishment of slabs to support battery modules, power conversion systems and Transformer structures
- Delivery, installation and electrical fit-out of the battery modules, power conversion systems and transformers
- Installation of 330kV overhead cabling from the battery transformers to the TransGrid switchyard
- Minor works to connect the battery to vacant structures in the TransGrid switchyard
- Testing and commissioning activities
- Removal of construction equipment and rehabilitation of construction areas.

The following works may also be required:

- Road network upgrades to accommodate transformer delivery across or around the inlet canal
- Establishment of asset protection zones or other design solutions for bushfire protection.

3.4.2 Construction program

The development of the BESS may be staged in response to NEM demand. The Project's modular design provides significant deployment flexibility with the capacity to stage the 700 MW to meet market needs. The construction of the first stage of the BESS is expected to begin in 2021 subject to planning approval and have a duration of 18 months, with commercial operations possible at the end of 2022 (subject to Project approval).

Indicative timeline for subsequent stages of the BESS would be triggered to meet grid needs:

- Stage 1 operational (230 MW and 920 MWh) – target Q4 2022 as earliest date
- Stage 2 operational (230 MW) – target Q2 2024
- Stage 3 operational (240 MW) – target Q4 2026.

The majority of construction activities would be carried out during the following hours:

- 7am-6pm Monday to Friday
- 8am-1pm Saturdays
- No work on Sundays or Public Holidays.

Other activities that would be carried out outside of the standard daytime construction hours may include:

- Work determined to comply with the relevant noise management level at the nearest sensitive receiver
- The delivery of materials outside approved hours as required by the NSW Police or other authorities for safety reasons

- Emergency situations where it is required to avoid the loss of lives and properties and/or to prevent environmental harm
- Situations where agreement is reached with affected receivers.

3.4.3 Construction workforce

The Project will involve the recruitment and training of a construction workforce and ongoing operations and maintenance roles. Additionally, major contractors will be asked to demonstrate their commitment to use State and Hunter Region workforces and create indigenous and equal opportunity employment in the delivery of the Project.

Development and construction of the Project will also provide localised upskilling and training in the region in relation to the deployment of batteries.

3.5 Operation

The Project would operate on a 24 hour and 365 days per week basis. Operation would respond to market demand and may fluctuate from discharge at full capacity for up to four hours or and partial capacity for longer duration.

Maintenance activities would be required, including maintenance of landscaping and asset protection zones, water management infrastructure, access tracks and inspection, testing and replacement of components on a rolling basis. It is intended to have an operation life of 20 to 30 years and depending on the selected technology, components may be replaced and or upgraded to extend this timeframe.

3.6 Decommissioning

Following the end of economic life, above ground components would be removed and re-purposed where possible and land rehabilitated where necessary to achieve existing conditions.

3.7 Alternatives to be investigated further during EIS preparation

The specific technology and layout will be progressed further as part of the EIS. At time of lodgement of the EIS a single technology provider may not have been selected and may change for future stages of development. As such, reasonable worst-case assumptions will be used to facilitate impact assessment in the EIS.

4. Statutory context

4.1 NSW planning framework

The Environmental Planning and Assessment Act 1979 (EP&A Act) and the Environmental Planning and Assessment Regulation 2000 (the EP&A Regulation) provide the framework for land use planning and development control in NSW. The EP&A Act and Regulation are supported by a number of Environmental Planning Instruments (EPIs), which include State Environmental Planning Policies (SEPPs) and Local Environment Plans (LEPs).

Part 4 of the EP&A Act establishes the framework for assessing development that is permissible with consent. The Project is SSD under Part 4, Division 4.7 Section 4.36 of the EP&A Act, as it meets the requirements of Clause 8 of the State Environmental Planning Policy (State and Regional Development) 2011 (SRD SEPP). The Project is specified in Schedule 1 Clause 20 of the SRD SEPP in that it is:

- Development for the purpose of electricity generating works
- Has a capital investment value (CIV) of more than $30 million.

The Project is defined as electricity generating works and has a CIV estimated to exceed one billion dollars. Therefore the Project is proceeding with an application for SSD. Under Section 4.12(8) of the EP&A Act, the application is to be accompanied by an EIS that meets the requirements of Schedule 2 of the EP&A Regulation and any other relevant legislative requirements that relate to the EIS.

This scoping report has been prepared to obtain the Secretary's Environmental Assessment Requirements (SEARs) which will facilitate the preparation of an EIS. Following the receipt of the SEARs, Origin would prepare and publicly exhibit the EIS in accordance with the SEARs and relevant requirements under Part 4 of the EP&A Act and the EP&A Regulation.

4.2 Statutory requirements for the project

4.2.1 Permissibility

The Project meets the definition of 'electricity generating works' under the Standard Instrument – Principal Local Environmental Plan (Standard Instrument), being a building or place used for the purpose of 'electricity storage'. The Project is wholly located in land zoned SP2 Infrastructure (Electricity generating works) with the purpose shown on the map permissible with consent under the Lake Macquarie LEP 2014. Further, Clause 34 of the State Environmental Planning Policy (Infrastructure) 2007 (Infrastructure SEPP) states 'development for the purpose of electricity generating works may be carried out by any person with consent on any land in a prescribed rural, industrial or special use zone'. Land which is zoned SP2 Infrastructure is prescribed special use zone for the purposes of Clause 34 of the Infrastructure SEPP. Therefore the Project would be permissible with consent under Part 4 of the EP&A Act.

4.2.2 Power to grant consent

As SSD, the Project will be assessed under Part 4, Division 4.7 of the EP&A Act. Under Section 4.5(a) of the EP&A Act, the consent authority for the Project is the Independent Planning Commission. The consent authority will evaluate the SSD application in accordance with Section 4.15 of the EP&A Act.

The relevant mandatory provisions of the EP&A Act are identified in **Table 4-1**.

Table 4-1 EP&A Act mandatory considerations

Statutory reference	Consideration
Section 4.36 Development that is SSD	The Project is declared SSD through the application of Clause 8 and Schedule 1 of SRD SEPP being for the purpose of electricity storage and having a CIV exceeding $30 million.
Section 4.37 Staged SSD	The Project application does not seek consent for a staged development.
Section 4.38 Consent for SSD	The Independent Planning Commission or the Minister for Planning and Public Spaces is the consent authority for SSD under Division 4.7 of the EP&A Act. The consent authority may determine the SSD application by either granting conditional consent or refusing consent.
Section 4.39 Regulations – SSD	The relevant regulations establish the form and content requirements for the EIS and the requirements for the consultation process.
Section 4.10 Evaluation	The determination of the application is to be evaluated under Section 4.15 of the EP&A Act.

Environmental approvals that are not required for SSD under Section 4.41 of the EP&A Act, but which have been considered as part of the Scoping Report are listed in **Table 4-2.**

Table 4-2 Relevant approvals not required under Section 4.41

Approval	Consideration
A permit under section 201, 205 or 219 of the *Fisheries Management Act 1994* (FM Act)	The Project would not involve dredging or reclamation works or works in water ways. The Project would not impact on marine vegetation or cause blockage in fish passage. No permits under the relevant FM Act sections is required.
An approval under Part 4, or an excavation permit under section 139 of the *Heritage Act 1977*	Two local heritage items are identified under the Lake Macquarie LEP at or in the vicinity of the Project area, being the Eraring Power Station and the Great Northern Railway. No impacts to the heritage items or value are expected as a result of the Project (refer to **Section 6.4**).
An Aboriginal heritage impact permit under section 90 of the *National Parks and Wildlife Act 1974* (NPW Act)	No Aboriginal heritage sites or listed items are identified within the Project area or within a 200 m buffer. Significant impacts to Aboriginal heritage is unlikely as a result of the Project, however potential heritage significant would be assessed further in the EIS (refer to **Section 6.3**).
A bush fire safety authority under section 100B of the *Rural Fires Act 1997*	The Project area is located within identified bushfire prone land. Potential risks associated with bushfires would be assessed further in the EIS (refer to **Section 6.10.1**).
A water use approval (section 89), a water management work approval (section 90) or an activity approval (other than an aquifer interference approval) under section 91 of the *Water Management Act 2000* (WM Act).	The Project would not require a water use approval under section 89 of the WM Act. The Project would not involve any water management work under section 90 of the WM Act. The Project would not involve work being carried out on waterfront land which means controlled activity approval is not required under section 91(2) of the WM Act. No aquifer interference activity would occur and as such section 91(3) would not apply to the Project.

Environmental approvals that are referred to in Section 4.42 of the EP&A Act, where authorisations cannot be refused if it is necessary for carrying out SSD and must be applied consistently are outlined in **Table 4-3**.

Table 4-3 Relevant approvals required under Section 4.42 of the EP&A Act

Approval	Consideration
An aquaculture permit under section 144 of the FM Act	The Project would not involve aquaculture development and no aquaculture permit is required.
An approval under section 15 of the Mine *Subsidence Compensation Act 1961* (repealed by *Coal Mine Subsidence Compensation Act 2017*)	The Project is located within a mine subsidence district. An approval under the *Coal Mine Subsidence Compensation Act 2017* would be required.
A mining lease under the *Mining Act 1992*	An exploration licence and mining/production lease cover the Project area. Since the Project would only involve surface infrastructure with a limited footprint, potential impacts on existing or future mining activities are not anticipated. A mining lease is not required.
A production lease under the *Petroleum (Onshore) Act 1991*	The Project would not involve petroleum production and no production lease is required.
An environment protection licence (EPL) under Chapter 3 of the *Protection of the Environment Operations Act 1997* (POEO Act) (for any of the purposes referred to in section 43 of that Act)	Origin would seek either a new EPL or a variation of the existing EPS EPL, which would be obtained prior to Project commencing.
A consent under section 138 of the *Roads Act 1993*	The Project is located with the EPS site next to Rocky Point Road, which is a local road owned and managed by Lake Macquarie City Council. No road upgrades are currently planned in relation to the Project.
A licence under the *Pipelines Act 1967*	No pipelines or associated licences would be required for the Project.

4.2.3 NSW environmental legislation

Based on the scope of the Project the legislation that may be applicable are identified in **Table 4-4**. The applicability would be confirmed in the EIS.

Table 4-4 NSW legislation requirements

Legislation	Requirement
Contaminated Land Management Act 1997	This Act outlines the circumstances in which notification of the NSW Environment Protection Authority (EPA) is required in relation to the contamination of land. This may become relevant during construction and / or operation of the Project and would be discussed in greater detail in the EIS.
Biodiversity Conservation Act 2016	This Act aims to conserve threatened species, populations and ecological communities through ensuring appropriate assessment, management and regulation of actions that may damage critical or other habitat for a listed threatened species, or may otherwise significantly affect a threatened species, population or ecological community. The EIS for the Project would include an assessment of biodiversity impacts (refer to **Section 6.2**) in accordance with the *Biodiversity Conservation Act 2016* and biodiversity assessment method.
Biosecurity Act 2015	Under this Act, all plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Section 22 requires that any

Legislation	Requirement
	person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable. The Biosecurity Act may be applicable if listed weeds are identified within the Project area.
Heritage Act 1977	Section 146 of the Heritage Act specifies that if a relic is discovered or located, the Heritage Council must be notified 'of the location of the relic, unless he or she believes on reasonable grounds that the Heritage Council is aware of the location of the relic'. The Project is located within the curtilage of the Eraring Power Station heritage item which is considered to have local heritage significance. It is not expected that the Project would have any significant negative impact on the heritage item. The EIS for the Project would include an assessment of potential heritage impacts (refer to **Section 6.4**).
Native Title (New South Wales) Act 1994	This Act provides for native title in relation to land or waters. The Project does not affect land subject to a native title claim or determination, or land to which an Indigenous Land Use Agreement applies.
National Parks and Wildlife Act 1974	This Act provides for the management and conservation of land declared as national parks and conservation areas, as well as regulating the management of Aboriginal cultural heritage objects. No part of the Project falls within land reserved under the National Parks and Wildlife Act 1974 or NSW National Parks owned or managed lands. The EIS for the Project would include an assessment of potential Aboriginal heritage impacts (refer to **Section 6.3**).
Protection of the Environment Operations Act 1997	An environment protection licence (EPL) is required for scheduled activities or development work listed by the Act. Schedule 1 lists activities that require a licence and Section 17 applies to 'general electricity works'. EPS operates under EPL 1429 and a new EPL would be sought to authorise new scheduled activity associated with the Project. The POEO Act has a number of regulations relating to matters of pollution, waste, air quality and noise. If relevant, these specific sections would be considered as part of the impact assessments within the EIS.
Roads Act 1993	Section 138 of this Act states: A person must not (a) erect a structure or carry out a work in, on or over a public road, or (b) dig up or disturb the surface of a public road, or (c) remove or interfere with a structure, work or tree on a public road, or (d) pump water into a public road from any land adjoining the road, or (e) connect a road (whether public or private) to a classified road, otherwise than with the consent of the appropriate roads authority. The Project would is not anticipated to require work affecting a public or classified road.
Waste Avoidance and Resource Recovery Act 2001	This Act encourages the most efficient use of resources in order to reduce environmental harm. Waste and resource impacts associated with the Project would be considered as part of the EIS.

4.2.4 NSW environmental planning instruments

Relevant SEPPs and LEP to the Project have been considered in **Table 4-5**.

