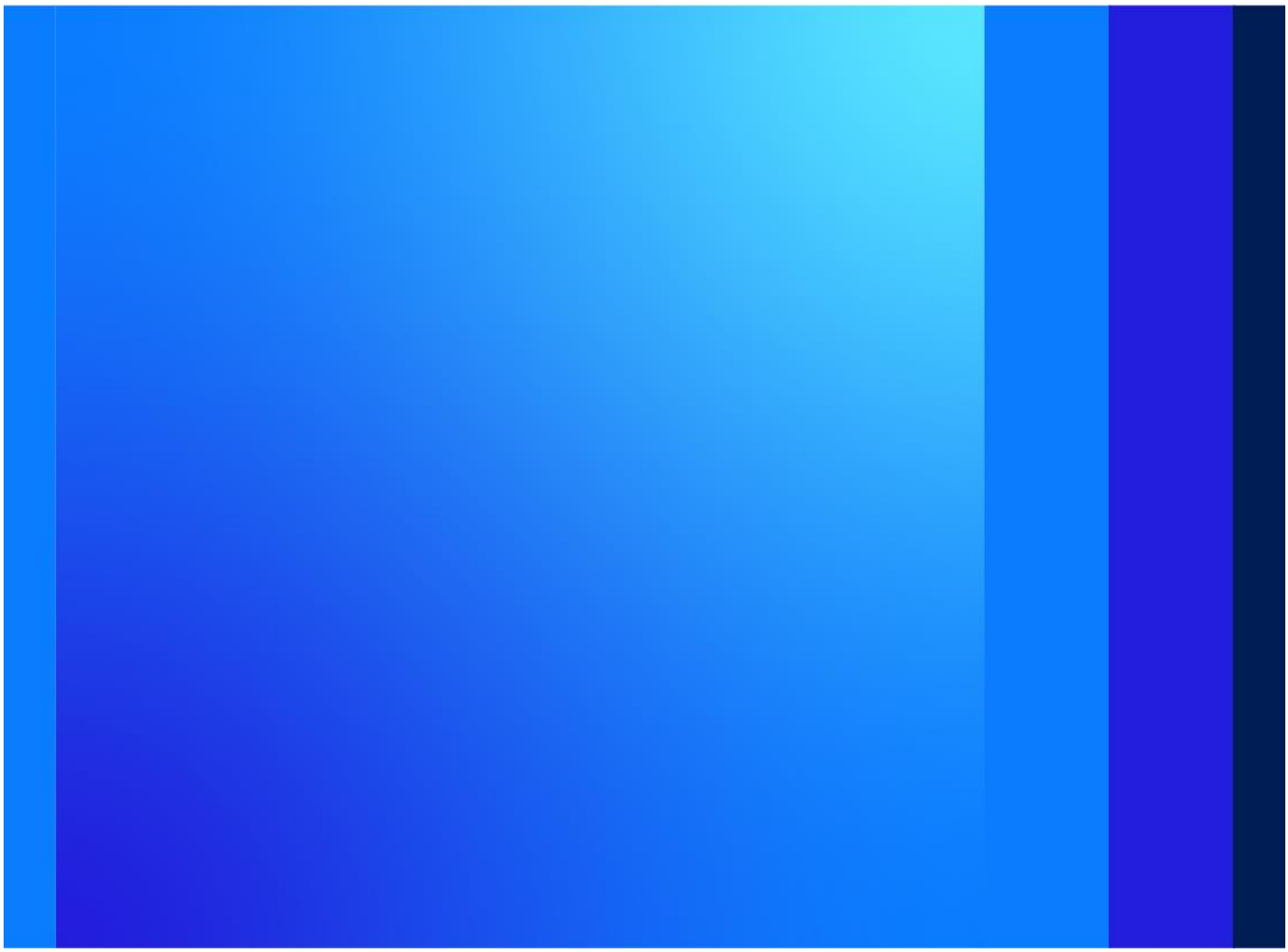
# Kurri Kurri OCGT Gas Fired Power Station

## Environmental and Planning Scoping Report

18 December 2020



# Kurri Kurri OCGT Gas Fired Power Station

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| Authors: | Tim Colman and Mark Terei |
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Jacobs Group (Australia) Pty Limited
ABN 37 001 024 095
Level 7, 177 Pacific Highway
North Sydney NSW 2060 Australia
PO Box 632 North Sydney
NSW 2059 Australia
T +61 2 9928 2100
F +61 2 9928 2444
www.jacobs.com

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# Glossary

| Term/Acronym | Description |
|---|---|
| AEMO | Australian Energy Market Operator |
| AEP | Annual exceedance probability |
| *AER* | *Australian Energy Regulator* |
| AHD | Australian Height Datum |
| AHIMS | Aboriginal Heritage Information Management System |
| ANZECC | Australian and New Zealand Environment and Conservation Council |
| ANZG | Australian and New Zealand Guidelines |
| ASS | Acid sulphate soil |
| BAM | Biodiversity Assessment Method |
| *BC Act* | *Biodiversity Conservation Act 2016* |
| BDAR | Biodiversity Development Assessment Report |
| CASA | Civil Aviation Safety Authority |
| Cessnock LEP | *Cessnock Local Environmental Plan 2011* |
| CSM | Conceptual Site Model |
| CSSI | Critical State Significant Infrastructure |
| DAWE | Department of Agriculture, Water and the Environment |
| DO | Dissolved oxygen |
| DP | Deposited Plan |
| DPIE | NSW Department of Planning, Industry and Environment |
| EES | NSW Office of Environment, Energy and Science |
| EIS | Environmental Impact Statement |
| EMF | Electric and magnetic fields |
| EP&A Act | *Environmental Planning and Assessment Act 1979* (NSW) |
| EP&A Regulation | Environmental Planning and Assessment Regulation (2000) |
| EPA | New South Wales Environment Protection Authority |
| EPBC Act | *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) |
| EPI | Environmental Planning Instruments |
| EPL | Environment Protection Licence |
| ESB | Energy Security Board |
| ESOO | Electricity Statement of Opportunities |
| Federal Minister | The Federal Minister for Agriculture, Water and the Environment |
| FRP | Filterable reactive phosphorus |
| GDEs | Groundwater Dependent Ecosystems |
| GHG | Greenhouse gas |
| HAZID | Hazard identification |
| Hydro Aluminium | Hydro Aluminium Kurri Kurri Pty Ltd |
| IFR | Instrument Flight Rules |
| IRM | Interim Reliability Measure |
| ISEPP | State Environmental Planning Policy (Infrastructure) 2007 |
| ISP | Integrated System Plan |
| Koala habitat SEPP | State Environmental Planning Policy (Koala Habitat Protection) 2019 |
| LCVIA | Landscape Character and Visual Impact Assessment |
| LEP | Local environmental plan |
| LGA | Local government area |
| LLS | NSW Local land services |

| | |
|---|---|
| MNES | Matters of national environmental significance |
| MW | Megawatts |
| NEM | National Electricity Market |
| NER | National Electricity Rules |
| NHVR | National Heavy Vehicle Regulator |
| NOx | Oxides of nitrogen (also: Nitrogen oxides) |
| NPI | NSW EPA *Noise Policy for Industry 2017* |
| NPW Act | *National Parks and Wildlife Act 1974* |
| OCGT | Open Cycle Gas Turbines |
| OEH | NSW Office of Environment and Heritage (former) |
| OEMP | Operational Environmental Management Plan |
| OSOM | Oversized or Overmass |
| PCBs | Poly-chlorinated Biphenyls |
| PCT | Plant Community Types |
| PFAS | Per- and polyfluoroalkyl substances |
| PHA | Preliminary Hazard Analysis |
| Pipelines Act | *Pipelines Act 1967* |
| PJ | Petajoules |
| PMF | Probable Maximum Flood |
| PMST | Commonwealth Protected Matters Search Tool |
| POEO Act | *Protection of the Environment Operations Act 1997* |
| RIT-T | Regulatory Investment Test for Transmission |
| RRO | Retailer Reliability Obligation |
| SEARs | Secretary's Environmental Assessment Requirements |
| SEPP | State Environmental Planning Policy |
| SEPP 33 | State Environmental Planning Policy No. 33 – Hazardous and Offensive Development (SEPP 33) |
| SEPP 55 | State Environmental Planning Policy 55 – Remediation of Land |
| SF6 | sulphur hexafluoride |
| Snowy Hydro | Snowy Hydro Limited |
| SRD SEPP | State Environmental Planning Policy (State and Regional Development) 2011 |
| SSD | State Significant Development |
| SSI | State Significant Infrastructure |
| TDS | Total Dissolved Solids |
| TEC | Threatened Ecological Community |
| TfNSW | Transport for New South Wales |
| The Hunter Regional Plan | The Hunter Regional Plan 2036 |
| The Proposal | Development of a gas-fired power station at Kurri Kurri, NSW |
| The Strategic Plan | The *Cessnock Community Strategic Plan 2027* |
| TP | Total phosphorus |
| TPH | Total Petroleum Hydrocarbons |
| TSS | Total Suspended Solids |
| VRE | Variable renewable energy |
| | |
| | |

# Executive Summary

## The Proposal

Snowy Hydro Limited (Snowy Hydro / 'the proponent') proposes to develop a gas fired power station at Kurri Kurri, NSW ('the Proposal'). Snowy Hydro is seeking approval for the Proposal from the NSW Minister for Planning and Public Spaces under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

The Proposal involves the construction and operation of a power station and electrical switchyard, together with other associated infrastructure. The power station would have a capacity of approximately 750 megawatts (MW) which would be generated via two heavy duty open cycle gas turbines.

The Proposal's overall purpose and objective is to provide dispatchable capacity and other services to the National Electricity Market (NEM) which can be used by the Australian Energy Market Operator (AEMO) to meet the requirements of the NEM, and to supplement Snowy Hydro's generation portfolio with dispatchable capacity when the needs of electricity consumers are highest. Importantly, gas fired generation capacity provides firming of renewable generation projects' intermittent electricity supply to the NEM. Without associated dispatchable and firming generation, renewable generation projects would not be viable as an effective part of the energy generation technology mix.

The proposed power station will operate as a 'peak load' generation facility capable of supplying electricity at short notice when there is a requirement in the NEM such as during periods of high electricity demand, low supply periods from intermittent renewable sources, supply outages at other baseload power stations, and transmission line constraints or outages.

Snowy Hydro is 100% owned by the Commonwealth of Australia and is a major provider of hedge products to NEM participants seeking to insure themselves against price volatility in the NEM. NEM participants such as retailers and owners of variable renewable energy (VRE) seek to hedge price risk by entering into contracts with Snowy Hydro. By making these products available to all NEM participants, greater competition is fostered and consumers thus benefit from cheaper electricity. The Proposal improves Snowy Hydro's capability to provide these products for NEM participants and thus creates greater liquidity for these products.

The necessary infrastructure required for the turbines to operate on natural gas fuel is the subject of a major investment being undertaken in parallel to the power station. This gas infrastructure investment facilitates the power station's capability to operate using natural gas. The new gas lateral pipeline is to be developed by a third party subject to a separate planning application under the Critical State Significant Infrastructure (CSSI) declaration (see below) for the project, and is therefore not part of the Proposal under this planning application.

However, the turbines are capable of operating on diesel as necessary and this functionality will be incorporated into the Proposal. Operation on diesel fuel is considered a back-up function in the case that gas supply to the Proposal Site is not available, for a short period during commissioning of the power station and provides the necessary risk management function for the provision of System Restart Services.

Additionally, major supporting electrical infrastructure required for the Proposal is a 132 kV electrical switchyard, located adjacent to the Proposal Site. The Proposal would connect into existing 132 kV electricity transmission infrastructure located adjacent to the Proposal Site.

The Proposal has a capital investment value of approximately $610 million, and is anticipated to be fully operational by the end of 2023.

## Statutory framework

The Proposal was declared by the Minister on 16 December, 2020 to be Critical State significant infrastructure (CSSI) under section 5.13 of the EP&A Act. As such, the Proposal is considered to be "essential for the State for economic, environmental or social reasons", and is listed under clause 16 and Schedule 5 of State Environmental Planning Policy (State and Regional Development) 2011 (SRD SEPP).

Accordingly, Snowy Hydro is lodging its application for approval for the Project as CSSI under Part 5, Division 5.2 of the EP&A Act.

This Scoping Report is intended to support a request for Secretary's Environmental Assessment Requirements (SEARs) which would then be addressed through the preparation of an Environmental Impact Statement (EIS).

Based on the results of a Commonwealth Protected Matters search, matters of national environmental significance (MNES) within the area of influence of the Proposal are limited to biodiversity. Consideration and assessment of the Proposal's potential impacts on MNES will be provided in a Biodiversity Development Assessment Report as part of the EIS. A referral to the Commonwealth Department of the Agriculture, Water and the Environment will be made in respect of the Proposal. Should the action be identified as a controlled action the Proposal would be assessed under the Bilateral Agreement (Amending Agreement No.1, 2020) between the Commonwealth and NSW Governments and the approval of the Federal Minister would be required.

## The Proposal Site

The Proposal Site is located in the small suburb of Loxford in the Hunter Valley region of New South Wales, approximately 3 km north of the town of Kurri Kurri, approximately 35 km west of Newcastle and 125 km north of Sydney. The Proposal Site is located within the Cessnock City Council local government area.

The Proposal Site forms part of the former Hydro Aluminium Kurri Kurri Pty Ltd aluminium smelter, which operated from 1969 to 2012 and was closed in 2014. Since closure of the smelter, extensive remediation works have taken place at the site, including Stage 1 of a two-stage demolition program of existing structures, asbestos removal and recycling of waste materials.

The Proposal Site's current condition is that of a brownfield site, extensively disturbed by past industrial development. The Proposal would require minimal if any new disturbance of undisturbed land.

## Preliminary environmental assessment

The key environmental issues that require further assessment as part of an EIS have been identified as:

- Aboriginal heritage;
- Biodiversity;
- Air quality and greenhouse gases;
- Plume rise and aviation hazard;
- Soils and contamination;
- Surface water and hydrology;
- Noise and vibration.

Other environmental issues have also been identified for further assessment as part of an EIS. Potential environmental and social impacts associated with the proposed gas pipeline identified in the CSSI declaration will not be assessed as part of this Proposal, as they are being assessed under a separate planning application.

## Stakeholder engagement

The proposed development for the purpose of electricity generating infrastructure is likely to attract stakeholder interest for reasons associated with employment, regional development, and potential environmental impacts during construction and operation.

A Community and Stakeholder Engagement Plan (CSEP) has been prepared to guide stakeholder engagement activities throughout the preparation of the EIS and the EIS exhibition period. The plan will identify the Proposal's key stakeholders, and support consultation objectives of:

- Building awareness of the Proposal's benefits for stakeholders and the local community;
- Facilitating ongoing and effective communication with key stakeholders and the community;
- Building a positive relationship with landholders adjacent to the Proposal; and
- Providing opportunities for meaningful input into the EIS process, and allow potential stakeholder concerns to be addressed prior to the EIS submissions where possible.

The consultation process and its outcomes will be documented in the EIS and relevant technical studies.

## Conclusion

This Scoping Report is a publicly available document which provides preliminary information on the Proposal and its potential impacts. It provides a description of the Proposal, existing information on environmental context, potential environmental impacts and how it is proposed to assess them. The report has been prepared in accordance with the EP&A Act for the NSW Department of Planning, Industry and Environment (DPIE) in support of an application for the Secretary's Environmental Assessment Requirements (SEARs) for the Proposal. An EIS will then be prepared addressing the SEARs.

# 1. Introduction

## 1.1 Background

Snowy Hydro Limited (Snowy Hydro) ('the proponent') proposes to develop a gas fired power station at Kurri Kurri, NSW ('the Proposal'). Snowy Hydro is seeking approval from the NSW Minister for Planning and Public Spaces under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) for the Proposal.

The Proposal involves the construction and operation of a power station and electrical switchyard, together with other associated infrastructure. The power station would have a capacity of approximately 750 megawatts (MW) which would be generated via two heavy duty gas turbines.

The proposed power station will operate as a "peak load" generation facility supplying electricity at short notice when there is a requirement in the National Electricity Market (NEM). The major supporting infrastructure that is part of the Proposal would be a 132 kV electrical switchyard located adjacent to the Proposal Site. The Proposal would connect into existing 132 kV electricity transmission infrastructure located adjacent to the Proposal Site.

A new gas lateral pipeline will also be required. This would be developed by a third party, and subject to a separate planning approval. While the gas lateral will be the subject of a separate planning application, it is within the scope of the CSSI declaration for this project, and hence referenced here for information.

More specifically, the main components of the Proposal would include:

- Two heavy-duty Open Cycle Gas Turbines (OCGT)[1];
- A new 132 kV electrical switchyard which is proposed to be located adjacent to the Proposal Site and connecting into the existing Ausgrid 132 kV transmission network.

The development is anticipated to be operational by the end of 2023.

The Proposal is described in greater detail in **Section 2** and **3**.

## 1.2 Project history and need

Over the past decade there has been a progressive movement towards the retirement of large thermal power stations, particularly coal fired power stations, as more renewable energy generators (particularly wind and solar) contribute to the NEM. More recently we have seen the retirement and decommissioning of the Hazelwood Power Station in Victoria, while AGL has announced that a large coal-fired power station at Liddell, NSW will be retired in stages, with one unit to shut down in April 2022 and the remaining three units in April 2023[2].

Dispatchable electricity and other network support services are increasingly being required and deemed critically important to the stability of the NEM as more intermittent renewable energy generators enter the market. The proposed gas fired power station at Kurri Kurri would function as a source of dispatchable electricity into the NEM and would be one of the mechanisms available to the Australian Energy Market Operator (AEMO) to respond to electricity demand following retirement of the Liddell power station.

A more detailed explanation on the project need can be found in Section 4.

[1] The reference to an Open Cycle Gas Turbine has been used consistently throughout this document. However, in the gas turbine industry Open Cycle operation is often colloquially referred to as Simple Cycle. Thus, for the purposes of this document they refer to the same technology.

[2] https://www.agl.com.au/about-agl/how-we-source-energy/agl-macquarie (Accessed 23.9.2020)

## 1.3 The Proponent

Snowy Hydro is a fully Australian owned and operated company that was corporatised in 2002, from what was the Snowy Mountains Hydro-Electric Authority, in all operating for almost 70 years beginning in 1949 with the construction of the Snowy Mountains Hydro-electric Scheme. Since its inception, Snowy Hydro has grown into an end to end integrated energy provider.

Snowy Hydro is 100% owned by the Commonwealth, operates as a corporate entity, and is governed by an independent Board of Directors. Snowy Hydro's role in the energy market today is to:

- generate energy that underpins the security and reliability of the NEM;
- underpin the transition to renewable energy;
- provide price risk management products for wholesale customers;
- increase competition in the energy markets;
- generate electricity that is delivered to homes and businesses;
- provide retail electricity and gas supplies through retail businesses, Red Energy and Lumo Energy.

Snowy Hydro employs nearly 2000 people across Australia, including more than 1200 people in the Red Energy and Lumo Energy retail businesses.

Snowy Hydro has a combined power portfolio of the Snowy Scheme along with gas and diesel-fired peak fired generators. In total, Snowy Hydro has 16 power stations and more than 5,500 MW of generating capacity across New South Wales, Victoria and South Australia. Snowy Hydro has also recently expanded its renewable portfolio to include contracted energy with 10 wind and solar projects.

Aside from the Snowy Hydro Scheme in southern NSW, Snowy Hydro owns and operates two gas fired power stations in Victoria: a 320 MW two unit open cycle turbine facility at Laverton North, and a 300 MW station comprising six 50 MW dual fuel open cycle gas turbines in the Latrobe Valley.

In NSW, Snowy Hydro acquired the Colongra Power Station in 2015. Colongra comprises four dual fuel open cycle gas turbines and has a total generating capacity of 667 MW. The natural gas to fuel the turbines is supplied from the Sydney-Newcastle gas pipeline.

Snowy Hydro's retail electricity and gas businesses deliver energy supplies to more than one million customers in Victoria, New South Wales, ACT, south-east Queensland and South Australia.

## 1.4 Summary of planning and assessment process

The Proposal has been declared by the Minister to be Critical State Significant Infrastructure (CSSI) under section 5.13 of the *Environmental Planning and Assessment Act 1979 Act* (EP&A Act). As such, the Proposal is considered to be "*essential for the State for economic, environmental or social reasons*", and is listed under clause 16 and Schedule 5 of *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP).

Accordingly, Snowy Hydro is lodging its application for approval for the Project as CSSI under Part 5, Division 5.2 of the EP&A Act.

This Scoping Report is intended to support a request for Secretary's Environmental Assessment Requirements (SEARs) which would then be addressed through the preparation of an Environmental Impact Statement (EIS).

The statutory planning framework is set out in detail in Section 5 of this report.

## 1.6 Purpose of Scoping Report

This Scoping Report has been prepared by Jacobs in conjunction with Snowy Hydro. The purpose of this Scoping Report is to support an application for SEARs under Division 5.2 of the EP&A Act. The SEARs will set out the matters to be addressed by Snowy Hydro as part of preparing the EIS. This Scoping Report aims to provide insight and document the following key aspects:

- A general overview of the Proposal, including the justification and need for the Proposal;
- The preliminary identification of potential environmental and social issues that would be associated with the construction and operation of the Proposal;
- An outline of the relevant planning legislation and approvals pathway;
- The preliminary identification of further assessments that are likely to be required in the EIS; and
- An outline of the consultation process that would be undertaken during the preparation of the EIS.

# 2. Site location and description

## 2.1 Proposal Site

The Proposal Site (Proposal Site) is located in the small suburb of Loxford in the Hunter Valley region of New South Wales, approximately 3 km north of the town of Kurri Kurri, approximately 35 km west of Newcastle and 125 km north of Sydney. The Proposal Site is located within the Cessnock City Council local government area (LGA).

### 2.1.1 The Proposal Site

The Proposal Site address is 73 Dickson Road, Loxford. Access to the property is via Hart Road and is approximately 1.0 km from the M15 Hunter Expressway. The Proposal Site would use the same road access, and a refurbished internal access road as part of the infrastructure plan for a proposed Industrial Estate development.

The Proposal Site is currently described as Part Lot 319 and Part Lot 769 in Deposited Plan (DP) 755231. A proposed future re-subdivision of land on and around the Proposal Site would likely result in a new property description applying to the Proposal Site.

The Proposal Site can be seen in more detail in Figure 2-1 and Figure 2.2 below.

The Proposal Site forms part of the former Hydro Aluminium Kurri Kurri Pty Ltd (Hydro Aluminium) aluminium smelter (smelter) which operated from 1969 to late 2012 and was closed in 2014. Since closure of the smelter, extensive remediation works have taken place at the site, including Stage 1 of a two-stage demolition program of existing structures, asbestos removal and recycling of waste materials.