Table 4-5 Environmental planning instruments and considerations

Environmental planning instrument	Considerations
State Environmental Planning Policy (State and Regional Development) 2011 (SRD SEPP)	The SRD SEPP identifies development that is significant to the state of NSW. As discussed in **Section 4.1**, the Project is classified as SSD under Clause 8 in conjunction with Clause 20 of Schedule 1 of the SRD SEPP.
State Environmental Planning Policy (Infrastructure) 2007 (Infrastructure SEPP)	The aim of the Infrastructure SEPP is to facilitate effectively delivery of infrastructure projects across NSW. The Project area is located in land zone SP2 Infrastructure under the Lake Macquarie LEP. This land use zone is also defined as a special use zone for the purpose of electricity generating works and under Clause 34 of the Infrastructure SEPP the Project is permissible with consent.
State Environmental Planning Policy (Koala Habitat Protection 2020) (Koala SEPP)	The Koala SEPP aims to encourage conservation and management of areas of natural vegetation that form koala habitats. The Koala SEPP applies to many LGAs across NSW as listed in Schedule 1, including the Lake Macquarie LGA. The EIS biodiversity assessment would consider any potential koala habitat impacts and relevant koala plans of management as part of the EIS preparation and biodiversity impact assessment for the Project in accordance with applicable Koala protection policy at the time.
State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55)	SEPP 55 aims to streamline approaches for the remediation of contaminated land to minimise the risk of harm to the health of humans and the environment. In accordance with section 7(1) of SEPP 55, a consent authority must not consent to the carrying out of development on any land unless: ▪ it has considered whether the land is contaminated, and ▪ if the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out, and ▪ if the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose. Origin has a detailed understanding of the contamination status of the EPS site. This would be reviewed and summarised as part of the EIS to confirm that the Project area is suitable either in its current state, or can be made suitable through remediation.
State Environmental Planning Policy No. 33 – Hazardous and Offensive Development (SEPP 33)	SEPP 33 aims to ensure that measures are used to reduce the impact of a development that is potentially hazardous or offensive. Section 12 of SEPP 33 requires a preliminary hazard analysis for development of a potentially hazardous industry. Section 13 of SEPP 33 specifies that the consent authority must consider: ▪ current circulars or guidelines published by the Department of Planning relating to hazardous or offensive development, and ▪ whether any public authority should be consulted concerning any environmental and land use safety requirements with which the development should comply, and ▪ in the case of development for the purpose of a potentially hazardous industry—a preliminary hazard analysis prepared by or on behalf of the applicant, and ▪ any feasible alternatives to the carrying out of the development and the reasons for choosing the development the subject of the application (including any feasible alternatives for the location of the development and the reasons for choosing the location the subject of the application), and

Environmental planning instrument	Considerations
	▪ any likely future use of the land surrounding the development. While lithium ion batteries do not exceed screening criteria under SEPP 33, the Department of Planning, Industry and Environment (DPIE) is understood to require the preparation of a preliminary hazard analysis be undertaken during the EIS preparation in accordance with relevant Hazardous Industry Planning Advisory Papers (HIPAPs) and other guidelines such as Applying SEPP 33 and Multi-level Risk Assessment published by DPIE.
Lake Macquarie Local Environmental Plan (LEP) 2014	The Project would be located within the City of Lake Macquarie LGA and development within this LGA is regulated by the Lake Macquarie LEP. The Project area is zoned SP2 Infrastructure (Electricity generating works) with the purpose shown on the map permissible with consent, and energy storage included in the definition of Electricity generating works. Other applicable clauses of the LEP include: ▪ Clause 5.10 heritage protection in relation to the listing of the EPS as a locally significant heritage item which requires that the consent authority must, before granting consent under this clause in respect of a heritage item or heritage conservation area, consider the effect of the proposed development on the heritage significance of the item or area concerned. ▪ Clause 7.1 in relation to acid sulfate soils requiring the preparation of an acid sulfate soils management plan in specified circumstances prior to issue of development consent. ▪ Clause 7.2 in relation to earthworks with specified mandatory considerations prior to the issue of development consent ▪ Clause 7.5 in relation to mandatory considerations of terrestrial biodiversity.

4.2.5 Commonwealth environmental approvals

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) prescribes the Commonwealth's role in environmental assessment, biodiversity conservation and the management of protected areas.

The EPBC Act requires referral to the Commonwealth Minister for the Environment and Energy for any actions that are likely to have a significant impact on the following:

- Matters of National Environmental Significance (MNES)
- An action by the Commonwealth or a Commonwealth agency which has, will have or is likely to have a significant impact on the environment
- An action which has, will have or is likely to have a significant impact on the environment on Commonwealth land, no matter where it is to be carried out.

Origin is not a Commonwealth agency and a preliminary assessment of the Project indicates no Commonwealth land would be affected.

A search of the EPBC Act Protected Matter Search Tool (PMST) for the Project study area was conducted in February 2021 to identify potential MNES that may trigger the need for referral of the action to the Australian Department of Agriculture, Water and the Environment (DAWE). A summary of the potential MNES within 10 kilometres of the Project area is presented in **Table 4-6** and the search results are shown in **Appendix B**.

Table 4-6 Protected matters search results

MNES	Matters within 10km of the Project area
World heritage properties	None
National heritage places	None
Wetlands of international importance	None
Great Barrier Reef Marine Park	None
Listed Threatened Ecological Communities	3
Listed Threatened Species	72
Listed Migratory Species	47
Other matters protected by the EPBC Act	
Commonwealth Land	3
Commonwealth Heritage Places	None
Listed Marine Species	52
Whales and Other Cetaceans	1
Critical Habitats	None
Commonwealth Reserves Tribunal	None
Commonwealth Reserves Marine	None

It is generally the responsibility of the proponent of a proposed development to identify whether a project, or action, has the potential to impact upon a MNES and constitute the need for a referral to the Commonwealth for determination.

Biodiversity assessment has commenced and the need for a referral under the EPBC Act would be confirmed. If required, a Referral would be made to the Commonwealth Department of Agriculture, Water and Environment under the EPBC Act. Should any component of the Project be identified as a controlled action, the Project would be assessed under the Bilateral Agreement (*Amending Agreement No.1*, 2020) between the Commonwealth and NSW Governments and the approval of the Australian Minister for the Environment would be required.

4.2.6 Other approvals required to carry out the project

The following approvals, permits or authorisations are required for Project:

- An EPL under the POEO Act
- Approval under Section 15 of the *Coal Mine Subsidence Compensation Act 2017*
- A construction and occupation certificate under the EP&A Act.

The need for a controlled activity approval is to be determined by a referral process under the EPBC Act and is being progressed separately. No other licences and permits under other legislation would be required by the Project prior to commencement of construction. Network connection agreements with TransGrid are being progressed separately.

5. Engagement

5.1 Interest groups identified

Origin has completed a comprehensive stakeholder analysis and has identified a number of key interest groups including:

- State and Federal politicians
- Federal, State and Local government
- Government organisations
- Energy industry bodies
- Earing Community Forum and CCC
- Community investment recipients
- Near neighbours
- Indigenous groups including Traditional Owners
- Local businesses
- Environmental Groups
- Schools.

5.2 Engagement carried out

Origin has commenced stakeholder consultation following the public announcement of their plans to develop a BESS at the EPS site. Community consultation to date has included:

- General media release regarding plans to develop the Project resulting in publication in newspapers circulating locally, regionally and nationally
- Attempts to inform neighbours within 500 metres of the Project via phone where contact details are known, and letter box drop
- Email correspondence with the EPS Community forum advising of plans for the Project
- Email correspondence with EPC Ash Dam community consultation committee advising of plans for the Project.

EPS's primary mechanism for community engagement is the Community Forum, which is made up of local community members and meets face to face on a quarterly basis. The forum is advised of current and upcoming activities and opportunities (including community investment) and provides the community the opportunity to raise concerns or ask questions relating to Origin's operations. Due to Covid-19 and the inability to meet face to face, Origin created a community newsletter which Origin is aiming to issue three or four times per year. Origin will use the newsletter as an opportunity to keep the community updated on the Project. The newsletters are available at https://www.originenergy.com.au/about/who-we-are/what-we-do/generation.html.

A Community Consultative Committee (CCC) was established in 2020 as a condition of approval relating to the expansion of the EPS ash dam. The CCC brings together representatives of the community which includes those living close to EPS and the broader community, Lake Macquarie City Council, and the proponent Origin Energy to have open discussion about the expansion of the EPS ash dam. The CCC meets quarterly, providing an opportunity for Origin to update the community on activities at Eraring, and for the community members to raise matters with Origin alike.

Both the EPS Community Forum and the CCC have been notified in writing of the proposed EPS Battery Project.

Consultation undertaken to date, issues raised and responses are summarised in Table 5-1.

Table 5-1 Summary of stakeholder consultation to date

Stakeholder	Date	Consultation Activity	Purpose	Issues or Concerns Raised	Consideration of Issues
Greg Piper, MP State Member for Lake Macquarie	11 January 2021	Group Manager, Eraring Power Station, contacted Greg by phone to advise	Advised of project, offered to answer questions and commitment to keep updated		
Eraring Power Station Community Forum	12 January 2021	Sent an email informing of battery Project announcement	To advise of Project, provide a link to the announcement and commit to keeping community updated	Responses received were positive	
Community Investment Partners/Recipients	12 January 2021	Sent an email informing of battery Project announcement	To advise of Project, provide a link to the announcement and commit to keeping community updated		
Community Consultative Committee (ash dam)	12 January 2021	Sent an email informing of battery project announcement	To advise of project, provide a link to the announcement and commit to keeping community updated	Concerns with validity of renewable energy if charged by a coal fired power station	Origin has responded in writing to the concerns/issues and will discuss further at a face to face meeting on 25 March 2021
Lake Macquarie City Council	9 March 2021	Phone call with Deputy CEO and follow up email advising of battery Project. Face to face meeting scheduled for 25 March 2021	Advised of project, offered to answer questions, commitment to keep updated and face to face meeting arranged for 25 March 2021	Supportive and interested in job creation and opportunities for the community	
Neighbours (within 500 m)	Week commencing 22 March 2021	Efforts to contact via phone or where details were known or letter box drop advising of battery Project including frequently asked questions flyer and contact details.	Inform near neighbours of plans to lodge scoping report and provide mechanisms to facilitate future consultation.		

5.3 Community views

Origin has received some feedback from the Community Forum who have expressed they are supportive of the Project.

The CCC has raised some questions regarding operation of the Project, and Origin will provide a comprehensive overview at the next CCC meeting which is scheduled in March 2021.

In mid-January 2021 after the announcement of the battery project, there were a number of mentions of the Battery Project announcement on social media forums such as Facebook, twitter and Reddit, with the majority of coverage positive in nature.

5.4 Engagement to be carried out

A community and consultation plan has been developed outlining the activities Origin will undertake to inform and consult the community and other identified stakeholders. Origin will inform neighbours and the surrounding community of the lodgement of this Scoping Report and provide a frequently asked questions flyer. This will include directions on how the community can review documents via the Major Project Website and communicate with Origin regarding the Project going forward. A copy of the notification and frequently asked questions document is provided in Appendix C. Furthermore, Origin is developing extensive content to be placed on the Origin website providing information on all activities and projects being undertaken at the EPS.

5.4.1 Engagement during EIS and identified and anticipated stakeholder issues

Due to the Project location and nature of the Project, concerns anticipated include:

- Interaction and implications for the EPS
- Social and amenity impacts including transport, traffic, noise and vibration, air quality impacts, risks and hazards
- Impacts to biodiversity
- Impact to potential Aboriginal heritage
- Impacts to water
- Whether other options were considered
- End of life provisions and rehabilitation
- Provision of local jobs.

Community engagement is expected to be targeted at keeping neighbours and key stakeholders informed of the assessment process and anticipated Project impacts such that concerns can be addressed and managed through the design process. This is expected to be achieved through direct consultation with immediate neighbours, advertising the Project and how additional information can be obtained in the local media, and general information sessions via the Community Consultation Committee prior to EIS exhibition.

Agency engagement is identified throughout Section 6 in relation to specific matters with interests expected to include:

- The NSW Planning, Industry and Environment cluster regarding the environmental assessment and land use implications of the Project and full suite of environmental impacts
- NSW EPA and State government in relation to management of legacy contamination

- Lake Macquarie Council regarding impacts to Council services as well as a full suite of environmental impacts and rehabilitation
- Local Emergency Management Committee and rural fire services in relation to bushfire and hazards
- Transport for NSW regarding impacts to the road network and any need for oversize over mass transport
- TransGrid in relation to works affecting the Switchyard and network connection agreements.

5.4.2 Further actions

Origin will develop a consultation plan for the EIS once SEARs are received and the outcomes of consultation will be included in the EIS and relevant technical studies.

6. Proposed assessment of impacts

6.1 Overview

The assessment of the likely environmental consequences of the Project has involved:

- Consideration of the construction and operational stages of development
- Desktop review of relevant databases, historic aerial photography, reports associated with the existing development of the EPS and available background data
- Review of Draft for Exhibition Scoping an Environmental Impact Statement Guidelines issued by the Department of Planning, Industry and Environment (DPIE)
- Outcomes of stakeholder consultation to date.

Table 6-1 provides preliminary consideration of environmental matters and identifies the environmental issues that require further assessment and management.

From this process, environmental aspects for further consideration in the EIS as identified in **Table 6-1** are:

- Biodiversity
- Aboriginal heritage
- Non-Aboriginal heritage
- Amenity – noise and vibration
- Traffic, transport and access
- Hazards and risks
- Water
- Social-economic
- Land and contamination
- Air and Greenhouse Gas.