The site's current condition is that of a brownfield site, extensively disturbed by past industrial development. The Proposal would require minimal if any new disturbance of undisturbed land.

The Stage 1 demolition works were the subject of a development application to Cessnock City Council that was approved subject to conditions, in 2016.

Hydro Aluminium submitted an EIS, titled '*Former Hydro Aluminium Kurri Kurri Smelter Remediation*' in July 2016 which is still subject to approval (based on publicly available information), with the latest Response to Submissions Report submitted in August 2020. These remediation works include Stage 2 demolition works, further remediation and the demolition of below ground infrastructure.

The rights to develop the existing smelter site were purchased by a property developer who is planning to develop it into an Industrial Estate with a series of smaller sub-divided lots. Snowy Hydro is seeking to secure ownership of approximately 10 hectares of land within this sub-division for the Proposal. The proposed power station and switchyard would be located in the area of the site shown in Figure 2.2.

The Proposal Site and vicinity is currently the subject of a rezoning application. Currently, the Proposal Site and its surrounds are zoned RU2 Rural Landscape under the *Cessnock Local Environmental Plan 2011* (Cessnock LEP), with small pockets of surrounding land zoned E2 Environmental Conservation, as shown in Figure 2.3. A large proportion of the land surrounding the Proposal comprising the former smelter site is still owned by Hydro Aluminium.

The closest residential zoned land is the suburban areas of Kurri Kurri, located approximately 2 km south and south-west of the Proposal Site. Further residential areas at Heddon Greta and Cliftleigh are situated approximately 2.5 km to the east. There are some sparse rural residential properties south and south-east of the Proposal Site, the nearest being located on Dawes Avenue, Loxford which is approximately 1.25 km south-east of the Proposal Site (and is owned by Hydro Aluminium). The Kurri Kurri Speedway Club is on Dickson Road, Loxford and is approximately 800 m south-east of the Proposal Site.

Immediately south of the Proposal Site are the remains of the former aluminium smelter and the M15 Hunter Expressway. There is some native vegetation adjacent to the Proposal Site in the north, east and west. Land further east and north of the Proposal Site comprises low-lying open rural land, and the waterways of Swamp Creek, Black Waterholes Creek and the Swamp Creek wetlands, which lead to the Wentworth swamps and are part of the extensive Hunter River floodplain. The Hunter River is approximately 9 km north-east of the Proposal Site in Maitland.

The Proposal footprint is mostly within the existing electrical switchyard of the former aluminium smelter and part of the smelter site. The existing electrical switchyard will be fully decommissioned and removed, and the land remediated, prior to the construction of the power station. The surrounds are primarily flat, with natural drainage falling gradually towards the north-east towards Black Waterholes Creek. There are two large, shallow artificial ponds located north-east of the Proposal Site, which were constructed to capture stormwater runoff from the smelter site and are integrated with the natural drainage regime. These ephemeral ponds overflow and discharge as irrigation to the adjacent paddock owned by Hydro Aluminium north of the site.

### 2.1.2 Proposed rezoning and master plan

In 2015, Hydro Aluminium prepared a Planning Proposal to rezone the entire Kurri Kurri Smelter site, with the Proposal Site being rezoned to IN3 – Heavy Industrial. On 23 March 2016, a delegate to the Minister for Planning made a 'Gateway Determination' advising that the timeframe for completion is 23 December 2020, however, it is noted this may be extended.

The rezoning proposal, if approved, would rezone the former smelter site and some of the surrounding land to a combination of residential, general and heavy industrial, business, rural, recreation, special purpose and environmental zones. This would designate the Proposal Site as General Industrial. However, whether the Proposal Site is eventually zoned for General Industrial or Heavy Industrial is unlikely to affect the planning outcome of this Proposal, or have any material bearing on the ultimate Ministerial determination. The Proposal would not be incompatible with the local council's land use objectives for either the current zoning or proposed rezoning type.

The proposed rezoning aims to "…*respond to the development opportunities and constraints, whilst managing the interface between the future land uses*."[3] At the time of preparing this report, the proposed rezoning is awaiting DPIE's consideration and determination. The master plan concept for the rezoning, which affects land in both the Cessnock and Maitland LGAs, is shown in Figure 2-4. This Scoping Report is drafted on the basis that the rezoning proposal (which is subject to change) will be approved prior to construction of the power station.

[3] http://leptracking.planning.nsw.gov.au/proposaldetails.php?rid=6797 DPIE LEPs Online System; Current LEP Proposals. Accessed 5 October 2020.

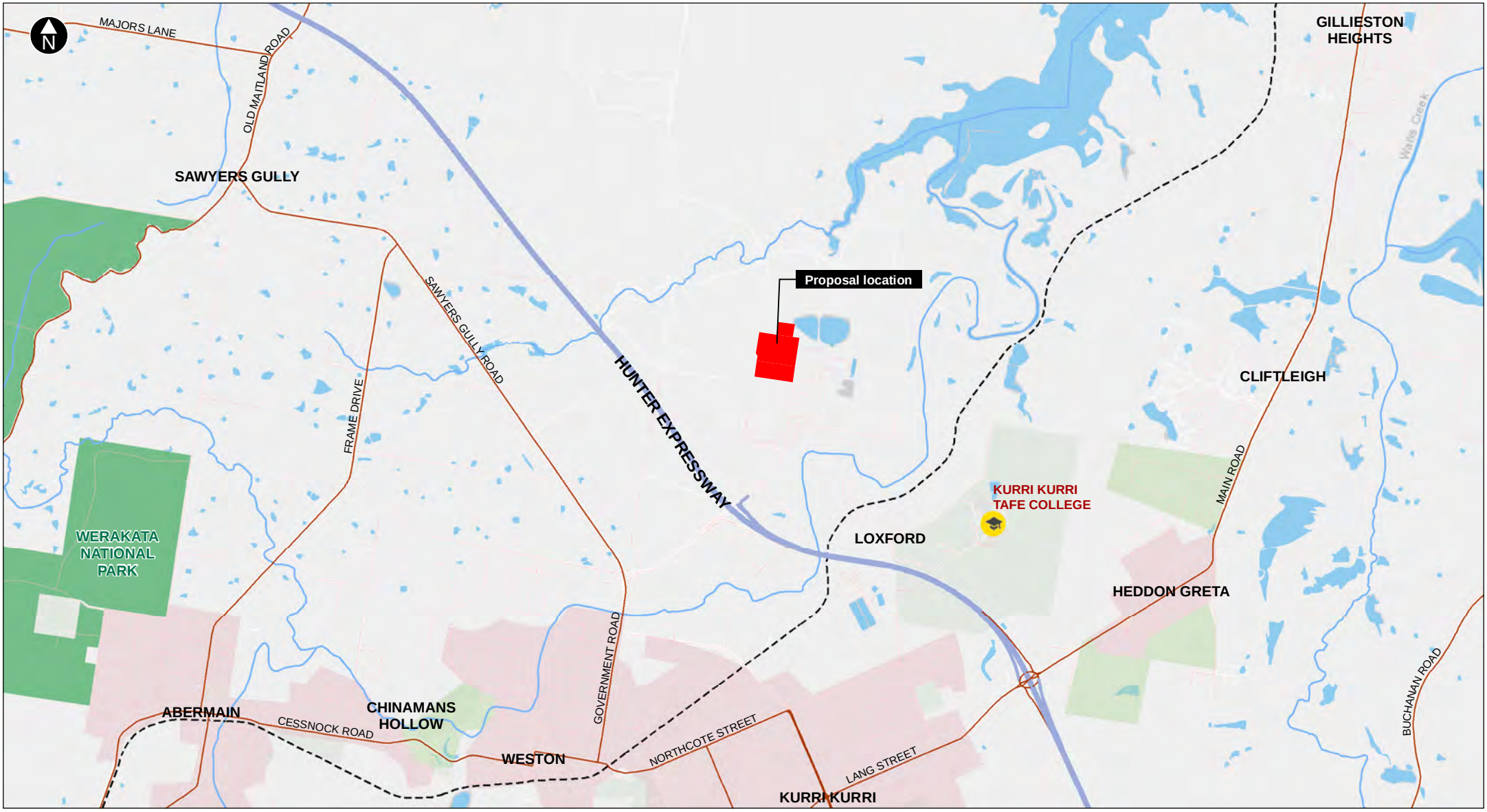


**Figure 2-1** Project regional context - Kurri Kurri Gas Fired Power Station

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**Figure 2-2** Proposal location - Kurri Kurri Gas Fired Power Station

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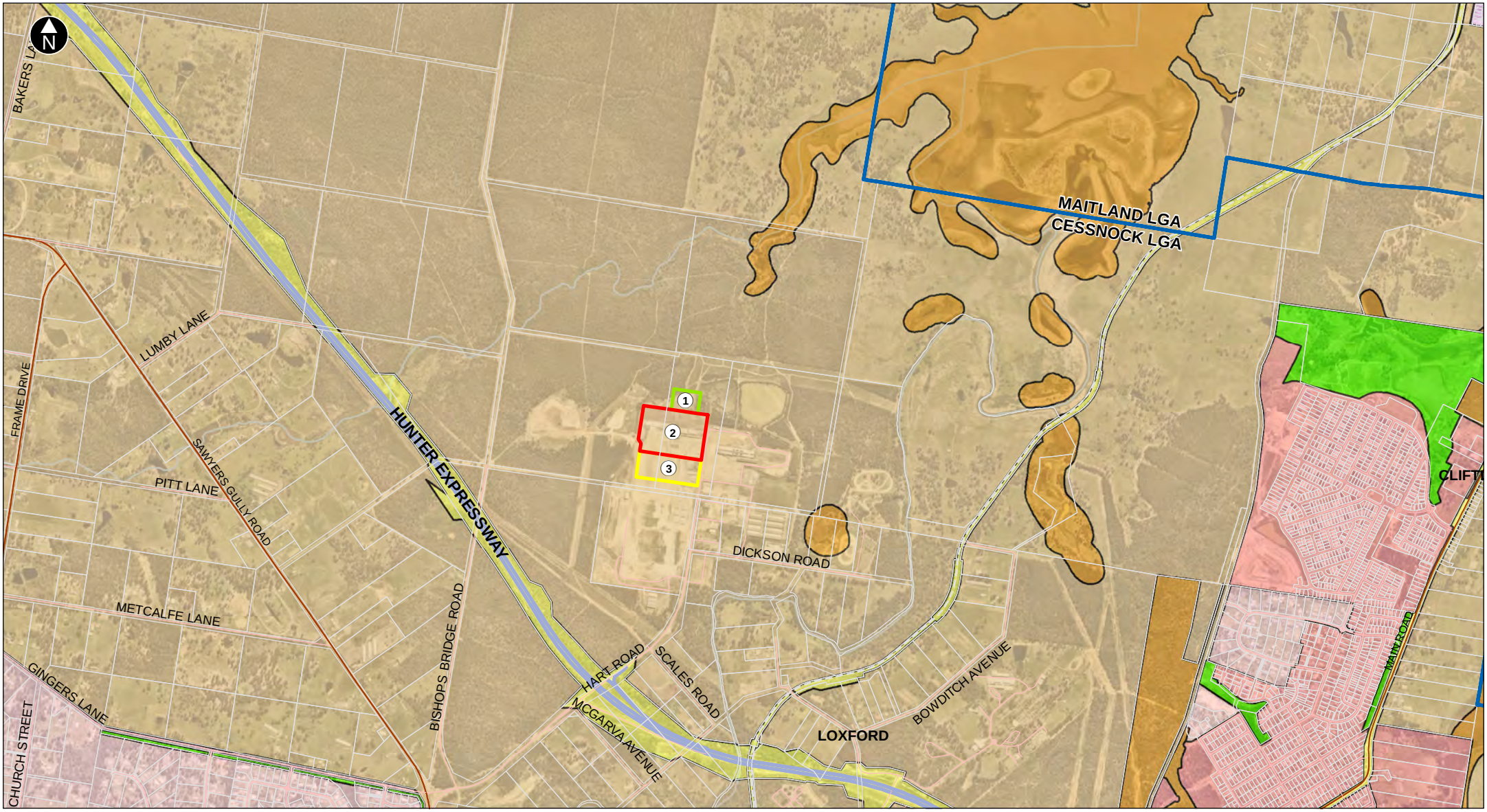