Preliminary consideration of existing environment, potential impact mechanisms and proposed assessment and consultation for these matters, and those excluded from further assessment are provided in **Section 6.2** to **6.15**

Table 6-1 Overview and preliminary consideration of environmental matters

Matter	Scale and nature of likely impacts of the Project	Sensitivity of receiving environment	Potential to generate cumulative impacts with other projects	Level of assessment
Biodiversity	The Project would involve clearing 20 ha of vegetation. The potential biodiversity impacts are expected to be direct and of a moderately large scale during construction. Indirect impacts including a reduction in ecological corridors connectivity may also occur as a result of the Project.	The Project area is moderately disturbed and mostly cleared. The Project area is adjacent to undisturbed wetlands but is not anticipated to intrude on this area.	No	Standard
Aboriginal heritage	The Project would involve clearing and ground disturbance across an approximate 20 ha area. The Project is not within land mapped as Sensitive Aboriginal Landscape Area under the LEP and does not affect any sites listed on the Aboriginal Heritage Information Management System (AHIMS). The majority of this area has been previously disturbed for the purpose of a borrow-pit. Nevertheless, Aboriginal heritage items and values may be present particularly within areas of less disturbance.	While largely disturbed, any evidence of past occupation of the site by Aboriginal people is important.	No	Standard
Non-Aboriginal heritage	Non-Aboriginal heritage items near the Project include Eraring Power Station (ID 93) and the Great Northern Railway line (ID I89) The Project would not impact the railway line, and is not inconsistent with the EPS heritage item. The site may previously accommodate activities associated with early settlement as previously identified in assessments for the Attemperation reservoir. If present within the Project area these relics would be limited to areas of less disturbance and impacted by the Project.	While largely disturbed, any remaining relics are protected and are likely to have local significance.	No	Standard
Amenity – noise and vibration	The construction and operation stages of the Project is anticipated to generate noise that would be audible at a local level but is unlikely to exceed noise management levels. The Project design and standard construction noise management measures would manage or minimise any exceedance of noise management levels.	The Project is not located close to any sensitive noise and vibration receivers, with the closest residential receiver being 600 metres away to the west at Dora Creek.	Yes. The Project would have cumulative impacts with the existing operation of the EPS.	Standard

Matter	Scale and nature of likely impacts of the Project	Sensitivity of receiving environment	Potential to generate cumulative impacts with other projects	Level of assessment
Traffic, transport and access	The Project would introduce additional traffic to local roads during construction including the need for some oversize and overmass vehicle movements for the delivery of transformers. No material change to traffic is expected from the operation of the Project. Private property access would be unaffected and no offsite parking would be required. No road or intersection upgrades are planned.	The community is known to be sensitive to traffic impacts due to existing ash recycling activities and proposed expansions.	Yes. Traffic impacts would accumulate with proposed increase in ash recycling traffic and existing EPS operations including outages.	Standard
Hazards and risks	The Project is located in bushfire prone land with Vegetation Category 1 and vegetation buffer zones present over parts of the Project area. The design of the Project would need to consider bushfire risks to and from the Project. The Project would incorporate controls to manage hazards to a low and reasonably practical and to avoid offsite impacts.	Battery components are within steel enclosures and are not highly sensitive to bushfire but will require appropriate protection. Any fire emanating from the Project would have potential for impacts to sensitive rural properties and other EPS assets. As an operational power station with a full suite of hazard management controls the receiving environment is not considered sensitive from hazards perspective.	No	Standard
Water	The Project would be designed and constructed in a way that would not be affected by flooding from weather events. Water used during construction would be sourced locally, however it would not come from Lake Macquarie. There would be no implications for water balance within the existing EPS site. There would be negligible impacts on water demand post construction. The Project area currently drains in a northern direction towards water management infrastructure of the EPS or directly west towards Muddy Lake. Drainage will be incorporated at the detailed design stage to prevent erosion and achieve discharge quality requirements for the receiving waters.	Muddy Lake is a coastal wetland and is considered sensitive from a water quality perspective. The railway would also be considered sensitive to flooding risks.	Water management would occur in the context of existing EPS site water management but would not accumulate with other Proposed projects.	Standard

Matter	Scale and nature of likely impacts of the Project	Sensitivity of receiving environment	Potential to generate cumulative impacts with other projects	Level of assessment
	The Project area is not within the Flood Planning Area and limited down gradient land uses exist. Increased site runoff would need to be managed so as not to exceed flood conveyance of existing EPS and railway water management infrastructure.			
Social	The Project is expected to have predominantly positive social impacts through the provision of jobs and local spend during construction. Labour is likely to be drawn from local suppliers and as such is not expected to put additional pressure on social infrastructure.	Social infrastructure is familiar with fluctuating labour demands of the EPS associated with outages and is not considered sensitive given proximity to significant population centres of Lake Macquarie, the Central Coast, Newcastle and Sydney.	No	Minor
Land	Origin has detailed understanding of contamination status and the Project area and contamination is not expected to be of significance impact in relation to the Project. As part of the EIS preparation, any existing contamination would be assessed and need to be managed during construction.	Any mobilisation of existing contaminants if present could impact sensitive receiving environments including coastal wetlands.	No	Minor
Economic	The Project would involve a significant private investment in future NEM stability and contribute to the lest cost future energy market as identified in **Section 2.2**.	Employment generation in the local area is considered beneficial for an economic perspective.	No	Minor
Air and Greenhouse Gas	Localised dust emissions could eventuate during construction in the absence of mitigation measures. Standard management measures are available such that impacts would not eventuate off site. Normal operation of a battery has no emissions. The construction and operation of the Project, as with all energy storage projects, has implications for the greenhouse gas intensity of the NEM. Battery storage when combined with increased renewable energy generation will ultimately reduce the carbon intensity of the NEM. In the short term, embedded carbon in battery components, construction related emissions and round-trip	The receiving environment is sensitive to air quality impacts as a result of the ongoing operation of the EPS and associated ash dams.	No.	Minor

Matter	Scale and nature of likely impacts of the Project	Sensitivity of receiving environment	Potential to generate cumulative impacts with other projects	Level of assessment
	efficiency losses between charging and discharging batteries would increase carbon intensity of energy delivered to the NEM via the Project.			
Amenity – visual and odour	The Project is unlikely to be visible to private dwellings or local road users due to existing screening by vegetation and topography, with additional screening able to be provided as necessary. The Project will not introduce odour impacts on the Project area or surrounding area and would not produce any odours during construction or operation that have the potential to interfere with local amenity.	The receiving environment is considered unlikely to be sensitive to visual impacts if they were to eventuate given the existence of Power and Mining operations within the area.	No	No further assessment proposed.
Built environment	The Project would not impact the public domain, public infrastructure or other built assets. The use of local roads during construction would be considered in the traffic impact assessment.	The Project occurs within the EPS landholding which is not considered sensitive to additional infrastructure associated with energy generation and transmission.	No	No further assessment proposed.

6.2 Biodiversity

6.2.1 Existing environment

Landscape context

The Site is located in the Hunter Subregion of the Sydney Basin Interim Biogeographic Regionalisation for Australia (IBRA) Region and lies within the Macquarie Tuggerah catchment. The EPS is situated approximately three kilometres north of Dora Creek, which is the main river system draining the northern section of the Macquarie Tuggerah catchment into Lake Macquarie (Australian Government, 2016).

The majority of the Project area largely comprised areas that have previously been disturbed, which do not represent a complex or natural ecosystem. The Project area lies within the area subject to the EPS Biodiversity and Land Management Plan (AECOM, 2020). The plan provides the overarching framework document that outlines the management measures and principles for the protection and conservation of the EPS site's land and biodiversity values.

The western edge of the Project area is designated a Proximity area for Coastal Wetlands under the State Environmental Planning Policy (SEPP) (Coastal Management) 2018. The SEPP (Coastal Management) Coastal Wetland is located adjacent to the railway line that forms the western boundary of the Project area.

There are no areas of outstanding biodiversity value mapped within the Project area.

Vegetation and habitat

Comprehensive vegetation surveys, classification and mapping program was undertaken at the EPS site in 2007 (Bell, 2007) and re-assessed with subsequent surveys in (Umwelt, 2018). Three plant community types (PCTs), as defined in the Bionet Vegetation Classification database were identified within the Project area:

- PCT 1716: Prickly-leaved Paperbark forest on coastal lowlands of the Central Coast and Lower North Coast
- PCT 1638: Smooth-barked Apple - Red Bloodwood - Scribbly Gum grass - shrub woodland on lowlands of the Central Coast
- PCT 1635: Narrow-leaved Apple - Parramatta Red Gum - Persoonia oblongata heathy woodland of the Howes Valley area.

PCT 1716 also corresponds to the Swamp Sclerophyll Forest on Coastal Floodplains Endangered Ecological Community (EEC), as listed under the *Biodiversity Conservation Act 2016* (BC Act).

Additionally, the wider EPS site contains areas of other PCTs, rehabilitation and cleared land (existing tracks, roads and infrastructure).

Other vegetation within the Project area includes shrubs and revegetation. The following weed species have also been identified within the Project area:

- Crofton weed (*Ageratina adenophora*)
- Lantana (*Lantana sp.*)
- Blackberry (*Rubus sp.*).

In terms of potential habitat for fauna and flora species within and around the Project area, the following are present:

- Suitable wetland vegetation providing potential amphibian habitat
- Range of mixed age trees and diversity of understory and groundcover species
- Hollow-bearing trees and fallen logs of various sizes

- Lake Macquarie, Lake Eraring, Dora Creek and tributaries are mapped as Key Fish Habitat (DPI, 2019).

Threatened species

As described in **Section 4.2.5**, a Protected Matters Search was carried out on 11 January 2021. It identified the following protected matters within 10 kilometres of the Project area:

- 3 listed threatened ecological communities
- 72 listed threatened species
- 47 listed migratory species
- 52 listed marine species.

Surveys undertaken in 2007, 2020 and 2021 have identified six threatened species within the Project area as listed in **Table 6-2**. No migratory species have been identified within the Project area.

Table 6-2 Threatened species identified during surveys of the Project area (2020-2021)

Common name	Scientific name	Status as listed on the EPBC Act	Status as listed on the BC Act
Black-eyed Susan	*Tetratheca juncea*	Vulnerable	Vulnerable
Netted bottlebrush	*Callistemon linearifolius*	-	Vulnerable
Squirrel glider	*Petaurus norfolcensis*	-	Vulnerable
Green and golden bell frog	*Litoria aurea*	Vulnerable	Endangered
Little bent-winged bat	*Miniopterus australis*	-	Vulnerable
Eastern bent-wing bat	*Miniopterus schreibersii oceanensis*	-	Vulnerable

6.2.2 Potential impacts and issues for consideration

Construction of the Project has the potential to impact biodiversity, including threatened species, populations, and ecological communities. Potential impacts to biodiversity (direct and indirect) would be mostly associated with areas of surface disturbance. These impacts could potentially occur as a result of the following mechanisms:

- Vegetation clearance and disturbances associated with the works
- Possible injury/mortality of fauna species during vegetation clearance and/or as a result of collisions with construction plant and vehicles
- Introduction and/ or spread of noxious weeds and other invasive species
- Disturbance from construction noise, vibration and light on fauna in vegetated areas (including threatened ecological communities outside of the Project boundary and that are suitable habitat for Threatened Species listed under the BC Act and EPBC Act)
- Indirect impacts and edge effects.

Impacts during operation of the Project would be limited to potential edge effects and noise, disturbance to fauna. The use of barbed wire if unable to be avoided has been identified as a threat to glider species.

6.2.3 Proposed assessment approach

The biodiversity impacts will be assessed in accordance with section 7.9 of the BC Act and the Biodiversity Assessment Method (BAM) and documented in a Biodiversity Development Assessment Report (BDAR).

The biodiversity assessment will be based on a desktop review of database searches, regional biodiversity mapping and any relevant existing site-specific reports, as well as site inspections and detailed targeted field surveys, as required. The assessment will be carried out for any threatened species, populations and ecological communities considered likely to be present on the EPS site or within a 50 metre buffer (to enable consideration of indirect impacts such as edge effects).

The biodiversity assessment will include the following:

- Investigations for design to avoid impacts on Threatened Ecological Communities (including EEC) and any other threatened species (or their habitat), as far as practicable
- Identification and description of the flora and fauna species, habitat, populations and ecological communities that occur, or are likely to occur
- An assessment of any direct and indirect impacts of the Project on flora and fauna species, populations, ecological communities and their habitats, and groundwater dependent ecosystems
- Assessment of the significance of the impacts of the Project on species, ecological communities and populations, and any groundwater dependent ecosystems listed under the Commonwealth EPBC Act, the BC Act and the Fisheries Management Act that occur or are considered likely to occur
- Identification of mitigation and offset measures, determined in accordance with the BAM and the EPBC Act Environmental Offsets Policy, if necessary.

6.2.4 Any engagement required

No further engagement is proposed.

6.3 Aboriginal heritage

6.3.1 Existing environment

A search of the Aboriginal Heritage Information Management System (AHIMS) database was carried out on 5 January 2021 for the Project area with a 200 metre buffer. The search did not identify any Aboriginal sites or Aboriginal places within the 200 metres of the Project. This is supported by information in the existing Aboriginal Cultural Heritage Management Plan for the EPS, which shows the nearest Aboriginal site is approximately 2.8 kilometres to the east on the shores of Lake Macquarie. Land to the west of the rail corridor that delineates the western Project area boundary is identified as Sensitive Aboriginal Landscape Area under the Lake Macquarie LEP.

Existing AHIMS data and previous Aboriginal archaeological investigations indicate that the Lake Macquarie region is relatively understudied in terms of Aboriginal archaeology, with few regional models developed. Of those that have been undertaken, collectively the results of previous surface and subsurface investigations have established an impression of past-Aboriginal land-use (Haglund, 1986), attesting to an emphasis on heavy utilisation of the Lake Macquarie coastline for selective shellfish exploitation (Dyall, 1977) generally consisting of shallow deposits with low technological diversity. On the basis of limited technological diversity. Dallas et al. (1993) suggested these sites were likely used seasonally or only occasionally. Most of the sites distributed around Lake Macquarie are located on the eastern side allowing the exploitation of the lake and ocean. Consequently, Aboriginal sites in the western areas of Lake Macquarie are relatively scarce. Of the sites that have been identified, most are found in the near-coastal areas or creek lines and attest to shellfish exploitation.

In 2006, HLA-Envirosciences Pty Ltd (HLA, now AECOM) undertook archaeological survey for proposed alterations and additions to the existing EPS site. HLA suggested that based on their primary and secondary research, Aboriginal sites/places follow a general model in the Lake Macquarie area (HLA Envirosciences, 2007). This model suggests that Aboriginal occupation typically focussed within two areas: along the Lake Macquarie edge in the form of artefact scatters and shell middens; and in the footslopes and mountains of the Dividing Range to the west of Lake Macquarie. Between these two foci were specific transport routes, most notably large creek lines such as Wyee Creek, Dora Creek, Cockle Creek, Kilabeen Creek and Wallarah Creek. Movement

between these two foci most likely represented a form of seasonality or semi-regular migration. Hence, Aboriginal sites/places are likely to be found adjacent the lake, in the Dividing Range footslopes and mountains, and along the major creek lines in between.

Key observations to be drawn from a review of the existing environment and archaeological context of the Project area are as follows:

- Aboriginal site types with low potential to occur within the Project area will comprise middens (shell deposits with or without artefacts) and open artefact sites (i.e., artefact scatters and isolated artefacts) scatters only
- Scarred trees, burials, hearths, bora (ceremonial) rings, stone arrangements and scarred axe grinding grooves are unlikely to occur within the Project area
- Rocks suitable for the production of flaked objects (e.g. chert, quartz, silcrete) or ground-edge tools (e.g. quartzite, basalt) are unlikely to occur within the Project area
- For most areas, the presence or absence of surface artefacts will not be a reliable indicator of Aboriginal archaeological sensitivity and/or subsurface deposits
- Archaeological site visibility will be highest on erosional surfaces (e.g. creek banks) and lowest on depositional ones (e.g. floodplain contexts, levees, vegetated terraces).

On the basis of the above and in context of historical disturbances and land use, a preliminary prediction of archaeological potential within the Project area is low.

6.3.2 Potential impacts and issues for consideration

Although the majority of the Project area has been subject to previous disturbance by vegetation clearance and earthworks associated with previous works at EPS, there is still potential for the construction of the Project to disturb unrecorded Aboriginal items or sites.

Aboriginal heritage would not be directly impacted during operation of the Project, as ground disturbance/excavation would be restricted to the construction phase of the Project. However, the introduction of new infrastructure to the area has the potential to impact the setting or value of local Aboriginal items or sites.

6.3.3 Proposed assessment approach

An Aboriginal Cultural Heritage Assessment Report will be prepared as part of the EIS and will consider the archaeological potential of the Project area. It will also document environmental management measures that would be implemented, in line with the existing Heritage Management Plan for EPS.

The Aboriginal heritage assessment of the Project will include:

- Assessment of the Aboriginal archaeological potential within the Project area
- Identification of registered Aboriginal sites within, and in the vicinity of the Project area
- Identification of the potential for the Project to disturb Archaeological heritage, and, where this is the case, determine:
- In consultation with relevant stakeholders, the significance of the heritage items / areas to the Aboriginal community
- The extent and significance of impact to these resources
- Identification of appropriate measures to avoid, minimise and/ or mitigate potential impacts to Aboriginal heritage.

6.3.4 Any engagement required

Consultation will be undertaken in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (Department of Environment, Climate Change and Water, 2010).

6.4 Non-Aboriginal heritage

6.4.1 Existing environment

A search of available non-Aboriginal heritage databases identified that the Project area is located within the Eraring Power Station heritage item listed on Lake Macquarie LEP (ID 93). The Great Northern Railway (ID 189) is 250 metres west of the Project area and is also listed on the Lake Macquarie LEP as a heritage item with local significance. There are no other listed items which are State, National or Commonwealth heritage near the Project area.

Previous heritage investigations carried out at the attemperation reservoir of the EPS site identified nine areas with high archaeological potential due to the presence of historic features, including a collapsed structure, fence lines and dams (HLA Envirosciences, 2007). The attemperation site is across the inlet canal around 80 metres south west of the Project Area. No detailed heritage investigation was carried out for the Project area, however previous survey investigations found that most of the area has been heavily disturbed previously by pastoralism, land clearance and fire trails.

6.4.2 Potential impacts and issues for consideration

The Project would not impact the railway line and is not inconsistent with the EPS heritage item. The site may have accommodated activities associated with early settlement as previously identified in assessments for the Attemperation reservoir. If present within the Project area these relics would be limited to areas of less disturbance and impacted by the Project.

6.4.3 Proposed assessment approach

Heritage items and places of heritage potential or significance are managed according to Origin's Heritage Management Plan (Origin, 2019). A Statement of Heritage Impact would be prepared for the Project including site walk-over to confirm likelihood of relics being present.

6.4.4 Any engagement required

Consultation with Lake Macquarie Council regarding the EPS heritage listing and Heritage NSW may be required.

6.5 Land

6.5.1 Existing environment

Soils and geology

Geologically, the Project area lies entirely within the Sydney Basin on Triassic Narrabeen Sediments, comprising conglomerate, pebbly sandstone, grey green and grey siltstone and claystone. The soils of the EPS site are predominantly the Doyalson Soil Landscape, which typically include high erosion hazard, hard-setting, stony and strongly acidic soils of low fertility (HLA-Envirosciences, 2006).

The Gosford-Lake Macquarie 1:100,000 Geological Sheet (9131 and part sheet 9231) identifies the subsurface geology at the EPS site to be predominately Munmorah Conglomerates, part of the Narrabeen Group, comprising conglomerates, pebbly sandstones and grey to green shales, derived from the Mesozoic, early Triassic Period.

Land capability

Land and soil capability refers to the physical capacity of land to sustain a range of land uses and management practices. Classification of land into classes on a scale of 1 to 8 identifies the types of land use that would be appropriate in each classification. The land capability and classifications of the Project is expected to be 'Moderate to severe', which corresponds to Land and Soil Capability of Class 4 (Moderate capability land) (OEH, 2012).

Acid sulfate soils

Acid sulfate soils are naturally occurring sediments and soils containing iron sulfides. In an undisturbed and waterlogged state these soils are harmless, but when disturbed or exposed to air, these soils can release sulfuric acid, which may result in detrimental impact to receiving water, plants and animals. A small area at the western boundary of the Project area is mapped by NSW Planning, Industry and Environment as having high probability of acid sulfate soils.

Soil salinity

The online eSPADE mapping portal indicates that the Project area has modelled soil electrical conductivity (**EC**) which is a measure of the amount of salts in soil (salinity) as generally 0.05 to 0.10 decisiemens per metre (DS/m), with some localised areas of up to 0.4 DS/m for both 0 – 0.3 metres below ground level and 0.3-1 mBGL.

These soils are considered 'non saline' to 'slightly saline' as per soil salinity class ranges (Agriculture Victoria, 2020).

Contamination

The EPS site has been used extensively for electricity generation over a significant time period. Extensive contaminated site investigations have been undertaken on site between 2015 and 2020 and Origin has a well-developed understanding of contamination status of the overall EPS site. The Project area was associated with a former training area but has subsequently been used as a borrow pit. It is understood to remain contaminated in places to a limited extent. Migration potential is being monitored as part of the Origin contamination monitoring program with no detects of contaminants in groundwater within the Project area in the past 5 years.

6.5.2 Potential impacts and issues for consideration

The Project does not propose any change in land use from to the ongoing "electricity generating works", being a type of industrial use. The EPS and contamination present at the sites will continue to be managed in accordance with the environment protection licences issued by the EPA.

There is potential that any existing contamination in the Project area could become mobilised as a result of construction activities, however given the ground surface in the area has already been heavily modified, the risk is likely to be minimal. The nature of the contamination is not such that significant remedial works to support the development would be required. Contamination risks associated with the development are expected to be readily managed by the implementation standard controls during construction and design to remove future exposure pathways.

Construction of the Project would also involve the storage, treatment or handling of fuels, chemicals, building materials, wastes and other potential contaminants. Any contamination spill during construction would be managed and mitigated to make the land suitable for the Project and to prevent impacts on human health and the environment. Contamination risks would be managed through the application of Australian Standards for the storage and handling of fuels and chemicals and appropriate engineering design. In the unlikely event of significant leaks or spills of contaminants, remediation would be implemented immediately during construction.

6.5.3 Proposed assessment approach

A site review will be prepared as part of the EIS and would document the outcomes of the background searches. The review would describe:

- Land titles information, dangerous goods licences; site plans and information gained from discussions with stakeholders, workers and local Council; correspondence with regulatory authorities
- Site history including zoning, previous and present land use, building approvals and chronological list of site uses
- Review of historical aerial photographs
- Possible contaminant sources and potential off-site effects
- Potential environmental risks
- Any available reports or other information relating to the site and surrounding properties
- Details relating to soils, acid sulfate soils, geology and hydrogeology
- The likelihood of interaction between the Project and existing contamination and whether or not measures are likely to be required to manage these to prevent exacerbation.

All relevant factors would be reported, and appropriate mitigation and management measures recommended.

6.5.4 Any engagement required

No further engagement is proposed.

6.6 Water

6.6.1 Existing environment

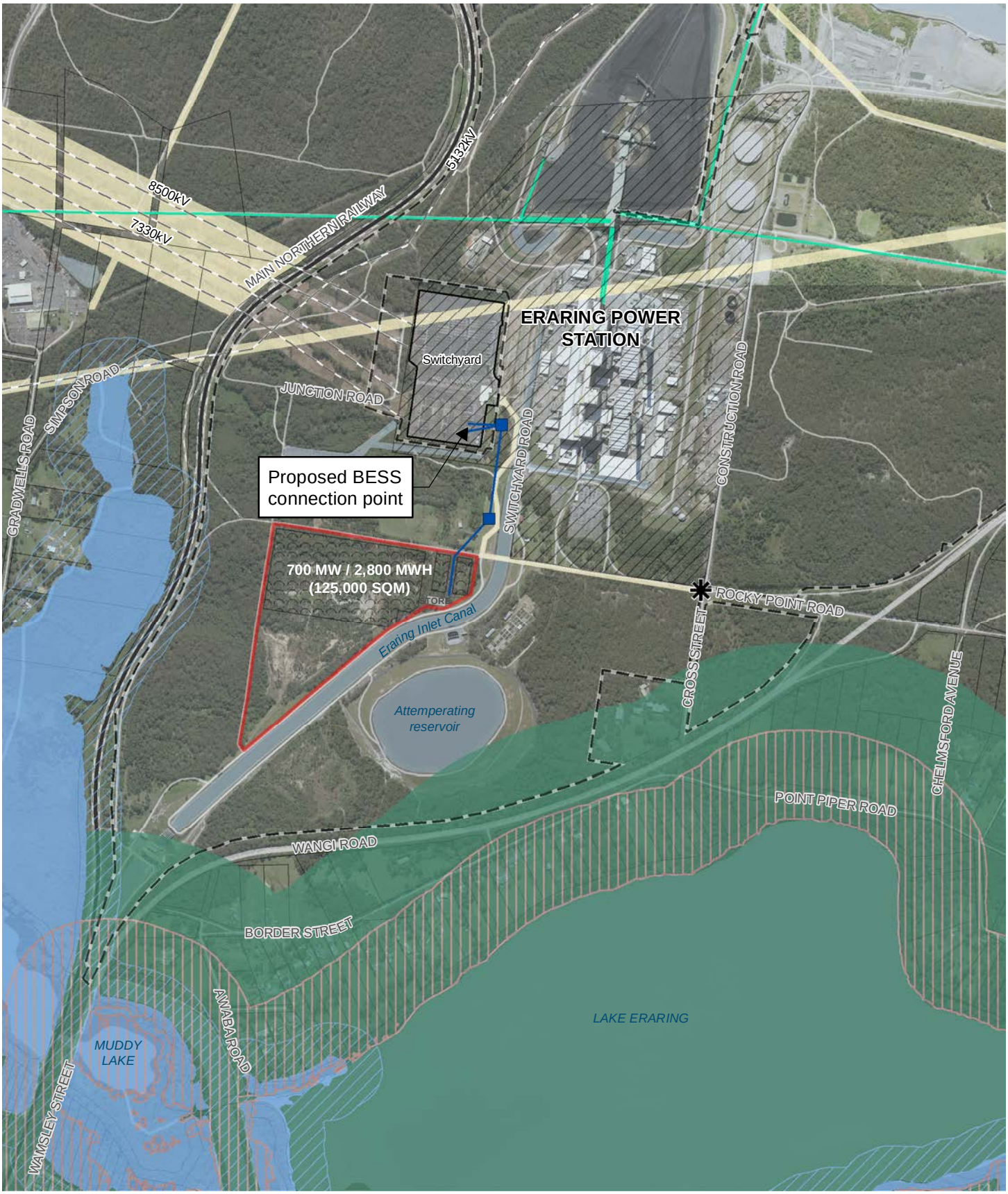
Surface water

EPS is situated on the western shore of Lake Macquarie with key waterbodies illustrated in Figure 6.1. The Project area is within the Lake Macquarie catchment and is approximately 2.4 kilometres west of Myuna Bay in Lake Macquarie at its nearest point. The EPS cooling water intake canal is immediately south of the Project site and connects EPS to Lake Macquarie via Lake Eraring.

The EPS is situated approximately 1.6 kilometres north of Dora Creek, which is the main river system draining the northern section of the Macquarie Tuggerah catchment into Lake Macquarie. Protection of the water quality of these receiving waters is of importance from a statutory, community, and internal policy standpoint.

The Project area is currently subject to the Water Management Plan for EPS. The plan categorises water into three types, Cooling Water, Stormwater, and Process Water, to effectively manage water across the Site and to mitigate the potential for any environmental harm to occur. The EPS is currently subject to EPL 1429. Due to the proximity to a protected wetland, there are no available EPL 1429 discharge points. No discharges are permitted, other than clean stormwater.

Existing creek lines surrounding the Project area flow into the Muddy Lakes system to the west. Surface water would drain to the north and west to Muddy Lake.



Site layout

- Site access point
- Node
- Cable connection
- Project footprint
- Battery footprint
- Store
- Eraring Power Station
- Eraring site boundary

Coastal SEPP 2018

- Coastal wetland
- Proximity area for coastal wetlands
- Coastal environment area
- Coastal use area

Surrounding context

- Transmission line
- Railway
- Conveyor
- Switchyard
- Arterial road
- Local road
- Service maintenance track
- Easement
- Minor waterway
- Waterbody
- Lot boundary

0 100 200 300 400 m

1:15,000 at A4
GDA94 MGA56

Data sources

Origin 2021
Aerometrex 2020
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DPE 2018

Figure 6.1 Waterbodies and coastal zones

Date: 11/02/2021 Path: J:\E\Projects\04_Eastern\IS365800\Geospatial\Apps\1_ScopingReport\IS365800_SCOPING_RPT_F004_Waterways_r1v1.mxd
Created by : KM | QA by : SW

Groundwater

Previous investigations at EPS site indicated the EPS site (ERM, 2015) sits above two broadly defined groundwater aquifers:

- Shallow groundwater: located approximately seven metres below top of casing (mbtoc) within unconsolidated fill/reworked materials, residual materials and in alluvial sediments. It is considered to be discontinuous across the site, being present primarily in low lying areas. Groundwater yields are expected to be low due to the high silt and clay content.
- Deeper groundwater: located at approximately 10 to 15 metres below ground level (mbgl) in sedimentary bedrock including weathered and / or fractured conglomerates, sandstone and coal seams. In areas where significant fracturing is absent, the groundwater yield is expected to be low.

Existing groundwater monitoring wells are located across the EPS, with two wells located within the Project area (MW_B and EJ_MW40). Contamination occurrence is routinely monitored at MW_B which has been largely dry for the past five years.

Flooding

The Project is not located on land that is mapped under the Lake Macquarie Local Environment Plan 2014 as being susceptible to flooding. The wetlands area around 100 metres west and north of the Project is identified partially as Flood Planning Area under the Lake Macquarie LEP. However, the Project would not intrude on the wetlands area and would not be affected by flood risks associated with wetlands due to the elevated topography.

6.6.2 Potential impacts and issues for consideration

Water quality

Potential surface water quality impacts during construction of the Project include:

- Soil erosion – construction would result in the exposure of the natural ground surface and subsurface through the removal of vegetation, and minor earthworks within the Project area that may increase the potential for soil erosion to occur
- Surface water quality - construction of the Project has the potential to impact surface water quality through the pollution of stormwater runoff with sediments, existing contaminants if present, fuel and other hazardous materials from the construction site.