1. Proposed Switchyard Area
2. Proposed Plant Area
3. Proposed Buffer Area
Cadastre

Motorway
Main roads
Roads
Railway
Local Government Area

Land use zones

B1 Neighbourhood Centre
E2 Environmental Conservation
R1 General Residential
R2 Low Density Residential
R5 Large Lot Residential
RE1 Public Recreation
RU2 Rural Landscape
SP2 Infrastructure

0 0.5 1 km

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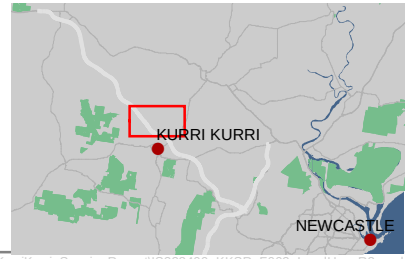


**Figure 2-3** Current land use zones - Kurri Kurri Gas Fired Power Station

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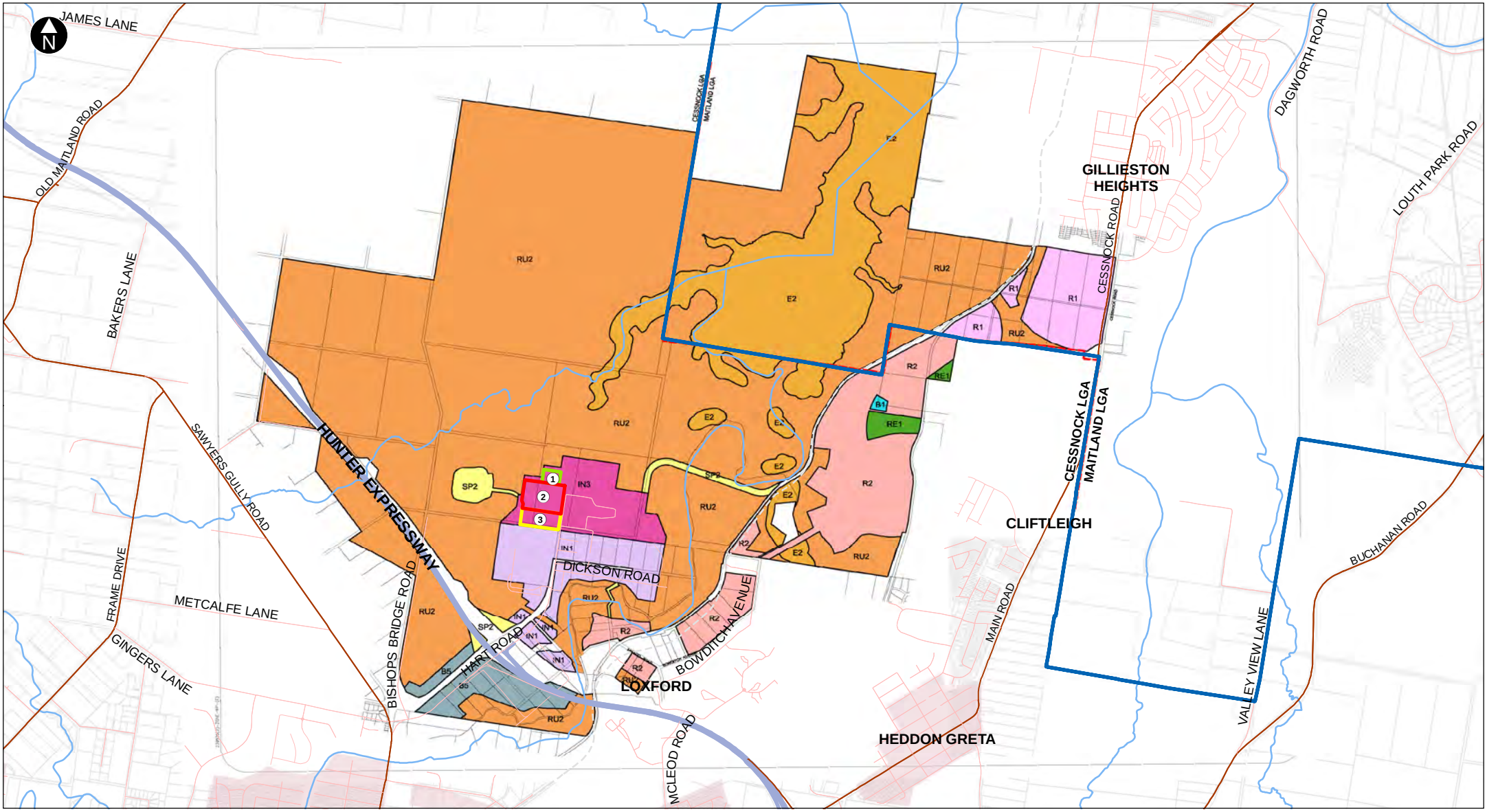


1. Proposed Switchyard Area
2. Proposed Plant Area
3. Proposed Buffer Area
Urban areas
Cadastre

Motorway
Main roads
Roads
Railway
Local Government Area

| | |
|---|---|
| B1 | NEIGHBOURHOOD CENTRE (1.19ha) |
| B5 | BUSINESS DEVELOPMENT (33.20ha) |
| E2 | ENVIRONMENTAL CONSERVATION (268.51ha) |
| IN1 | GENERAL INDUSTRIAL (65.73ha) |
| IN3 | HEAVY INDUSTRIAL (53.48ha) |
| R1 | GENERAL RESIDENTIAL (56.57ha) |
| R2 | LOW DENSITY RESIDENTIAL (137.22ha) |
| RE1 | PUBLIC RECREATION (8.54ha) |
| RU2 | RURAL LANDSCAPE (1246.75ha) |
| SP2 | SPECIAL PURPOSE INFRASTUCTURE (12.77ha) |

0 1 2 km

1:40,000 at A4

GDA2020 MGA56

Source: McCloy Group, December 2020
Note: Subject to Planning Approval and subject to change.
This image has been georeferenced to this location.
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**Figure 2-4** Hydro Kurri Kurri Rezoning Master Plan - Kurri Kurri OCGT EIS

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## 2.2 Regional context

The Cessnock City LGA has an area of 1,966 square kilometres and a population of approximately 60,000 (ABS ERP, 2019). The main employment industries in the Cessnock LGA are tourism (accommodation and food services), retail trade, health care and social assistance, education and training, manufacturing, public administration and safety, and construction. Closer to the Proposal Site is Weston Aluminium (recycling) and TAFE NSW Kurri Kurri campus.

The closest population centre to the Proposal Site Kurri Kurri, approximately 3 km to the south. Other nearby population centres are Maitland and Rutherford, approximately 8.5 km north-north-east of the Proposal Site.

The Proposal Site is surrounded on the north, east and west by extensive native vegetation, which appears to be regrowth. Parts of this area are mapped as known habitat for endangered fauna such as the Regent Honeyeater.

There are no National Parks, Nature Reserves or Conservation Areas in the vicinity of the Proposal Site. However, some of the lands to the east and north-east of the Proposal Site at the upper extent of the Hunter River floodplain are zoned E2 Environmental Conservation under the Cessnock LEP. The Proposal would not impact directly on any land in an Environmental Conservation zone.

## 2.3 Site selection

Important to the selection of the Proposal Site is the re-use of land previously occupied by heavy industry, the Hydro aluminium smelter. The Proposal Site is a small section of the former smelter site, and consequently reduces industrial impacts on the overall area by transitioning from the smelter to a gas fired power station. This is a significant consideration, in comparison to disturbing a greenfield site and introducing new impacts to such a location. Similarly, the 132kV high voltage transmission lines currently connecting the Proposal Site to the broader electricity network would be re-used for the power station. In combination, this makes the smelter location a preferred site for a new gas fired power station, in terms of the strategic planning impact.

Other attributes which identified the Proposal Site as suitable for a power station were as follows:

- The site is a brownfield site, which minimises the impact of installing the new generation facility;
- The site is removed from densely populated areas and highly sensitive neighbouring land uses;
- Proximity to gas supply pipelines, including the prospect of connecting to existing networks and augmentations to the State's gas transmission centring around the Newcastle region;
- Proximity to existing high voltage electricity transmission network and high electricity demand centres;
- Capacity of the transmission network to deliver electricity produced without constraint;
- Availability of suitable and suitably zoned land with compatible existing land use;
- Availability of the site at the time of the development need and forecast electricity market demand;
- Access for the delivery of heavy construction loads and ongoing liquid fuel transport routes;
- Availability of skilled construction and operations workforce;
- Proximity to centres for operational maintenance resourcing;
- Ready availability of water and wastewater facilities;
- Local businesses and infrastructure sufficient to support a power station.

Key site selection parameters included environmental, infrastructure, economic, engineering, and land use constraints and opportunities. The Proposal Site was selected because it best satisfies the criteria for a gas fired power station and its ancillary infrastructure needs, while minimising the potential for environmental and social impacts.

# 3. Proposal description

## 3.1 Overview

Snowy Hydro is seeking to develop a new gas fired power station in the Hunter Valley to increase its dispatchable generating capacity in New South Wales. The Proposal will be able to supply electricity to the grid at short notice during periods of high electricity demand including during low supply periods from intermittent renewable sources or during supply outages at other base load power stations.

The power station is proposed to comprise two heavy-duty Open Cycle Gas Turbines (OCGT). At this stage the preferred gas turbine technology for the Proposal is an Industrial frame 'F Class' unit, however the final framing size of the gas turbine will be confirmed during the detailed design and tender process. The power station is expected to have a nominal total electrical output of about 750 MW at standard reference conditions at the Proposal Site, but this will be dependent on the ultimate gas turbine selected. The choice of the eventual gas turbine will be based on a range of environmental, engineering and economic factors that will be considered as the power station design advances.

The gas turbines are expected to operate on natural gas fuel for the majority of the time in operation, however the turbines will be capable of operating on diesel (or diesel fuel) as necessary and this functionality will be incorporated into the Proposal. Operation on diesel fuel is considered a 'back-up' function in the case that gas supply to the Proposal Site is not available.

There is the potential for commissioning of the first gas turbine earlier than the second, and a short period of operating on diesel fuel only, following commissioning. This period might be for approximately six months, and is dependent upon the construction schedule of the connecting gas lateral, which will potentially follow the power station construction. It is noted that operation on diesel would be as a peaking station, with the overall hours of operation expected to be very low, in the order of two per cent capacity factor during the six month period. Following this initial period, the power station would operate as dual fuel.

The Proposal has been designed with a capacity factor (the proportion of available hours in a year the power station is expected to operate) of up to 10 per cent. However, this is dependent upon market conditions and the actual plant operation capacity factor is likely to be lower than this.

Based on this capacity factor the projected annual gas consumption for the Proposal would be in the order of 0.5 to 1.0 petajoules/year.

The major supporting infrastructure required, which is part of the Proposal, will be a new 132 kV electrical switchyard (developed by Snowy Hydro). Potable water, wastewater, access roads and stormwater connections will be required, and will be provided (see Section 2.1.1) to the Proposal Site boundary. Temporary power and other services will also be required during the construction phase of the Proposal.

The power station would have a capital investment value of approximately $610 million and is anticipated to be operational by the end of calendar year 2023.

The main elements of the Proposal are as follows:

- Large industrial frame gas turbines in Open Cycle configuration as described above;
- The connecting electrical switchyard will operate at 132 kV, with the exact arrangement yet to be determined. The generators' step-up transformers are proposed to be located within the power station boundary;
- Storage tanks and other water management infrastructure;
- Fire water storage and firefighting equipment such as hydrants and pumps;
- Maintenance laydown areas;

- Diesel fuel storage tank(s) and truck unloading facilities;
- Site access roads and car parking; and
- Office/administration, amenities, workshop/storage areas.

The power station would be monitored and controlled from Snowy Hydro's Control Centre in Cooma, NSW, with local control of the power station able to be taken as required. Approximately 10 local staff will be in attendance during business hours and respond to call-outs as required.

The minimum expected design life for the mechanical and electrical components will be 30 years, while for civil and structural components it will be 50 years.

## 3.2 Gas turbine technology

Electricity will be generated by gas turbines through the combustion of natural gas and/or diesel fuel within the turbines. The gas turbine units consist of a compressor, combustion chamber, turbine and electricity generator. Air is compressed to a high pressure before being admitted into the combustion chamber. Fuel (natural gas or diesel as required) is injected into the combustion chamber where combustion occurs at high temperatures and the gases expand. The resulting mixture of pressurised hot gas is admitted into the turbine causing the turbine and its rotor to turn the generator and thus generating power. The hot exhaust gas is vented directly to the atmosphere through an exhaust stack (the gas temperature could be in the order of 600°C). Refer to Figure 3-1 for a simple schematic of an OCGT.

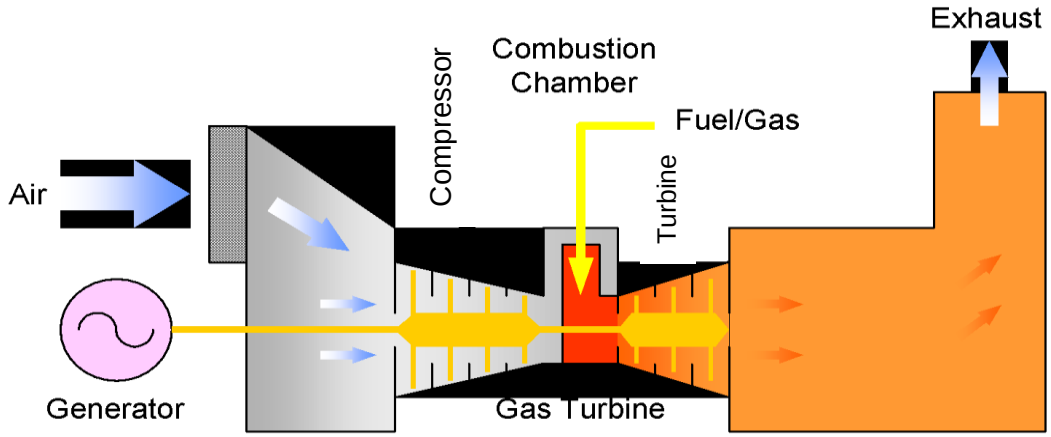


Figure 3-1: Open Cycle Gas Turbine - Schematic diagram

## 3.3 Proposed equipment

The Proposal would utilise heavy-duty OCGTs (known as "industrial" frame as opposed to "aero-derivative"). For this technology there are multiple suppliers and products available on the market. A tender and evaluation process to choose a preferred gas turbine manufacturer will consider several factors, including:

- Performance characteristics such as thermal efficiency and output at different ambient conditions and loading, firing gas and/or diesel;
- Operational characteristics such as start-up times and operational flexibility, usage rates of consumables such as water and oil and catalysts and auxiliary power consumption when off-line and in service;
- Environmental factors such as air emissions, noise and water use;
- Compliance with the applicable legislation, codes and standards; and
- Capital, operating and maintenance costs.

## 3.4 Ancillary facilities

The power station will ultimately also require supporting ancillary facilities in order to operate as intended. Some of these key ancillary facilities include:

- Natural gas receiving station yard (outside of the scope of this proposal; to be developed and assessed by others as part of the gas lateral project. See Section 3.5);
- Generator step-up transformers, generator circuit breakers and switchyard infrastructure including either underground cable or overhead line support structures;
- Water storage tanks (potable and demineralised), pumps, demineralised water plant, etc;
- Diesel fuel storage tank(s) and forwarding pumps;
- Diesel tanker truck unloading facilities;
- Trade waste (water) collection and treatment facilities;
- Water storage tanks and ponds;
- Truck loading/unloading facilities;
- Liquid fuel storage tanks;
- Emergency diesel generator(s) with associated internal fuel storage;
- Closed circuit cooling systems for small on-site heat exchangers;
- Firefighting system including water storage;
- Control room;
- Office and amenities facilities;
- Local electrical switch/control rooms;
- Workshop and warehouse;
- Communication systems;
- Occupational health and safety systems including an emergency warning and evacuation system;
- Concrete foundations, bitumen roadways, concrete pads in liquid fuel unloading station and gas turbine or engine unit maintenance areas;
- Concrete bunded areas with drains for liquid fuel tanks, liquid chemicals store, oil filled transformers and other facilities where such liquids could leak;
- Security fence, security lighting, stack aviation warning lights (if required) and surveillance system;
- Landscaped areas and staff parking areas; and
- A level construction and laydown area.

## 3.5 Gas pipeline and gas receiving station

The necessary infrastructure required for the turbines to operate on natural gas fuel is a new gas lateral pipeline and a gas receiving station. The lateral and the gas receiving station are to be developed by a third party, and while included in the CSSI declaration for this Project, will be subject to a separate planning application. These two items therefore do not form part of the Proposal under this planning application. A brief description of the lateral under development is provided below for context.

Natural gas fuel will be supplied to the proposed power station from the existing eastern Australia gas transmission network and the many other facilities that feed into it. The connection point will be into the

existing Jemena JGN North Trunk gas transmission pipeline between Sydney and Newcastle with the tie in point to be located in the Newcastle area. The likely length of a gas lateral pipeline would be in the range between 15 and 20 km, between the Proposal Site and a suitable take-off point on the JGN North Trunk. The pipeline proponent will be responsible for obtaining all regulatory and planning approvals for the pipeline, and for the gas receiving station, which would be located at the Proposal Site.

The preferred route will be determined separately as the Proposal design progresses and will be selected based on engineering, environmental and land access constraints and opportunities. Once the pipeline route is chosen, the pipeline proponent will, as necessary, enter into negotiations for a pipeline easement to the Proposal Site. The length and diameter of the pipeline will be dependent on the route selected and whether the pipeline is used to store gas. However, an easement of approximately 20-30 metres would be expected for the underground gas pipeline (metering and gas receival stations would be required above ground).

## 3.6 Electricity transmission

The power station will connect into the NEM via a new 132 kV switchyard and three existing Ausgrid operated 132 kV transmission lines. The transmission lines are currently operational and connected into the existing Hydro Aluminium switchyard, which would be decommissioned and demolished prior to construction of the power station.

The new electrical switchyard will transfer the electricity produced at the power station to the regional electricity transmission and distribution system.

## 3.7 Electrical switchyard

The proposed location of the new 132 kV electrical switchyard is shown in Figure 2.2. The final orientation of the switchyard would be confirmed during the detailed design process however is expected to be within the Proposal Site boundary as shown in Figure 2.2. The electrical switchyard forms part of the Proposal and will be assessed in the EIS.

## 3.8 Water and wastewater

There is currently an existing Hunter Water potable water supply to the decommissioned aluminium smelter, and it is planned that the Proposal will be connected to this water supply source. The developer for the Industrial Estate will provide a suitable water connection to the power station boundary as part of the industrial development. The sizing of the line will be determined as the design progresses. Water storage tanks will be provided within the power station boundary to assist with the power station peak water demands. Potable water will be also used for evaporative cooling of air into the gas turbines and other minor station water demands such as fire water (a rare occurrence), gas turbine compressor washing, amenities, etc.

Groundwater is not proposed to be used during the construction or operation of the power station.

A demineralised water plant will be included within the Proposal boundary which will service the power station. Demineralised water is required for fogging (cooling of the air to improve the gas turbine performance mainly during high ambient temperature conditions or when additional power augmentation is required) and for water injection when operating the plant on diesel fuel (for NOx emission control).

Evaporative cooling and fogging will most likely only be used on hot days when the plant is operating on gas fuel. It is anticipated that only evaporative cooling and water injection will be used on hot days when operating on diesel fuel. However, these details will be confirmed during the detailed design phase.

Once the water is injected into the gas turbine combustion chamber, it will evaporate and be discharged to the atmosphere via the exhaust stack.

The Industrial Estate developer will prepare an overall wastewater plan for the entire Industrial Estate which is anticipated to connect into the existing Hunter Water system as part of the industrial development of the

Proposal Site. The power station wastewater (trade waste and municipal sewage) will ultimately utilise this connection. The connection point and size will be determined as the Proposal design progresses.

Trade waste discharge from the Proposal Site will consist of mainly demineralised water plant regeneration waste and any discharge from on-site oily water separators. Trade waste will be discharged after any required on-site treatment and will need to comply with trade waste requirements imposed by Hunter Water. Potential treatment options are still being considered but could include treatment in a neutralising tank or pit before being discharged to the sewer as trade waste under a trade waste agreement, collected by a liquid waste truck or discharged directly to the environment as irrigation if the water is treated to an appropriate standard.

## 3.9 Vehicular access

The Industrial Estate developer will provide sufficient vehicle access to the Proposal Site to allow construction and operation of the power station. The roads will be sufficient for oversized trucks with heavy loads during the construction, operation and closure phases of the Proposal.

It is envisaged that during construction heavy loads will be transported via the Hunter Expressway onto Hart Road leading into the Proposal Site. Temporary management of road furniture and minor road upgrades may be required to enable the transport of the largest and heaviest loads. Major upgrades to road infrastructure are currently not expected, however, a more detailed assessment will be undertaken for the planning application.

Parking for staff will be provided on-site.

## 3.10 Construction activities and construction staging

The main elements of the Proposal are outlined in Section 3.1. The power station is anticipated to be in operation by the end of calendar year 2023, subject to Snowy Hydro securing all the necessary approvals. At a high level, the key construction activities for the Proposal include:

- Installation and maintenance of environmental controls;
- Clearing of vegetation at the switchyard site;
- Earthworks to prepare the Proposal Site and construction areas;
- Installation of foundations and underground services;
- Construction and upgrading of internal access roads;
- Installation of above ground civil, mechanical and electrical plant and equipment within the Proposal Site;
- Construction of a new electrical switchyard and connection to the Ausgrid network;
- Connection to gas receiving station (developed by others);
- Commissioning and testing; and
- Removal of construction equipment and establishment of site landscaping.