The potential impacts on water quality are expected to be limited, given the nature and scale of the construction works. Appropriate standard environmental management measures would be implemented and would be expected to sufficiently manage any impacts. For example, water and soil controls would be employed to minimise soil erosion and discharge of sediment and other pollutants during construction.

Water use

Water would be required for construction purposes (e.g. standard dust suppression measures) and would be able to be sourced sufficiently from local supplies. It is anticipated that this would have no implications for the existing EPS site water balance, and would not require additional water from the nearby lakes. There would be negligible water use post construction of the Project.

Drainage and flooding

The existing topography and elevation of the Project area means that flooding risks are low and no downstream impacts are anticipated from potential flooding due to the Project Area distance from nearby major water bodies such as Lake Eraring. Potential runoff would be controlled and managed to prevent sediment discharge into the adjacent wetlands. Drainage associated with the Project area would be considered in the design. .

The scale and location of Project components would not affect the hydrology of the local or regional catchments. The Project would be designed to maintain predeveloped peak outflows such that there is no downstream impact on flooding.

6.6.3 Proposed assessment approach

The EIS would consider water impacts in relation to hydrology, water quality and availability. The EIS would describe the water quality management outcomes to be achieved through the design process such that deterioration of water quality does not result from any aspect of the Project.

6.6.4 Any engagement required

Engagement with Transport for NSW may be required to understand flood conveyance capacity through the rail corridor.

6.7 Amenity – noise and vibration

6.7.1 Existing environment

The Project is within an industrial area with the primary land use being energy generation. There are no sensitive receivers in the immediate vicinity of the Project and surrounding land consists of broad acre rural development and low density residential properties. The largest commercial centre and population centre nearby is Charlestown in Lake Macquarie LGA, and the closest residential suburb is Dora Creek. The nearest sensitive receivers are residential properties located approximately 600 metres to the west along Gradwells Road. There are also residential properties located approximately 700 metres to the south along Border Street.

The local settlement of Dora Creek is approximately 1.5 kilometres to the south west of the Project and includes the Dora Creek Public School and Dora Creek Seventh-Day Adventist Church.

Noise sources in the vicinity of the suburbs of Eraring, Dora Creek and Wangi Wangi include the EPS and other activities performed at the EPS site, the train line running north-south in the vicinity of the suburbs and traffic along Wangi Road. Noise sources from EPS include power station machinery, onsite machinery such as the cooling water inlet pumping station, and earthmoving equipment operated on and near the ash dam.

6.7.2 Potential impacts and issues for consideration

The construction stage of the Project is anticipated to generate noise due to the use of construction plant and equipment. Such noise may be audible at a local level but is unlikely to exceed noise management levels given the distance to the nearest sensitive receivers. Standard construction noise management measures are expected to keep noise impacts below highly impacted levels.

Operation of batteries, power conversion systems and transformers would generate low level noise. Operational noise is not anticipated to be audible at offsite receivers but may contribute to cumulative noise impacts. The Project design would include treatments to avoid exceedance of operational noise management levels if predicted.

6.7.3 Proposed assessment approach

While material noise impacts are not anticipated, noise impact assessment would be provided in the EIS to confirm anticipated noise impacts for both construction and operational stages. Project specific mitigation measures would be developed to achieve noise management levels. The assessment would use available noise monitoring data to characterise the background noise levels, before modelling predicted noise levels generated by the Project to identify and assess any noise impacts to local receivers. The results of the modelling would also be used to recommend any Project specific mitigation and management measures.

6.7.4 Any engagement required

No further engagement is proposed.

6.8 Amenity – visual

6.8.1 Existing environment

The potential viewshed and potential viewpoints from publicly accessible locations are illustrated in

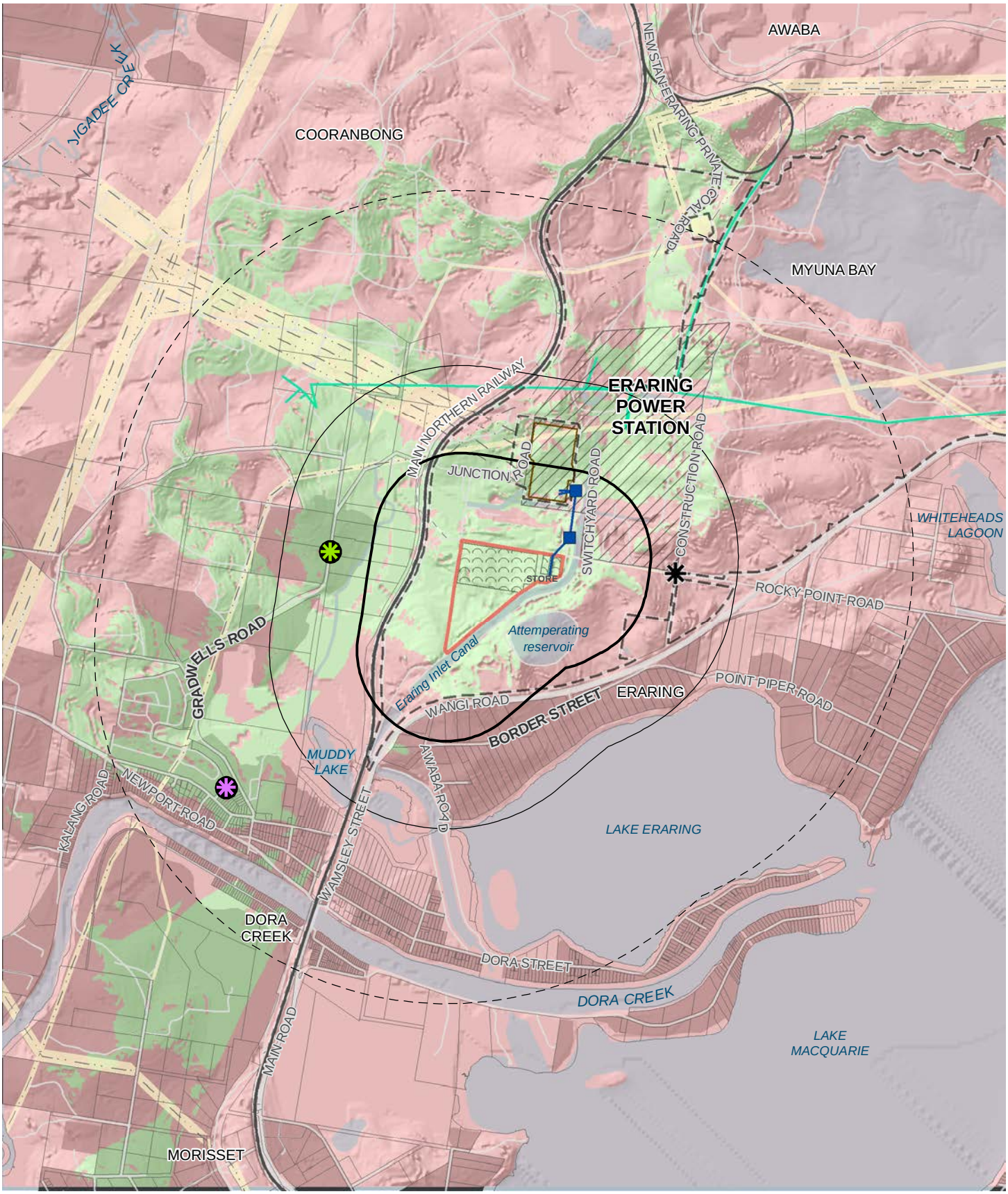
Figure 6.2. This has been calculated based on a five-metre-high box placed over the entire Project footprint, using a digital terrain model but without considering vegetation screening. **Table 6.3** summarises the potential receivers present surrounding the Project.

Table 6.3: Potential visual receptors

Distance	Land zoning	Potential for views
Within 250 m	SP2 or E2 zones only	There are no publicly accessible viewpoints within 250 m of the Project. The Great North Railway line passes within 250 metres at its nearest point but is screened by vegetation within the E2 zoned land which is unlikely to be disturbed.
250 - 500 m	Predominantly SP2 and E2 zoning with approximately 5 lots of RU4 zoned land on Boarder Street to the south	The Publicly accessible Wangi Road is located within 500 metres of the Project along with approximately five properties on Border Street, Lake Eraring. No views to the Project are likely from these publicly accessible locations due to intervening topography and infrastructure associated with EPS attemperation dam and inlet canal. Portions of private property within 500 m but zoned E2 to the west are not screened by topography but dense vegetative screening is present and protected by E2 zoning and Origin ownership.
500 m – 1 km	Nine rural properties on Gradwells Road zoned RU2 are present to the west of the Project and remaining properties along Boarder Street zoned RU4 to the south.	No views to the Project are likely from publicly accessible locations to the south due to intervening topography and infrastructure associated with EPS attemperation dam and inlet canal or west due to intervening dense vegetation protected by E2 zoning and Origin ownership.
1km – 2km	Residential areas of Dora Creek zoned R2 and dwellings within the E4 zone towards lake Eraring	No views to the Project are likely from publicly accessible locations to the south or west due to intervening topography and infrastructure associated with EPS attemperation dam and inlet canal or west due to intervening dense vegetation protected by E2 zoning and Origin ownership.

The Project area is set within the existing EPS landholding which includes vegetated and topographical buffers to sensitive receptors. The tops of the EPS turbine hall and stacks are approximately 100 and 200 metres above ground level respectively and are visible from publicly accessible locations as illustrated in photo 6-1 and Photo 6-2 below.

While Figure 6.2 identifies views are potentially visible from the west and south, all photos illustrate the intervening vegetation and topographic screening available. The Project area is surrounded by mature vegetation along a ridge line to the west, the elevated EPS inlet canal to the south and east, elevated attemperation dam to the east and main EPS operations area, elevated TransGrid switchyard, coal yards and extensive buffer lands to the north. A small depression in the ridgeline to the west may provide views into the Project area from in the nearest dwelling to the west were it not for the presence of vegetative screening. Intervening vegetation is zoned E2 Environmental Protection and is unlikely to be impacted in the future.



Site layout

- Site access point
- Node
- Cable connection
- Project footprint
- Battery footprint
- Store
- Eraring Power Station
- Eraring site boundary

Visibility (footprint height: 5m)

- Not Visible
- Visible
- Residential zoned land

Distance from project boundary

- 500m
- 1km
- 2km

- Subdivision view
- Nearest receptor view

Surrounding context

- Transmission line
- Railway
- Conveyor
- Switchyard
- Arterial road
- Distributor road
- Local road
- Service maintenance track
- Easement
- Minor waterway
- Waterbody
- Lot boundary

0 500 m

1:30,000 at A4
GDA94 MGA56

Data sources

Origin 2021
Jacobs 2021
Aerometrex 2020
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Figure 6.2 Viewshed

Photo 6-1: View from east of subdivision looking across Project area to EPS

Photo 6-2: View towards Project site from Gradwells Road frontage of nearest public receptor

6.8.2 Potential impacts and issues for consideration

The Project infrastructure would be limited to low lying infrastructure. It is considered highly unlikely that any Project component would be visible from publicly accessible locations.

6.8.3 Proposed assessment approach

No further assessment of visual impacts is proposed. The EIS would confirm that all Project infrastructure would be of a scale that would not be visible from sensitive publicly accessible locations.

6.8.4 Any engagement required

No further engagement is proposed.

6.9 Access – traffic and transport

6.9.1 Existing environment

Access to and from the Project area is via B53 Wangi Road and the private Rocky Point Road within the EPS site. The Project area is approximately 300 metres north of the B53 Wangi Road at it nearest point. The B53 Wangi Road is classified as a State road and forms part of the approved 25 / 26 m B-double network and Oversize Over Mass load carrying vehicle network and connects settlements along the eastern shore of Lake Macquarie to the M1 and Newcastle. The M1 is approximately 2.8 kilometres west of the Project area at its nearest point and provides a wider transport link.

Between the Project area and Port of Newcastle where main Project components are expected to originate, the road network also consists of motorway and state roads, carrying moderate volumes of traffic, including heavy vehicles. These also form part of the approved 25 / 26 m B-double network and OSOM load carrying vehicle networks and include:

- A43 from Port of Newcastle to Sandgate
- A37 from Sandgate to Jesmond
- A15 from Jesmond to the M1
- M1 to Ryhope
- Cessnock Road / Awaba Road from Ryhope to B53 at Toronto.

Alternative routes to site may also include using the B53 from Wallsend to Rocky Point Road or continuing on the M1 past Ryhope to the Morisset exit and approaching Rocky Point Road from the South via Morisset and Dora Creek. The Morisset exit from the M1 would also be used for deliveries originating from the Sydney region.

The Great Northern Railway alignment lies approximately 250 metres west of the Project area. Also known as the Main North Line, the Great Northern Railway is a major railway in New South Wales that runs through the Central Coast, Hunter and New England regions. The nearest train station to the Project area is Dora Creek, approximately 1.6 kilometres south, which is on the Great Northern Railway.

There are no formal footpath pavements or cycle ways on Wangi Road but Eraring is served by local buses of the Hunter Buses Network. The nearest bus stop is an unmarked stop located on Wangi Road opposite Horn Street (Stop ID 2264163), which is used by the following services:

- Route 275 (Toronto to Wangi via Fishing Point & Rathmines) that connects Morisset to Toronto
- Route 281(Lake Haven to Wangi Wangi) that connects
- Local school bus services.

6.9.2 Potential impacts and issues for consideration

Construction of the Project would require the use of heavy vehicles to deliver construction plant, equipment and materials, as well as the removal of waste. Additional light vehicle movements would also occur, associated with the construction workforce. Construction parking would be provided within the Project area or EPS site. Potential construction traffic and transport impacts include:

- Impacts to intersection and traffic performance on the surrounding road network
- Potential to contribute to delays and disruption to bus services which use Wangi Road and the surrounding road network.

Operational traffic generated by the Project would be limited to vehicles associated with maintenance, which is not expected to result in noticeable impacts on the local road network.

6.9.3 Proposed assessment approach

The Environmental Impact Statement will include a traffic and transport impact assessment to identify and assess potential impacts of the Project on road network performance during construction and operation, and would propose management measures to avoid, minimise and manage these potential impacts where feasible and reasonable.

The assessment will focus on construction traffic and will be informed by traffic monitoring data carried out to understand existing traffic (types and number of movements) on access routes (including consideration of peak traffic times and sensitive road users).

The assessment of construction traffic and transport impacts will include:

- Identification of heavy vehicle routes, site access and egress points
- Identification of daily and peak traffic movements likely to be generated from construction of the Project and other traffic generating activities proposed by Origin above background traffic levels
- Traffic modelling to identify the potential impacts of construction traffic movements on the performance of the surrounding road network
- Consideration of potential impacts on cyclists and pedestrian safety and infrastructure, where relevant
- Consideration of potential impacts on local bus services.

6.9.4 Any engagement required

Where required, consultation with Transport for NSW, key stakeholders and Lake Macquarie City Council will be undertaken as part of the traffic and transport assessment.

6.10 Hazards and risks

6.10.1 Bushfire

Existing environment

The Project area contains bushfire prone lane as mapped by NSW Rural Fire Service (NSW RFS, 2020) (Refer to Figure 6.3). Parts of the Project area that has not been fully cleared of vegetation is mapped as Vegetation Category 1 and the disturbed areas are mapped as vegetation buffer.

The Project area is within Origin's bushfire management zone, specified as a Strategic Fire Advantage Zone due to its provision of strategically located fuel reduced areas to minimise the potential for large wildfires to develop, this zone also reduces the vulnerability of assets which are susceptible to fire.

Origin has in place a consolidated Biodiversity and Land Management Plan (AECOM, 2020) which provides a working plan towards bushfire management, among other environmental aspects and aims to ensure bushfire safety is provided and complies with relevant legislation.

Site layout

- Site access point
- Node
- Cable connection
- Project footprint
- Battery footprint
- Store
- Eraring Power Station
- Eraring site boundary

Bushfire Prone Land

- Bushfire prone vegetation buffer
- Category 1: high risk
- Category 2: low risk
- Category 3: medium risk

Surrounding context

- Transmission line
- Railway
- Conveyor
- Switchyard
- Arterial road
- Local road
- Service maintenance track
- Easement
- Minor waterway
- Waterbody
- Lot boundary

0 100 200 300 400 m

1:15,000 at A4

GDA94 MGA56

Data sources

Origin 2021
Aerometrex 2020
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DPE 2018

Figure 6.3 Bushfire prone land

Potential impacts and issues for consideration

The Project has the potential to be impacted by bushfire risks during construction and operation. During construction the mains sources of bushfire risks and impacts include:

- Hot works such as welding during igniting surrounding vegetation and causing a bushfire
- Inadequate bushfire emergency response system in place resulting in serious injury or death
- Insufficient training of construction workers dealing with bushfire risk.

The operation of the Project does not introduce new bushfire risks to the Project area on the basis that the design of the BESS technology would include fire prevention and mitigation systems and be provided with appropriate asset protection areas. Any vegetation clearing required for the Project area, including the proposed transmission line corridor, would also help to mitigate any potential bushfire risks from vegetated areas.

Overall, the hazards and risks associated with construction, operation and decommissioning of the Project are considered low and do not introduce new bushfire risks to the site. Risks would be managed with the implementation of Biodiversity and Land Management Plan which would be updated to include the Project.

Proposed assessment approach

The EIS would investigate bushfire hazard and risks and the potential impacts of the Project related to such risks. The level of assessment required would be minor. A Bushfire Risk Assessment would be prepared in accordance with the requirements of *Planning for Bush Fire Protection 2019* (NSW RFS, 2019) and, where necessary, *AS 3959 – 2009 Construction of buildings in bushfire prone area* (Australian Standard, 2009).

Any engagement required

Key stakeholders including NSW State Emergency Service, RFS and DPIE Hazards Branch would be consulted during the EIS process in relation to battery technology and associated hazards and risks during construction and operation. The consultation process would consider feedback as required.

6.10.2 Waste

Existing environment

The Project area is located within EPS site which has had industrial and utilities land use since the 1980s. Waste generated on EPS site are sorted and disposed of in accordance with existing waste management plans and a Pollution Incident Response Management Plan is also developed to identify and minimise any significant risks in relation to waste on site . Origin operates EPS under EPL 1429 and has an Origin Risk Database where environmental hazards relating to any licenced activities are listed. The scheduled activities listed in EPL 1429 provides for chemical storage, coal works, crushing and grinding, electricity generation and sewage treatment. Waste from EPS site are regulated by EPL 1429 and Origin actively monitors and controls waste and discharge associated with EPS.

Potential impacts and issues for consideration

The likely waste generation associated with the Project would mainly occur during the construction stage and may include green waste from cleared vegetation, construction materials, general waste from site personnel, and spoil. There is potential for the Project to result in adverse impacts to the local environment if waste is not managed appropriately. If waste streams are not managed properly there may be impacts to visual amenity, risks to health and safety of construction workers and members of the public, contribution to landfill and potential pollution caused by release of chemical. All waste produced during construction and operation would be managed and disposed of at appropriate licenced facilities.

The operation of the Project would not produce any waste and would not significantly impact the local environment in that regard. Most battery components are expected to be readily recyclable at end of life.

Proposed assessment approach

The level of assessment required for the EIS in relation to waste impacts would be minor. The EIS would identify potential waste streams associated with the construction and operation of the Project, and would identify mitigation measures to manage any potential waste impacts. Waste categorisation for potential waste streams would be based on *NSW Waste Classification Guidelines* (NSW EPA, 2014). The EIS would include standard management practices compliant with the *Waste Avoidance and Resource Recovery Act 2001* and other relevant policies and guidelines.

6.10.3 Mine subsidence

Existing environment

The Project area is located within a mine subsidence district (Westlake district) and would refer to Subsidence Advisory NSW Guideline 2 when consideration potential development impacts.

Potential impacts and issues for consideration

The Project would not involve any underground or mining works. The Project would be susceptible to mine subsidence.

Proposed assessment approach

The Project would have no impact on the mine subsidence matter and at this stage no further assessment is proposed for the EIS. Consultation with Subsidence Advisory NSW would be undertaken for Project components within a mine subsidence district and any issues raised would be considered.

6.10.4 Electromagnetic fields and battery thermal runaway

Existing environment

Electric and magnetic fields (EMF) are part of the natural environment and electric fields are present in the atmosphere and static magnetic fields are created by the earth's core. EMF is also produced wherever electricity or electrical equipment is in use. Transmission lines, electrical wiring, household appliances and electrical equipment all produce power frequency EMF.

There are existing transmission lines, transformers and a switchyard near the Project area, as shown in Figure 3.1

Potential impacts and issues for consideration

Concerns related to electric and magnetic fields (EMF) are unlikely in regard to the transmission component of the Project given that the 330kVtransmission line connection to the existing switchyard is within the EPS landholding and there are no public receivers within 600 metres of the Project.

The Project may change the alter the EMF of the Project area. Potential exposure to EMF would be considered for Origin staff and contractors as part of health and safety management practices. The design of the Project components would consider EMF risks and any necessary buffer areas to future land uses.

The Project would not involve the storage or handling of hazardous substances in excess of SEPP 33 screening criteria to be considered potentially hazardous development. The Project would also not affect the existing storage and handling arrangements for hazardous substances at the EPS.

Lithium-ion batteries carry the risk of thermal runaway. Thermal runaway occurs when a cell, or area within the cell of the battery unit experiences thermal or mechanical failure and causes the cell temperature to rise. The temperature rise in turn releases energy and causes the unit to be heated further, and can lead to a sudden release of energy. The battery enclosures would be fitted with a range of safety features in accordance with current applicable standards to prevent the propagation of fire from within the battery enclosure to surrounding vegetation.

Proposed assessment approach

Consideration of EMF is embedded as part of the battery design by the technology provider and would confirm potential introduction of EMF risks by the Project, which are considered unlikely or low. A hazard study for the selected BESS technology and Project design would be prepared as part of the EIS. The EIS would assess EMF risks with reference to related standards, policies and guidelines such as Energy Networks Australia (ENA) *EMF Management Handbook* (ENA, 2016) and *Guidelines for limiting exposure to Time-varying Electric, magnetic and Electromagnetic Fields* (ICNIRP, 2010).

The Project would not exceed screening criteria under SEPP 33 guidelines to be considered a potentially hazardous development). The detailed design of the Project would consider hazards, determine risks and adopt prevention and mitigation strategies in accordance with applicable guidelines and Origin hazard management procedures.

The EIS would include a review of the Project to assess conformance to criteria for land use safety planning requirements.

6.10.5 Other hazards and risks

Existing environment

There are a number of terrestrial and aquatic weeds identified at EPS which was found to represent 4.8 per cent of total EPS area in 2016 (AECOM, 2020). It was found that the Project area has minimal to no weed occurrence. The Project area is not located near any coastal hazards and there are no landslide or land movement risks.

Seismic risks have previously been flagged in relation to the ash dam. In general there are minimal earthquake hazards in this region and the Project would have limited susceptibility to Seismic risks.

Potential impacts and issues for consideration

The Project is not expected to have biosecurity, coastal hazard, land movement or dams safety impacts.

Proposed assessment approach

The EIS biodiversity assessment would consider biosecurity risks and impacts related to weeds as part of the BDAR. No further assessment is proposed for coastal hazards, land movement and seismic risks are proposed.

6.11 Social and economic

6.11.1 Existing environment

The Project is located in Lake Macquarie LGA, which has a population of 197,371 as at the 2016 Census (ABS, 2016). Lake Macquarie LGA is part of the Hunter Region in NSW which is a significant region for power generation, viticulture and thoroughbred breeding industries. The largest industries of employment in Lake Macquarie LGA include health care and social assistance services, and the most common occupations include 20.1 per cent professionals, and more than 16 per cent technicians and trades workers. In 2018, the construction, manufacturing sectors were the biggest economic contributors in the region with $3.3 billion and $2.7 billion in output respectively (Lake Macquarie Council, 2020).

6.11.2 Potential impacts and issues for consideration

The Project would provide the following direct and indirect social and economic benefits for the LGA:

- Recruitment and training of a construction workforce during the construction of the Project
- Creation of approximately four permanent full time equivalent positions during the operation of the Project and generation of other indirect employment opportunities
- Sourcing Project related inputs from Australian industry and services providers, where viable.

The construction contractors would be engaged based on their commitment to use Australian suppliers and create Indigenous and equal opportunity employment in Project delivery. The major equipment such as BESS units would come from overseas technology providers however local supply opportunities exist for other equipment.

6.11.3 Proposed assessment approach

The level of assessment required for considerations of social and economic impacts of the Project would be minor. No adverse impacts are expected during the construction and operation stages of the Project and in general the Project would contribute to employment and potentially benefit local businesses in services and accommodation industries.

Short term impacts may also stem from construction-related traffic generation and increased local demand on temporary accommodation. During operation and in the long term, the Project would support increased uptake of renewable energy in the electricity grid and would place downward pressure on electricity prices, particularly evening peak prices for consumers and businesses.

6.11.4 Any engagement required

The Project would involve ongoing consultation with relevant community and agency stakeholders. Potential social and economic impacts would be assessed in the EIS alongside outcomes of the community consultation process.

6.12 Built environment

6.12.1 Existing environment

The Project is located wholly in the Lake Macquarie LGA on Origin's existing landholding at the EPS site. The EPS is located near the township of Dora Creek on the western shore of Lake Macquarie, in the Hunter Region of NSW.

Land use adjacent to and within the Project area predominantly includes cleared and vegetated areas for electricity generation on land zoned SP2 Infrastructure and other minimal use on land zoned E2 Environmental Conservation (see Figure 2.1). Other land uses surrounding the Project includes sparse residential and rural development, roads and road reserves, and drainage channels for irrigation. The existing EPS switchyard and the 330 kV transmission lines are located around 300 metres north of the Project area.

Land tenure in the Project area is wholly owned by Origin. The Project area does not contain, and would not impact on freehold land National Parks, state forests, certified aerodromes, defence or Commonwealth lands. No acquisition of land would be needed for the Project.

6.12.2 Potential impacts and issues for consideration

The Project would be compatible and consistent with the land zoning and existing land use requirements, and would not impact the public domain, public infrastructure or other built assets. No private property lands would be impacted by the Project.

No significant impacts are anticipated on surrounding areas and land uses. Cumulative impacts in relation to other past, existing or proposed development near the Project, would also be considered and assessed as part of the EIS.

The Project area would be constrained to a 20 ha section of existing land owned by Origin at the EPS site. The Project area is predominantly cleared and previously disturbed and appropriately zoned for the BESS development. The final footprint of the permanent and temporary sites of the Project would be developed and assessed as part of the EIS.

The Project would not impact any existing surrounding land use or any adjacent properties during the construction period and the long term operation.

The land is subject to subsidence considerations and is within an existing mining exploration lease area. The EIS would consider any further approvals assessment required under the *Coal Mine Subsidence Compensation Act 2017*.

Origin has considered potential expansion in the future for more BESS storage capacity design on the land adjacent to the Project area. This would be considered in cumulative impact assessment. This would not form part of the approval for the current Project.

6.12.3 Proposed assessment approach

The level of assessment required as part of the Project EIS would be minor. Generally no significant impacts are expected on land use and property matters. Potential impacts would be considered as part of the EIS preparation, and mitigation measures would be proposed to avoid or manage potential impacts during design and construction of the Project.

6.12.4 Any engagement required

The impact assessment would take into consideration any feedback received from stakeholders, including surrounding landholders during the EIS process.

6.13 Air

6.13.1 Existing environment

Air quality

The Project is within an industrial area with the primary land use being energy generation. There are no sensitive receivers in the immediate vicinity of the Project and surrounding land consists of broad acre rural development and low density residential properties. There are a number of coal mines located in the vicinity of the Project area, including the Myuna Colliery to the east, Mandalong Mine to the west, and the Newstan Colliery to the north.

As an existing power station site, EPS has requirements for compliance with air quality criteria. The existing air quality environment of the Project area is currently influenced by existing operations of the EPS. As an existing power station site, EPS has requirements for compliance with air quality criteria under its EPL. The existing air quality environment of the Project area is currently influenced by existing operations of the EPS, and Continuous monitoring is undertaken by two ambient air quality monitoring stations, located at the Dora Creek Bowling Club and the Marks Point.

The largest commercial centre and population centre nearby is Charlestown in Lake Macquarie LGA, and the closest residential suburb is Dora Creek. The nearest sensitive receivers are residential properties located approximately 600 metres to the west along Gradwells Road. There are also residential properties located approximately 700 metres to the south along Border Street.

Air quality is a key issue for the local community, with a new air quality monitoring station having opened at Morisset in November 2020. Limited air quality monitoring data is available from this station, given its recent opening.