All pre-construction activities including design, field surveys, environmental studies and consents, approval of associated management plans and community and stakeholder engagement are intended to be completed by December 2021. This timeframe is strongly dependent on the approvals timeframe and may be subject to change. The construction contractor's notice to proceed is anticipated to allow construction and commissioning activities to commence in approximately Q1 of 2022 and commercial operation is planned between July 2023 and December 2023.

# 4. Strategic justification and need

## 4.1 Project need and objectives

With social and economic considerations driving development, supported by the continuing energy affordability of renewables, modern solutions are being investigated to address supply security.

Australia's commitment to affordable, reliable energy and environmental aspirations is compounded by the rapidly ageing existing thermal generation infrastructure struggling to meet peak requirements. As a transitional technology, gas is not only the cleanest of the carbon-based energies, but the fastest to construct to meet the approaching supply shortfall as 10,000 MW is expected to be retired by 2040.

Australia has an abundance of world-class talent with gas project experience. As an Australian owned and operated company, Snowy Hydro's potential development offers employment and community opportunities during construction and operation.

To provide a reliable supply, intermittent energy, such as wind and solar, needs to be firmed. The industry estimates two megawatts of renewable energy requires around one megawatt of dispatchable generation. In the longer term, dispatchable generation could come from a range of sources.

By 2026, Snowy 2.0 will be operational providing an additional 2,000 MW of capacity. The cost of batteries is falling, making storage an increasingly commercial option.

Neither will meet the shortfall in generation accompanying Liddell's closure in 2023.

The solution lies with the construction and operation of a Kurri Kurri gas fired power station supplying 750 MW that would enable firming of 1000 - 1800 MW of renewables.

The Proposal's purpose and objective is to provide dispatchable capacity and other services to the NEM to be used by AEMO to meet the requirements of the NEM, and supplement Snowy Hydro's generation portfolio with dispatchable capacity when the needs of electricity consumers are highest.

Importantly, gas fired generation capacity provides firming of renewable generation projects' intermittent electricity supply to the NEM. Without associated dispatchable and firming generation, renewable generation projects would not be viable.

Electricity systems must be balanced with respect to supply (electricity generation) meeting demand (electricity consumption) continuously (virtually every second) or the system will become unstable and fail, causing widespread "blackouts" and a high economic cost to electricity users. AEMO undertakes the balancing process in real-time by dispatching generation (and sometimes controllable loads) to match the varying customer loads. To avoid involuntary load shedding, sufficient generation capacity must always be available. The National Electricity Objective incorporated within the National Electricity Law[4] is:

> *"The objective of this Law is to promote efficient investment in, and efficient operation and use of, electricity services for the long-term interests of consumers of electricity with respect to—*
>
> *(a) price, quality, safety, reliability and security of supply of electricity; and*
>
> *(b) the reliability, safety and security of the national electricity system."*

The rules require "*a maximum expected unserved energy (USE) in a region of 0.002 per cent of the total energy demanded in that region for a given financial year.*"[5] The 0.002% standard was set at the start of the NEM in

[4] Section 7 of the National Electricity Law, under "NATIONAL ELECTRICITY (SOUTH AUSTRALIA) ACT 1996 – SCHEDULE-NATIONAL ELECTRICITY LAW"

[5] 5*.3.9.3C(a) of the National Electricity Rules*

1998 and tightened in 2010. At the 20 March 2020 general meeting, the COAG Energy Council considered advice from the Energy Security Board (ESB) aimed at improving the reliability (resource adequacy) of the electricity system. The Council agreed to implement interim measures to deliver further reliability by establishing an out-of-market capacity reserve and amending triggering arrangements for the Retailer Reliability Obligation (RRO). The measures will be triggered to keep unserved energy to no more than 0.0006% in any region in any year[6].

The Reliability Panel (an independent advisory panel forming part of the Australian Electricity Markets Commission's institutional arrangements) outlined the shift to distributed generation from an ageing thermal fleet, with positive and negative impacts on reliability, cost and supply.[7]

Until sufficient energy storage systems can meet the balancing of electricity generation and consumption, other technologies would need to provide generation capacity. For low-capacity factor plants (where operation is required to meet occasional shortfalls in generation capacity), open cycle gas turbines fuelled by natural gas represent an economic and feasible technology. Back-up fuel such as diesel provides added security when natural gas is unavailable or constrained. Alternative fuels, such as renewable energy derived hydrogen or biofuel, may become cost-effective and available in the future. Gas turbine suppliers are investigating using this technology.

AGL has announced that the large (approximately 2000 MW) coal-fired power station at Liddell, NSW will be retired in stages, with one unit to shut down in April 2022 and the remaining three in April 2023[8].

The *Report of the Liddell Taskforce* (2020)[9] found that the closure of the Liddell power station by 2023 would withdraw around 13 per cent of NSW's electricity supply. Modelling indicated, depending on the market's response to deliver new capacity, that this could lead to a NSW wholesale price increase from the low $60s per MWh in 2022 to between $75 and $80 per MWh in 2023-24. Maintaining price, reliability and security outcomes could be achieved through a combination of options, including new gas generation.

Dispatchable electricity and other network services are increasingly important to the stability of the NEM as intermittent renewable energy enters the market. Gas fired generation is a proven technology potentially operational by late 2023. In peaking capacity, emissions are low compared to coal and given its fast start capacity, gas fired generation can be used to support renewables. The proposed gas fired power station at Kurri Kurri would provide additional dispatchable electricity into the NEM following the planned retirement of Liddell and the increased penetration of intermittent renewables generation.

## 4.2 Strategic policy context

### 4.2.1 Snowy Hydro policies

#### Sustainability

Snowy Hydro has built its core business on sustainable generation of electricity, from on-demand hydroelectricity of the Snowy Scheme (and Snowy 2.0, currently under development), to more recent partnerships with wind and solar companies, and gas and diesel generation portfolio. Snowy Hydro has made

[6] https://www.aemc.gov.au/energy-system/electricity/electricity-system/reliability

[7] Reliability Panel AEMC "Information paper – the Reliability Standard" 12 March 2020 at https://www.aemc.gov.au/sites/default/files/2020-03/Reliability%20Standard%20-%20Information%20Paper.pdf

[8] https://www.agl.com.au/about-agl/how-we-source-energy/agl-macquarie (Accessed 23.9.2020)

[9] Report of the Liddell Taskforce, Commonwealth of Australia and NSW Government, 2020

recent commitments to buy over 1,000 MW of new renewable energy through long term contracts in industrial-scale wind and solar energy generation.

Snowy Hydro recognises that about three-quarters of Australia's existing thermal generation fleet is currently beyond its original engineering design life, and as such there is not just a need, but an opportunity to modernise and decarbonise the industry. Snowy Hydro is already playing a leading role in this transition.

This Proposal supports the transition to a modern, sustainable and low-carbon electricity generation sector. In the Hunter Region, the planning process for retirement of the Liddell Power Station has commenced, supported by the Australian Government as discussed in Section 4.2.3. Renewable energy technologies are being invested in by Snowy Hydro and other industry participants.

Snowy Hydro has identified a need for OCGT generation as a viable, reliable source of dispatchable energy that can assist with firming of energy from renewable sources such as solar and wind. The Proposal is therefore considered to be a necessary step in the transition to a low carbon economy. The Proposal is not expected to have a material impact on national greenhouse gas (GHG) emissions considering the low expected capacity factor for the power station.

### 4.2.2 The National Energy Market

Almost every electricity consumer in NSW receives electricity from the NEM (unless they have an off-grid supply), which is an interconnected electricity system that serves the needs of customers in New South Wales, Queensland, Victoria, South Australia, Tasmania and the Australian Capital Territory (ACT).

The NEM is operated by AEMO. AEMO evaluates the expected supply and demand balance of electricity in the NEM and publishes advice to stakeholders in:

- An Integrated System Plan (ISP), most recently published in July 2020[10]; and
- An Electricity Statement of Opportunities (ESOO), most recently published in August 2020[11].

A key component of AEMO's function is to compare the supply-demand balance over its outlook period against both a Reliability Standard and a Reliability Measure (which is presently an Interim Reliability Measure (IRM)). As described by AEMO[3]:

> *"The ESOO provides technical and market data that informs the decision-making processes of market participants, new investors, and jurisdictional bodies as they assess opportunities in the National Electricity Market (NEM) over a 10-year outlook period.*
>
> *The NEM ESOO incorporates a reliability assessment against the reliability standard defined in the National Electricity Rules (NER) clause 3.9.3C and AEMO's Reliability Forecast under the Retailer Reliability Obligations (RRO).*
>
> *The Reliability Standard Implementation Guidelines describe how AEMO implements the reliability standard across its reliability processes, including the approach and assumptions in relation to the ESOO."*
>
> ***The Reliability Forecast***
>
> *The implementation of the Retailer Reliability Obligation (RRO) was agreed at the Council of Australian Governments (COAG) Energy Council meeting on 26 October 2018. The necessary legislative and National Electricity Rules (NER) changes took effect on 1 July 2019.*

[10] https://www.aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp/2020-integrated-system-plan-isp

[11] https://www.aemo.com.au/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/forecasting-and-reliability/nem-electricity-statement-of-opportunities-esoo

*A key component of the RRO is the calculation of a five-year reliability forecast and five-year indicative reliability forecast for each NEM region, to be published in the ESOO. If the reliability forecast identifies a material reliability gap three years ahead, AEMO will submit a reliability instrument request to the Australian Energy Regulator (AER).*

*The Interim Reliability Forecast Guidelines will apply for the reliability forecast produced as part of the 2020 ESOO. Final Reliability Forecast Guidelines are to be published by 28 February 2021 as per NER clause 11.116.4(c)."*

The AEMO's summary of the reliability assessment over the current 10-year outlook period is shown below in Table 4-1.

As indicated by Table 4-1, in NSW there is a need for 1,480 MW of generation this decade to meet the reliability standard and to meet the more stringent IRM capacity which is expected to be called for from 2023-24. This corresponds to the announced timing for the closure of the Liddell Power Station, which has a capacity of approximately 2,000 MW.

The Proposal as planned would assist in maintaining the supply-demand balance and in satisfying the reliability standard and the IRM.

Table 4-1 Forecast reliability gap (in MW) to meet the reliability standard and IRM (Source: AEMO ESOO)

| | Gap to meet reliability standard | | | Gap to meet IRM | | |
|---|---|---|---|---|---|---|
| | Victoria | South Australia | New South Wales | Victoria | South Australia | New South Wales |
| 2020-21 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2021-22 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2022-23 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2023-24 | 0 | 0 | 0 | 0 | 0 | 154 |
| 2024-25 | 0 | 0 | 0 | 0 | 0 | 305 |
| 2025-26 | 0 | 0 | 0 | 0 | 0 | 525 |
| 2026-27 | 0 | 0 | 0 | 0 | 0 | 472 |
| 2027-28 | 0 | 0 | 0 | 0 | 0 | 895 |
| 2028-29 | 0 | 0 | 0 | 0 | 0 | 1,001 |
| 2029-30 | 0 | 0 | 1,480 | 166 | 148 | 2,045 |

*Note: The forecast reliability gaps identified in this table apply to particular periods within the financial year stated.*

The Integrated System Plan (ISP) has also been prepared by AEMO from 2018. It has since guided governments, industry and consumers on investments needed for an affordable, secure and reliable energy future, while meeting prescribed emissions trajectories, and triggered the processes for actionable ISP projects.

The ISP is a whole-of-system plan that provides an integrated roadmap for the efficient development of the NEM over the next 20 years and beyond. Its primary objective is to maximise value to end consumers by designing the

lowest cost, secure and reliable energy system capable of meeting any emissions trajectory determined by policy makers at an acceptable level of risk.

The ISP identifies investment choices and recommends essential actions to optimise consumer benefits as Australia experiences what is acknowledged to be the world's fastest energy transition. That is, it aims to minimise costs and the risk of events that can adversely impact future power costs and consumer prices, while also maintaining the reliability and security of the power system.

The ISP has a longer time-horizon than the ESOO. The ISP identifies the following:

> *"The ISP modelling confirms that the least-cost and least-regret transition of the NEM is from a system dominated by centralised coal-fired generation to a highly diverse portfolio of behind-the-meter and grid-scale renewable energy resources that are supported by dispatchable firming resources and enhanced grid and service capabilities, to ensure the power system remains physically secure.*
>
> *ISP development opportunities are projects that do not involve a transmission asset or non-network option and include distribution assets, generation, storage projects, or demand side developments that are consistent with the efficient development of the power system.*
>
> *While the ISP Rules pave the way for actionable transmission projects through the Regulatory Investment Test for Transmission (RIT-T) process, there is no similar regulatory mandate for other resources, such as generation and storage. Rather the ISP offers a signal to inform the decisions of private developers. Market design is therefore crucial for both regulated and private investment to deliver the least cost outcome for consumers.*
>
> *By 2040 the ISP development opportunities are those which support the ISP findings that:*
>
> …
>
> 3. *6-19 GW of new dispatchable resources are needed in support. To firm up the inherently variable nature of distributed and large-scale renewable generation, we will need new flexible, dispatchable resources: utility-scale pumped hydro, large-scale battery energy storage systems, distributed batteries, VPP and other demand side participation (DSP). New flexible gas generators could play a greater role if gas prices remained low at $4 to $6 per GJ over the outlook period. To secure the benefits of all dispatchable resources, market reforms currently being pursued through the Energy Security Board's post 2025 market design process should be continued at pace, otherwise necessary resources may not be delivered on time and the system will have to rely on other mechanisms, such as transmission investment. Market design needs to reward the increasing value of flexibility and dispatchability in complementing and firming variable generation, and in providing the other system security services currently provided by the existing generators, which are scheduled to retire."*

In line with the ISP, this Proposal provides dispatchable generation, being a "flexible gas generator" to assist with "firming up" the intermittent wind and solar generation that is expected to replace dispatchable coal fired generation as the coal plants retire in the future.

The Proposal has been designed with a capacity factor (the proportion of available hours in a year the power station is expected to operate) of up to 10 per cent.

Projected annual gas consumption from the Proposal is quite low (in the order of 0.5-1.0 petajoules/year). Currently NSW gas demand (in the order of 140 PJ) is being supplied via a combination of the Moomba to Sydney pipeline (with an annual capacity of 150-170 PJ) and the Eastern Gas pipeline (with an annual capacity of 130 PJ). There are also three new supply sources of gas being proposed in NSW, being two LNG import facilities (each with annual capacities of 10 PJ) and Santos' Narrabri project (in the order of 70 PJ). Snowy Hydro's Kurri Kurri development, while providing benefits associated with managing peaking electricity prices and helping firm intermittent renewables projects, would be generating only minor incremental gas demand in NSW, and is therefore unlikely to have a material impact on net gas demand or gas prices.

### 4.2.3 Australian energy policy

On 15 September 2020, the Commonwealth Minister for Energy and Emissions Reduction and the Prime Minister issued a joint media release stating that its aim is: "Ensuring affordable, reliable and secure electricity supply". This release supports the development of the Proposal by Snowy Hydro in the event that other electricity industry participants do not step in and provide the new dispatchable energy to replace the Liddell power station in the required time frame.

### 4.2.4 NSW energy policy

The NSW Government released its electricity strategy, "Affordable, reliable power for NSW" on 22 November 2019. In announcing the strategy, the NSW Energy Minister highlighted the need for low-cost alternative sources of energy to replace the generating capacity that will be lost as existing assets are retired. The Minister also promoted a focus on reliability, and the need to ensure that the benefits of renewable energy sources are realised without sacrificing reliability of the NEM.

Within the strategy it is noted that:

> *"Variable renewable energy needs to be complemented by firm and flexible power. Hydroelectricity meets these requirements by generating and storing electricity at scale. Standard hydro power generates electricity by releasing water from an elevated reservoir but does not involve pumping that water up again. Standard hydro is reliant on sufficient water supplies in the upper reservoir, as there is no capability to reuse this water. Pumped hydro involves pumping water into an elevated reservoir and releasing it to generate electricity. NSW has two pumped hydro projects – Shoalhaven (240 MW) and Tumut 3 (1,800 MW) – and numerous smaller, standard hydro projects.*
>
> *Gas fired power stations generate electricity on demand with about half the level of emissions from coal but, given the current high input costs of gas, are typically only operated during periods of peak demand or when solar and wind are not generating. Gas generation can ramp up quickly, allowing it to dispatch quickly and currently is used to generate about 5 per cent of NSW's annual electricity.*
>
> *Batteries, as a form of electrical storage, also provide multiple grid services such as frequency regulation. The cost of batteries has fallen in recent years and is expected to continue to trend downwards making batteries a more feasible, commercial firming option for wind and solar farms."*

And:

> *"The NSW Government's Electricity Strategy will:*
>
> 1. *improve the efficiency and competitiveness of the NSW electricity market by reducing risk, cost, Government caused delays and by encouraging investment in new price-reducing generation and energy saving technology;*
> 2. *prompt Government to act if there is a forecast breach of the EST which private sector projects are unlikely to address. This should be done in a way that minimises costs to consumers and taxpayers and does not give rise to moral hazard risk; and*
> 3. *ensure that there are appropriate powers available for Government to analyse and respond to electricity supply emergencies, if they arise"* (NSW Government, *NSW Electricity Strategy*, November 2019)."

This Proposal is consistent with the released NSW Energy Strategy as it builds essential efficiency and reliability into the network, which will be needed during the transition period as existing assets are retired. Importantly, the Proposal will build this efficiency and reliability without generating any upward pressure on wholesale gas prices, and therefore without causing any increase to retail energy prices. Together, gas peaking and renewable energy generation are part of a group of technologies that will provide emissions reduction while meeting the necessary rapid start up, generation capacity, plant reliability and cost effectiveness necessary to meet NSW electricity demand.

### 4.2.5 Hunter Regional Plan 2036

The Hunter Regional Plan 2036 (Department of Planning and Environment, 2016) is a 20-year blueprint for the future of the Hunter region. 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. Relevant to the Project is the direction to 'diversify and grow the energy sector' by among other things, promoting 'new opportunities arising from the closure of coal-fired power stations that enable long term sustainable economic and employment growth in the region'.

The Hunter Regional Plan 2036 includes a goal to diversify energy supply. Specifically, the *Hunter Regional Plan 2036-Implementation Plan 2016-2018* includes Direction 12 to diversify and grow the energy sector by promoting new opportunities arising from the closure of coal fired power stations that enable long term sustainable economic and employment growth in the region. With the imminent closure of Liddell Power Station, significant local energy generation will be withdrawn from the Hunter Region. The Proposal is one of Snowy Hydro's responses aimed at offsetting this loss of generating capacity in the region by providing up to 750 MW of additional generation capacity.

The Hunter Regional Plan recognises the role of the Hunter region as the predominant location for the State's power generation. The Proposal is consistent with this Plan. Additionally, gas fired generation aligns with the objectives of the Plan by further diversifying the energy sector in the Hunter Valley.

### 4.2.6 Cessnock City Council

The *Cessnock Community Strategic Plan 2027* (Cessnock City Council, 2017) outlines the community's main priorities and vision for the future. The Strategic Plan outlines a vision for the City of Cessnock as 'thriving, attractive and welcoming'. Although the Plan acknowledges that coal mining and mining support services still play an important role in the region's economy, it also recognises the gradual shift away from a reliance on coal mining as a foundation of the region's economic base, and this is reflected in the main economic and environmental objectives under the Plan.

The Strategic Plan's objectives for 'a prosperous and sustainable economy' include:

- Encouraging more industry to create much needed jobs;
- Supporting businesses to grow and diversify; and
- Diversifying the economy – "we need more than wine and tourism".

During the Plan's preparation, the Cessnock community also voiced their concerns about the natural environment, stressing the importance of a healthy and sustainable environment, the need for improved monitoring of pollution levels by industry, and investment in alternative energy sources. The community also expressed concern at the impact of the reduction in coal mining employment. Job creation and security were identified in the Strategic Plan as key economic issues for the City, with increased local employment identified as important by local residents.

The Proposal would support both direct and indirect job opportunities by the creation of jobs, generating up to 250 jobs during construction and around 10 permanent positions during operation with increased employment during maintenance events. It would also support economic diversification and contribute to offsetting the reduction in coal mining employment. The Proposal also represents an investment in alternative energy sources that is consistent with the Australian and NSW governments' energy policies as outlined in Sections 4.2.3 and 4.2.4.

# 5. Statutory Framework

## 5.1 Critical State Significant Infrastructure

The Proposal is declared by the Minister under section 5.13 of the EP&A Act to be critical state significant infrastructure.

Under section 5.13 of the EP&A Act, any development that is SSI may also be declared to be critical SSI if, in the opinion of the Minister, it is considered to be "essential for the State for economic, environmental or social reasons."

Snowy Hydro wrote to the Minister for Planning and Public Spaces on 26 October 2020, requesting that the Proposal be declared to be CSSI, and setting out the reasons why the Proposal is considered to be "essential for the State for economic, environmental or social reasons." The Minister subsequently declared the Proposal (including the gas lateral pipeline) to be CSSI on 16 December 2020. Therefore, the planning approval pathway for the Proposal will be as set out under Subdivision 2 of Division 5.2 of Part 5 of the EP&A Act, as outlined in detail below.

## 5.2 Approval under the Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) establishes the planning and approvals process in NSW. The EP&A Act provides for the making of Environmental Planning Instruments (EPI), including local environmental plans (LEP) and State environmental planning policies (SEPP), which set out requirements for particular localities and/or particular types of development. The applicable EPIs and the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) made under the EP&A Act, collectively determine the relevant planning approval pathway and the associated environmental assessment requirements for proposed development activities.

The environmental assessment pathway under the EP&A Act is generally dependent on the location, purpose and proponent (private or NSW public authority). The scale of the development, including level of impact and/or capital investment value, will further refine the assessment process. Development can be exempt (does not require any approval or assessment) or can require various forms of approvals and assessment under Division 4.7 (Part 4) or Division 5.1 or 5.2 (Part 5) of the EP&A Act.

Part 4 of the EP&A Act applies to development that is permissible with development consent. Depending on the location, size and capital costs the consent authority for a development subject to Part 4 can be the local council (generally referred to as local development), or the Independent Planning Commission, or the Minister for Planning and Public Spaces (Minister) for State significant development (SSD) or State significant infrastructure (SSI).

Part 5, Division 5.2 of the EP&A Act applies to State Significant Infrastructure. Where the Minister for Planning forms the opinion that a development is essential for the State on economic, environmental or social grounds, he or she may declare it to be both SSI and CSSI in which case Division 5.2 of the Act applies.

The planning pathway is discussed in more detail in Section 5.3 with reference to the Proposal.