Odour

The surrounding landscape is influenced by industrial activity associated with coal mines, power stations and transportation. As such the odour of the area would reflect these activities.

6.13.2 Potential impacts and issues for consideration

During construction, disturbance of soil would generate dust. Construction plant and equipment, including vehicles required to transport staff and materials to site would also contribute combustion-related pollutants including oxides of nitrogen, sulphur oxides, volatile organic compounds and particulate matter.

With the exception of minor and occasional vehicle and potential plant emissions associated with maintenance and inspection of Project infrastructure, air quality impacts during operation of the Project are expected to be minimal.

With the standard mitigation measures that will be employed to minimise dust, air quality impacts to the surrounding region are expected to be negligible.

The Project would not have odorous qualities, characteristics or attributes with potential to interfere with local amenity

6.13.3 Proposed assessment approach

The EIS would document potential dust generation associated with Project construction and standard mitigation measures that would be implemented.

No further assessment relating to odour is proposed as part of the EIS.

6.13.4 Any engagement required

No further engagement is proposed.

6.14 Greenhouse gas

6.14.1 Potential impacts and issues for consideration

Greenhouse gas emissions can be categorised as Scope 1, 2 or 3 (Australian Government Clean Energy Regulator, 2018). Scope 1 emissions are the direct result of an activity, for example, the burning of fuel in vehicles used in construction or vegetation clearing. Scope 2 emissions are indirect emissions from the use of electricity that is generated outside of the Project area and Scope 3 are indirect emissions which are generated upstream/downstream in the wider economy as a result of third party supply chains, for example, emissions associated with the production and transport of materials used during construction.

The use of construction equipment and manufacture of materials for use in the Project would consume resources and as such are associated with greenhouse gas emissions. In addition, substation equipment and switchgear such as circuit breakers, disconnectors, and transformers, may contain sulphur hexafluoride (**SF6**) which is considered a greenhouse gas.

The operation of the Battery does not generate direct emissions . Instead, it increases the GHG intensity of the electricity supplied to the National Energy Market (**NEM**) via the BESS as a result of system round-trip efficiency losses. Operation of the Project would facilitate the use of additional renewable energy resources within the NEM.

6.14.2 Proposed assessment approach

A greenhouse gas assessment will be carried out as part of the EIS. The assessment will be prepared in accordance with AS 14064-2 (Australian Standard, 2019) and the Greenhouse Gas Protocol and will include:

- Identification and quantification of the sources of greenhouse gas emissions associated with the construction
- Identification and quantification of the potential greenhouse gas emissions savings afforded by operation of the Project, compared to the NEM
- Opportunities for reducing greenhouse gas emissions and energy consumption during construction.

6.15 Cumulative

6.15.1 Potential impacts and issues for consideration

Cumulative impacts result from successive, incremental, or combined effects of an activity or project when added to other past, current, planned, or reasonably anticipated future impacts (DPIE, 2017). The cumulative effects of multiple major projects (such as large residential or commercial developments, major road and rail projects, or other proposed major project developments) can result in a greater extent, magnitude or duration of impacts that would otherwise occur as a result of an individual project. Cumulative impacts may also arise where multiple or consecutive construction projects impact the same receivers (known as 'construction fatigue').

The extent to which another development or activity could interact with the construction and/or operation of project would be dependent on its scale, location and/or timing of construction. Generally, the largest adverse cumulative impacts would be expected to occur where multiple long-duration construction activities are undertaken close to, and over a similar timescale of, construction activities or where consecutive construction activities occur on an area of receivers, meaning they are exposed to relatively long timescales of construction impacts.

Cumulative impacts arising from the Project are not expected to be significant, given its location and scale. However, a search of the NSW planning website, local council and proponent websites was carried out to determine whether there are any other reasonably foreseeable future projects within the local area that may result in cumulative impacts. Two relevant projects were identified:

- Expansion of the ash dam at EPS, which was approved in 2019
- Sealing of gravel road from Newport Road to 25 Gradwells Road in Dora Creek, which would take place concurrently with the Project, given it is not anticipated to be complete before 30 June 2021.

Origin are separately progressing plans for expansion of ash recycling to achieve compliance with recycling requirements of existing EPS approvals. The operation of the EPS also relies on routine annual shutdowns which generate peaks in workers attending site above typical background levels.

There are no other council developments or projects, or major project applications listed on the NSW Planning Portal, that are identified as having the potential to affect or be affected by the Project.

The Project would generate cumulative impacts with existing and proposed projects in the area. Based on preliminary consideration of Project impacts, cumulative impacts are expected to be limited to noise and traffic.

6.15.2 Proposed assessment approach

Noise and Traffic impact assessments would include consideration of cumulative impacts and these would be summarised in the EIS. Any additional controls arising from cumulative impacts would be identified.

7. Summary and next steps

Origin is the current operator of the EPS. Origin are progressing a SSD application for a BESS and connection to the TransGrid switchyard at the EPS site. The Project would facilitate the increased penetration of renewable electricity generation into the NEM by providing storage to balance electricity supply with demand and other increasingly important network services. The Project is aligned with strategy for future energy supply arrangements at all levels of Government. The Project area is also strategically located to take advantage available, appropriately zoned land in close proximity to existing transmission infrastructure.

The application does not seek approval for changes to how the EPS is operated.

This document provides a description of the Project, existing information on environmental and strategic context and potential for environmental impacts and has been prepared in support of an application for the SEARs for the Project. An EIS will then be prepared addressing the SEARs. The EIS is intended to be placed on public exhibition in accordance with Division 4.7 of the EP&A Act.

Appendix A. Scoping summary table

Level of assessment	Matter	Cumulative Impact Assessment	Engagement	Relevant government plans, policies and guidelines	Scoping report reference
Standard	Biodiversity – flora and fauna	N No	General	▪ Commonwealth EPBC 1.1 Significant Impact Guidelines – Matters of National Environmental Significance ▪ Commonwealth Department of the Environment – Nationally Threatened Ecological Communities and Threatened Species Guidelines (various) ▪ Threatened Species Survey and Assessment Guidelines at http://www.environment.nsw.gov.au/threatenedspecies/surveyassessmentgdlns.htm ▪ NSW Biodiversity Offsets Policy for Major Projects (Office and Environment and Heritage, 2014) ▪ Framework for Biodiversity Assessment (Office and Environment and Heritage, 2014).	**Section 6.2**
Standard	Aboriginal heritage	No	Specific	▪ Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW (Department of Environment, Climate Change and Water, 2011) ▪ Aboriginal Cultural Heritage Consultation requirements for proponents (Department of Environment, Climate Change and Water, 2010) ▪ Code of practice for archaeological investigation of Aboriginal objects in NSW (Department of Environment, Climate Change and Water, 2010).	**Section 6.3**
Standard	Non-Aboriginal heritage	No	General	▪ NSW Heritage Manual (NSW Heritage Office and Department of Urban Affairs and Planning, 1996) ▪ Assessing Heritage Significance (NSW Heritage Office, 2001) ▪ Statement of Heritage Impact (NSW Heritage Office, 2002) ▪ Criteria for the assessment of excavation directors (NSW Heritage Council, 2011) ▪ Assessing significance for historical archaeological sites and relics (NSW Heritage Branch, 2009).	**Section 6.4**
Standard	Land – land capability, soil	No	General	▪ Acid Sulfate Soils Assessment Guidelines (Department of Planning, 2008) ▪ Managing Land Contamination: Planning Guidelines SEPP 55 – Remediation of Land (Department of Urban Affairs and Planning and Environment Protection Authority, 1998)	**Section 6.5**

Level of assessment	Matter	Cumulative Impact Assessment	Engagement	Relevant government plans, policies and guidelines	Scoping report reference
	chemistry, land contamination			▪ National Environment Protection (Assessment of Site Contamination) Measure (National Environment Protection Council, 2013) ▪ Guidelines for Consultants reporting on contaminated Land: Contaminated land guidelines (Environment Protection Authority, 2020) ▪ Guidelines on the duty to Report Contamination under the Contaminated Land Management Act 1997 (Environment Protection Authority, 2015).	
Standard	Water – hydrology, water quality, flooding	No	General	▪ Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom, 2004) and Volume 2 (Department of Environment and Climate Change, 2008) ▪ Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (Department of Environment and Conservation, 2004) ▪ Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC/ARMCANZ, 2018) ▪ Using the ANZECC Guidelines and Water Quality Objectives in NSW (Department of Environment and Conservation, 2006b)	**Section 6.6**
Standard	Amenity – noise and vibration	Yes	General	▪ Draft Construction Noise Guideline (NSW EPA, 2021) at https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/noise/20p2281-draft-construction-noise-guideline.pdf?la=en&hash=08B7AFCA1EABA290F78D720722E14F1F239FE6F8 ▪ Construction Noise Strategy (Transport for NSW, 2012) ▪ NSW Industrial Noise Policy (Environment Protection Authority, 2000) ▪ Assessing Vibration: A Technical Guideline (Department of Environment and Conservation, 2006) ▪ German Standard DIN 4150-3: Structural Vibration – Effects of Vibration on Structures ▪ Environmental Noise Management Assessing Vibration: A Technical Guideline (Department of Environment and Conservation, 2006)	**Section 6.7**
Standard	Access – traffic and transport	Yes	General	▪ Guide to Traffic Management – Part 3 Traffic Studies and Analysis (Austroads, 2017) ▪ Guide to Traffic Generating Developments Version 2.2 (Roads and Traffic Authority, 2002).	**Section 6.9**

Level of assessment	Matter	Cumulative Impact Assessment	Engagement	Relevant government plans, policies and guidelines	Scoping report reference
Standard	Hazards and risks – bushfire, waste, mine subsidence	No	General	▪ Planning for Bush Fire Protection 2019 (NSW Rural Fire Service, 2019) ▪ Australian Standards for Construction of Buildings in Bushfire Prone Areas (AS3959) ▪ NSW Rural Fire Service Guideline for Bushfire Prone Land Mapping (NSW Rural Fire Service, 2015) ▪ Waste Classification Guidelines Part 1: Classifying Waste (NSW Environment Protection Authority, 2014) ▪ NSW Waste Avoidance and Resource Recovery Strategy 2014-21 (NSW Environment Protection Authority, 2014) ▪ NSW Waste Reduction and Purchasing Policy (Environment Protection Authority, 1997) ▪ Surface Development Guideline 2 – Potential subsidence risk non-active workings (Subsidence Advisory NSW, 2018)	**Sections 6.10.1**, **0**, and **6.10.3**, respectively
Standard	Hazards and risks - EMF and thermal runaway	No	General	▪ Electromagnetic Fields Management Handbook (Energy Networks Australia, 2016) ▪ Guidelines for limiting exposure to Time-varying Electric, magnetic and Electromagnetic Fields (ICNIRP, 2010) ▪ Applying SEPP 33 – Hazardous and Offensive Development Application Guidelines (DPE, 2011). ▪ Assessment Guideline: Multi-Level Risk Assessment (DPE, 2011). ▪ Hazardous Industry Planning Advisory Paper No. 4 Risk Criteria for Land Use Safety Planning (HIPAP 4, DPE, 2011). ▪ Hazardous Industry Planning Advisory Paper No. 6 Guidelines of Hazard Analysis (HIPAP 6, DPE, 2011). ▪ Hazardous Industry Planning Advisory Paper No. 10 Land Use Safety Planning (HIPAP 10, DPE, 2011).	**Section 6.10.4**
Minor	Social and economic – community, job creation	No	General	▪ Draft Social Impact Assessment Guideline (DPIE, 2020)	**Section 6.11**

Level of assessment	Matter	Cumulative Impact Assessment	Engagement	Relevant government plans, policies and guidelines	Scoping report reference
Minor	Air – emissions, particulate matter and odour	No	General	▪ National Environment Protection (Ambient Air Quality) Measure (National Environment Protection Council,1998) ▪ Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (Environment Protection Authority, 2016)	**Section 6.13**
Minor	Air – greenhouse gas	No	General	▪ ISO 14064-2:2019(en) Greenhouse gases - Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements (International Organisation for Standardisation, 2019)	**Section 6.14**
Not relevant	Amenity – visual	No	General	▪ Guidelines for Landscape and Visual Impact Assessment (Landscape Institute and Institute of Environmental Management and Assessment, 2013)	**Sections 6.8** and **6.13**, respectively
Not relevant	Built environment – public and private property	No	General		**Section 6.12**

Appendix B. EPBC Protected Matters Search Tool

Australian Government

Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

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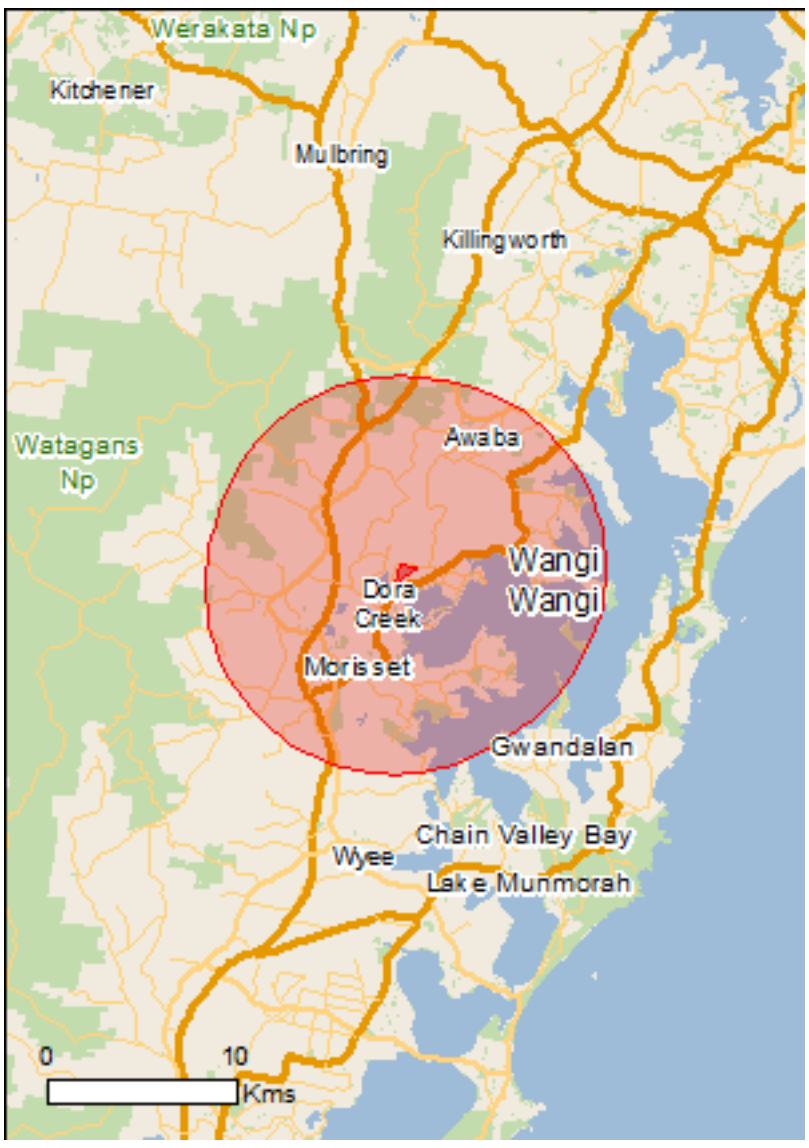

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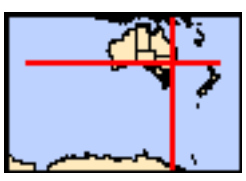

Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	72
Listed Migratory Species:	47

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	3
Commonwealth Heritage Places:	None
Listed Marine Species:	52
Whales and Other Cetaceans:	1
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	6
Regional Forest Agreements:	1
Invasive Species:	49
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	Critically Endangered	Community likely to occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species

Name	Status	Type of Presence
		habitat known to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely

Name	Status	Type of Presence
		to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thinornis cucullatus cucullatus Hooded Plover (eastern), Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat may occur within area
Fish		
Epinephelus daemelii Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area
Frogs		
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat may occur within area
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat known to occur within area
Litoria littlejohni Littlejohn's Tree Frog, Heath Frog [64733]	Vulnerable	Species or species habitat likely to occur within area
Mixophyes balbus Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat known to occur within area
Mixophyes iteratus Giant Barred Frog, Southern Barred Frog [1944]	Endangered	Species or species habitat known to occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat known to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat known to occur within area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus Long-nosed Potoroo (SE Mainland) [66645]	Vulnerable	Species or species habitat likely to occur within area
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Plants		
Acacia bynoeana Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat known to occur within area

Name	Status	Type of Presence
Angophora inopina Charmhaven Apple [64832]	Vulnerable	Species or species habitat known to occur within area
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat likely to occur within area
Corunastylis insignis Wyong Midge Orchid 1, Variable Midge Orchid 1 [84692]	Critically Endangered	Species or species habitat likely to occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat known to occur within area
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area
Diuris praecox Newcastle Doubletail [55086]	Vulnerable	Species or species habitat likely to occur within area
Eucalyptus camfieldii Camfield's Stringybark [15460]	Vulnerable	Species or species habitat likely to occur within area
Eucalyptus parramattensis subsp. decadens Earp's Gum, Earp's Dirty Gum [56148]	Vulnerable	Species or species habitat may occur within area
Euphrasia arguta [4325]	Critically Endangered	Species or species habitat may occur within area
Grevillea parviflora subsp. parviflora Small-flower Grevillea [64910]	Vulnerable	Species or species habitat known to occur within area
Melaleuca biconvexa Biconvex Paperbark [5583]	Vulnerable	Species or species habitat known to occur within area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat known to occur within area
Persoonia hirsuta Hairy Geebung, Hairy Persoonia [19006]	Endangered	Species or species habitat may occur within area
Pterostylis gibbosa Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood [4562]	Endangered	Species or species habitat may occur within area
Rhizanthella slateri Eastern Underground Orchid [11768]	Endangered	Species or species habitat may occur within area
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat known to occur within area
Rhodomyrtus psidioides Native Guava [19162]	Critically Endangered	Species or species habitat known to occur within area
Rutidosis heterogama Heath Wrinklewort [13132]	Vulnerable	Species or species habitat known to occur within area

Name	Status	Type of Presence
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat known to occur within area
Tetratheca juncea Black-eyed Susan [21407]	Vulnerable	Species or species habitat known to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Hoplocephalus bungaroides Broad-headed Snake [1182]	Vulnerable	Species or species habitat likely to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Anous stolidus Common Noddy [825]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna grisea Sooty Shearwater [82651]		Species or species habitat likely to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely

Name	Threatened	Type of Presence
		to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Dugong dugon Dugong [28]		Species or species habitat may occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta		Species or species habitat may occur within

Name	Threatened	Type of Presence
Ray [84994]		area
Manta birostris		
Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Sousa chinensis		
Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus		
Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus		
White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis		
Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus		
Spectacled Monarch [610]		Species or species habitat known to occur within area
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat likely to occur within area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons		
Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat known to occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris canutus		
Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat likely to occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Limosa lapponica		
Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species

Name	Threatened	Type of Presence
		habitat known to occur within area
Pandion haliaetus		
Osprey [952]		Breeding known to occur within area
Pluvialis fulva		
Pacific Golden Plover [25545]		Species or species habitat likely to occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land - Australian Postal Commission
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Defence Service Homes Corporation

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus		
Common Noddy [825]		Species or species habitat may occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba		
Great Egret, White Egret [59541]		Breeding known to occur within area
Ardea ibis		
Cattle Egret [59542]		Breeding likely to occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris canutus		
Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species

Name	Threatened	Type of Presence
		habitat likely to occur within area
[Calonectris leucomelas](#) Streaked Shearwater [1077]		Species or species habitat known to occur within area
[Diomedea antipodensis](#) Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
[Diomedea epomophora](#) Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
[Diomedea exulans](#) Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
[Diomedea gibsoni](#) Gibson's Albatross [64466]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
[Diomedea sanfordi](#) Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
[Fregata ariel](#) Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area
[Fregata minor](#) Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
[Haliaeetus leucogaster](#) White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
[Hirundapus caudacutus](#) White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
[Lathamus discolor](#) Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
[Limosa lapponica](#) Bar-tailed Godwit [844]		Species or species habitat known to occur within area
[Macronectes giganteus](#) Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
[Macronectes halli](#) Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
[Merops ornatus](#) Rainbow Bee-eater [670]		Species or species habitat may occur within area
[Monarcha melanopsis](#) Black-faced Monarch [609]		Species or species habitat known to occur within area
[Monarcha trivirgatus](#) Spectacled Monarch [610]		Species or species habitat known to occur

Name	Threatened	Type of Presence within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Species or species habitat likely to occur within area
Puffinus griseus Sooty Shearwater [1024]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche sp. nov. Pacific Albatross [66511]	Vulnerable*	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis rubricollis Hooded Plover (eastern) [66726]	Vulnerable*	Species or species habitat may occur within area

Name	Threatened	Type of Presence
[Tringa nebularia](#)		
Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area
Mammals		
[Dugong dugon](#)		
Dugong [28]		Species or species habitat may occur within area
Reptiles		
[Caretta caretta](#)		
Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
[Chelonia mydas](#)		
Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
[Dermochelys coriacea](#)		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
[Eretmochelys imbricata](#)		
Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
[Natator depressus](#)		
Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Whales and other Cetaceans		[Resource Information]
Name	Status	Type of Presence
Mammals		
[Sousa chinensis](#)		
Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
LNE Special Management Zone No1	NSW
Lake Macquarie	NSW
Pulbah Island	NSW
Sugarloaf	NSW
The Hunter Lakes	NSW
Watagans	NSW

Regional Forest Agreements	[Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
[North East NSW RFA](#)	New South Wales

Invasive Species	[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		

Name	Status	Type of Presence
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur

Name	Status	Type of Presence within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Asparagus scandens Asparagus Fern, Climbing Asparagus Fern [23255]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera subsp. rotundata Bitou Bush [16332]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Ulex europaeus Gorse, Furze [7693]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-33.06555 151.509025,-33.066665 151.516836,-33.067312 151.516578,-33.067816 151.515891,-33.068355 151.513746,-33.073606 151.506235,-33.065514 151.509025,-33.06555 151.509025

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Appendix C. Community notification and Frequently Asked Questions

xx March 2021

Resident
Eraring
Eraring NSW

Dear Eraring Resident

Proposed Eraring Battery Project

The purpose of this letter is to inform you of Origin's plans to develop a large battery at Eraring Power Station. This proposed battery, which will be subject to final approval from the Origin Board, is intended to position Origin's generation portfolio to support Australia's rapid transition to renewables.

The project was announced in mid-January 2021 and you can read more about it on our website. https://www.originenergy.com.au/about/investors-media/media-centre/origin_progresses_plans_for_nations_largest_battery_at_eraring_power_station.html

The battery would have an overall capacity of up to 700MW and a dispatch duration of 4 hours, making it the largest battery project currently under consideration in Australia.

A large-scale battery at Eraring will help us better support renewable energy and maintain reliable supply for customers, by having long duration storage ready to dispatch into the grid at times when renewable sources are not available.

Origin is committed to keeping our communities and stakeholders informed of our proposed projects and we will let you know when you'll have the opportunity to provide feedback and have your say on the project during the planning process. A Scoping Report has now been lodged with the NSW Department of Planning and a copy of the report can be read here: https://www.planningportal.nsw.gov.au/major-projects

In the meantime, if you have any questions at all please do not hesitate to contact me on 0400 035 434 or tania.carlos@originenergy.com.au.

Yours sincerely,

Tania Carlos
Senior Community Relations Business Partner
Energy Supply and Operations

Origin Energy ABN 30 000 051 696 • 180 Ann Street Brisbane QLD 4000
Telephone 13 24 61 • www.originenergy.com.au

Frequently Asked Questions

Q: Why is Origin planning to build a battery at Eraring Power Station?
A: We recognise Origin has an important role to play in positioning our electricity generation portfolio to support Australia's rapid transition to renewables.
A large-scale battery at Eraring will help Origin better support renewable energy and maintain reliable supply for our customers.

Renewable energy, such as from solar and wind, needs 'firming' capacity from sources like batteries to provide additional electricity to the grid during times of higher demand, or when supply from renewables is low. Batteries are an example of 'firming' capacity that support the continued growth of renewable energy in our energy system.

A large-scale battery at Eraring will also support Origin's orderly transition away from coal-fired generation by 2032 and the policy objectives of the NSW Electricity Infrastructure Roadmap which will see a substantial increase in renewable energy supply in NSW.

The site's existing links to transmission infrastructure, load centres and availability of suitably zoned land owned by Origin also make Eraring an ideal location for a large-scale battery.

Q: What's the current status of the proposed battery at Eraring?
A: Origin has received responses from an Expression of Interest to suitably qualified firms to supply and install the large-scale battery and released a Request For Tender on Monday 8 March. A Connection Enquiry has also been lodged with NSW transmission network service provider TransGrid to connect the battery to the national grid via the Eraring substation. Shortly we'll commence the planning application process, which will include community consultation and an opportunity to comment on this proposal.

Q: How do batteries support the transition to renewable energy?
A: Renewable energy, such as from solar and wind, needs 'firming' capacity that can provide additional electricity to the grid during times of higher demand, or when supply from renewables is low. Batteries are an example of 'firming' capacity that can shift energy from periods of abundant renewable supply into periods of low renewable supply ~~and~~ will support the continued growth of renewable energy in our energy system.

Q: How will the battery be charged?
A: The battery would be directly connected to the electricity grid, independent from the Eraring Power Station generation units. As a result, it would not be reliant on Eraring Power Station for charging - it could be charged by all forms of generation available in the market, including renewables.

Q: Where will the battery be located at Eraring?
A: The proposed battery will be located on Origin-owned land~~,~~ to the south west of the existing power station. The planned location is close to the power station's transmission switchyard and will be positioned to minimise visual impacts. More details on the proposed location will be provided during the community consultation phase of the planning application process.

Q: Can the battery be built on the ash dam?
A: No, we are not planning to build the battery on the ash dam.

Q: When will you know if the project will proceed?
A: Once we have all the necessary regulatory and technical approvals in place, the project will be taken to the Origin Board for a final investment decision. At the earliest this will occur in the second half of 2021.

Q: How long will the project take to complete?
A: Following selection of a preferred supplier and achievement of regulatory and technical approvals, along with Origin Board approval, we expect the battery will be deployed over three phases, with the first phase expected to be delivered between late 2022 and early 2023. We will share details of the timing for subsequent phases when this is available.

Q: Will there be more traffic movement during construction?
A: Following selection of a preferred supplier, the project will need to achieve the required planning approval from the NSW Government. As part of this planning process a range of assessments will be completed, including a detailed traffic management plan. The community will be given an opportunity to view and provide comment on all elements of the planning applications including the traffic management plan.

Q: How many local jobs will be created for the project?
A: We will be able to share further details on this aspect of the development once the Request For Tender process is complete and a shortlisted firm has been selected to supply and install the battery.

Q: How much will the project cost?
A: As we are currently commencing our Request For Tender with firms to supply and install the large-scale battery, we aren't currently able to confirm details such as the project budget.

Q: How would the project be funded?
A: The project would be funded by Origin however we have not finalised the detailed methods at this point. We will select the most appropriate financing arrangements for this project as it develops.

Q: How many hours of output will the battery have?
A: The proposed battery would have an overall capacity of up to 700 MW and a dispatch duration of 4 hours. This would make it the largest battery project currently under consideration in Australia.

If the battery operates at 700MW, it will be able to provide continual power output at this level for 4 hours. The amount of energy that can be stored in the battery (4 hours x 700MW = 2800MWh) is the defining constant here. If the battery operates at a lower output, it will be able to provide the power for longer. For example, if we operate at a power output level of 350MW, the battery would be able to continually provide this for 8 hours.

Q: How long does it take to charge the battery?
A: Most batteries charge and discharge at the same rate. This means that the battery would take four~~4~~ hours to charge at 700MW draw from the grid, or eight ~~8~~ hours at 350MW draw from the grid. However, some batteries can take slightly longer to charge than discharge.

Q: Will the battery have any environmental impacts e.g. noise from cooling fans?
A: The battery will create some noise from fans which are used to keep the batteries cool. However, this is expected to be well within the permitted levels of the existing power station. Noise studies will form a critical part of the environmental and planning assessment process.

Q: Are there any hazards associated with the battery?
A: Some early-stage technology Lithium-Ion batteries experienced fires when subjected to impacts or high internal temperatures beyond their design. Design of battery cells, charging management, fire suppression systems and, temperature monitoring have progressed over recent years helping to significantly improve safety and reduce risk. Additionally, the layout of the plant, maintaining spacing between components manages the risk of the spread of a potential fire. Consideration of fire risk is a key design component for Origin in ensuring safety for both our employees and the surrounding communities.