## 5.3 NSW Planning framework

### 5.3.1 CSSI planning approval process

An environmental impact statement (EIS) will be prepared in respect of the Proposal and to address the Secretary's environmental assessment requirements (SEARs). The EIS will be placed on public exhibition during which time any person may make a written submission. Issues raised in submissions will then be considered and referred to Snowy Hydro as the proponent, and if required by the Secretary, addressed in a Response to Submissions and/or Preferred Infrastructure Report. Once these reports have been prepared and considered the

Secretary will prepare an assessment report for the Minister. The Minister will then consider the report and determine whether the Proposal should be approved and the conditions that should be attached to the approval.

### 5.3.2 Other relevant clauses of the EP&A Act

Division 5.2 provides that certain authorisations are either not required, cannot be refused or must be consistent with the approved CSSI. These exemptions are identified in Table 5-1.

Table 5-1 EP&A Act mandatory considerations - Critical State Significant Infrastructure

| Statutory Reference Section | Application to Proposal |
|---|---|
| 5.23(1) and 5.23(3) Approvals or legislation that do not apply to CSSI | The following directions, orders or notices cannot be made or given so as to prevent or interfere with the carrying out of approved critical State significant infrastructure –<br>▪ A permit under section 201, 205 or 219 of the *Fisheries Management Act 1994*,<br>▪ An approval under Part 4, or an excavation permit under section 139 of the *Heritage Act 1977*,<br>▪ An Aboriginal heritage impact permit under section 90 of the *National Parks and Wildlife Act 1974*,<br>▪ A bush fire safety authority under section 100B of the *Rural Fires Act 1997*,<br>▪ A water use approval under section 89, a water management work approval under section 90 or an activity approval (other than an aquifer interference approval) under section 91 of the *Water Management Act 2000*,<br>▪ An interim protection order (within the meaning of the *National Parks and Wildlife Act 1974*),<br>▪ An order under Division 1 (Stop work orders) of Part 6A of the *National Parks and Wildlife Act 1974* or Division 7 (Stop work orders) of Part 7A of the *Fisheries Management Act 1994*,<br>▪ A remediation direction under Division 3 (Remediation directions) of Part 6A of the *National Parks and Wildlife Act 1974*,<br>▪ An order or direction under Part 11 (Regulatory compliance mechanisms) of the *Biodiversity Conservation Act 2016*,<br>▪ An environment protection notice under Chapter 4 of the *Protection of the Environment Operations Act 1997*,<br>▪ An order under section 124 of the *Local Government Act 1993*. |
| 5.24 Approvals or legislation that must be applied consistently to CSSI | An authorisation of the following kind cannot be refused if it is necessary for carrying out approved State significant infrastructure (or critical SSI) and is to be substantially consistent with the approval under this Division – (as relevant to the Proposal) –<br>▪ An approval under section 15 of the *Mine Subsidence Compensation Act 1961*,<br>▪ An environment protection licence under Chapter 3 of the *Protection of the Environment Operations Act 1997* (for any of the purposes referred to in section 43 of that Act),<br>▪ A consent under section 138 of the *Roads Act 1993*,<br>▪ A licence under the *Pipelines Act 1967*. |

| | |
|---|---|
| | From this list, it is considered likely that the Proposal would require a Roads Act s.138 approval; a Pipeline Licence (to be obtained by others), and an Environment Protection Licence (EPL) under the POEO Act. |

### 5.3.3 Development purpose

**Electricity generating works**

Development purpose is generally identified through reference to the definitions provided in the *Standard Instrument (Local Environmental Plans) Order 2006* (the Standard Instrument). The term "electricity generating works" is defined by the *Standard Instrument* as:

> "*a building or place used for the purpose of —*
>
> *(a) making or generating electricity, or*
>
> *(b) electricity storage*."

As described in Section 3, the Proposal comprises construction of two heavy-duty Open Cycle Gas Turbines (OCGT), and a new 132 kV electrical switchyard. The power station is anticipated to be operational by the end of 2023, and is being designed with a minimum expected design life of 30 years for the mechanical and electrical components, and 50 years for the civil and structural components.

If Snowy Hydro proceeds with the Proposal, a gas lateral connection to the Proposal Site and gas receiving station will be designed, constructed and operated by a third party. The pipeline and gas receiving station will therefore be subject to a separate planning approval, as well as a licence under the *Pipelines Act 1967*. The pipeline proponent will be responsible for obtaining all regulatory and planning approvals for the pipeline and the gas receiving station.

The Minister's declaration of the Proposal to be critical State significant infrastructure (CSSI) includes both the electricity generating works and the gas lateral pipeline. For the purposes of this Scoping Report, the gas lateral pipeline to the proposed power station is outside of the Proposal boundary and does not form part of the application.

### 5.3.4 Planning instruments and permissibility

**Cessnock Local Environmental Plan 2011**

The proposed power station will be located at Loxford, within the local government area (LGA) of the City of Cessnock, as shown in Figure 2-1 and Figure 2-3. The subject land formed a part of the former Kurri Kurri aluminium smelter site and is currently zoned RU2 Rural Landscape under the *Cessnock Local Environmental Plan 2011* (Cessnock LEP). Current land zoning at the Proposal Site and surrounds is shown in Figure 2.3.

Under the Cessnock LEP, the Proposal is classified as development that would be permitted with consent in the RU2 zone. However, due to the CSSI declaration, the provisions of the Cessnock LEP do not apply directly to the Proposal. This discussion is included to provide context and identification of matters that will be considered in preparation of the EIS.

As discussed in Section 2.1.2, a proposal is currently before the NSW Department of Planning, Industry and Environment (DPIE) to rezone the former smelter site and some of the surrounding land to a combination of residential, industrial, business, rural, recreation, special purpose and environmental zones. Although (at the time of preparing this report), the proposed rezoning is yet to be determined by DPIE. This is unlikely to alter the statutory planning framework or the approvals pathway for the Proposal. If the proposed rezoning is approved, it is likely that the future zoning for the Proposal Site would better reflect the proposed use.

Notwithstanding that the proposed new gas lateral pipeline and gas receiving station are not part of the Proposal approval, a pipeline would be development that is permissible without consent, under the provisions of *State Environmental Planning Policy (Infrastructure) 2007*.

**State Environmental Planning Policy (Infrastructure) 2007**

The *State Environmental Planning Policy (Infrastructure) 2007* (ISEPP) is the primary planning instrument in NSW that sets out how local infrastructure projects, state services and utilities are approved. Under clause 34 of the ISEPP, 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 RU2 – Rural Landscape is a prescribed rural zone for the purposes of clause 34 of ISEPP. Accordingly, the Project is permissible with consent under the provisions of the ISEPP.

The provisions of the ISEPP prevail where an inconsistency arises between the ISEPP and any local, regional or State policy, with the exception of the Coastal Management SEPP (which does not apply to this proposal) and the State and Regional Development SEPP, as discussed in the following section.

**State Environmental Planning Policy (State and Regional Development) 2011**

State Environmental Planning Policy (State and Regional Development) 2011 (SRD SEPP) aims to identify development that is of regional or State significance. It allows for specific types of development (Scheduled under the SEPP) that are not permissible without development consent, to be declared as State significant development.

However, as the Proposal is declared to be critical SSI under Clause 16 of the SRD SEPP, it will require approval under Division 5.2 of the EP&A Act.

Further detail regarding the implications of a declaration of critical State significant development is provided in Section 5.3.1 and Section 5.3.2.

**State Environmental Planning Policy No. 33 – Hazardous and Offensive Development (SEPP 33)**

Under SEPP 33 developers and consent authorities are required to assess the hazards and risks associated with a proposed development before approval is given for construction and operation. A potentially hazardous industry under SEPP 33 is defined as "*development for the purposes of any industry where, if the development were to operate without employing any measures to reduce or minimise its impact the development would pose a significant risk to human health, life or property or to the biophysical environment*".

Developments that are classified as potentially hazardous under SEPP33 are required by Clause 12 to have a preliminary hazard analysis (PHA) prepared to determine the risk to people, property and the biophysical environment at the proposed location and in the presence of controls.

During preparation of the environmental impact assessment, consideration will be given to whether the Proposal is considered potentially hazardous or offensive.

**SEPP (Koala Habitat Protection) 2019**

State Environmental Planning Policy (Koala Habitat Protection) 2019 aims to encourage the conservation and management of areas of natural vegetation that provide habitat for koalas. The Koala habitat SEPP applies to all local government areas (LGAs) listed within Schedule 1, including the City of Cessnock. There is potential for the Proposal to disturb small areas of potential Koala habitat in the immediate vicinity of the Proposal Site. The implications for the preparation of the EIS have been addressed in Section 6.

**State Environmental Planning Policy No. 55 – Remediation of land**

*State Environmental Planning Policy 55 – Remediation of Land* (SEPP 55) provides for a consistent State-wide planning approach to the remediation of contaminated land. SEPP 55 aims to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment. There is the potential for contamination to be identified during the impact assessment of the Proposal and the implications have been outlined in Section 6.

## 5.4 Other relevant NSW legislation and approval requirements

### 5.4.1 Biodiversity Conservation Act 2016

Part 7 of the *Biodiversity Conservation Act 2016* (BC Act) requires that an application for CSSI be accompanied by a biodiversity development assessment report (BDAR) unless "the Planning Agency Head and the Environment Agency Head determine that the proposed development is not likely to have any significant impact on biodiversity values".

Preliminary consideration of the impact of the Proposal on biodiversity is provided in Section 6.3.1. Given the proximity of the Proposal Site to locally and regionally sensitive areas of vegetation and potential wildlife habitat, a BDAR would be prepared to accompany the environmental impact statement.

### 5.4.2 The Pipelines Act 1967

The *Pipelines Act 1967* (Pipelines Act) establishes the framework for the construction, licencing and operation of pipelines over land in NSW, but does not contain provisions for the planning and development approvals in relation to construction of pipelines. These provisions apply under the EP&A Act and its subordinate environmental planning instruments. The Pipelines Act does however provide for 'Authority to Survey' where a proponent requires access to private land in order to survey possible pipeline routes or conduct geotechnical or other testing, including taking of samples.

This Scoping Report is prepared on the assumption that any gas lateral pipeline associated with the Proposal will require a licence under the Pipelines Act, and also that the gas lateral pipeline will be designed and constructed by others. Snowy Hydro will be neither be the proponent, nor the constructor, owner or operator of the new gas lateral pipeline. Therefore, Snowy Hydro will not be required to apply for or hold a licence under the Pipelines Act in respect to this Proposal.

### 5.4.3 National Parks and Wildlife Act 1974

Under Section 86 of the NPW Act it is an offence to harm or desecrate an Aboriginal object or Aboriginal place. Under the NPW Act, harm of an object or place includes any act or omission that:

> *"(a) destroys, defaces or damages the object or place, or*
>
> *(b) in relation to an object—moves the object from the land on which it had been situated, or*
>
> *(c) is specified by the regulations, or*
>
> *(d) causes or permits the object or place to be harmed in a manner referred to in paragraph (a), (b) or (c),*
>
> *but does not include any act or omission that:*
>
> *(e) desecrates the object or place, or*
>
> *(f) is trivial or negligible, or*
>
> *(g) is excluded from this definition by the regulations."*

Clause 3A of the *National Parks and Wildlife Regulation 2019* excludes the following from the definition of harm:

> *An act carried out in accordance with the Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW as published by the Department in the Gazette on 24 September 2010 is excluded from the definition of harm an object or place in section 5 (1) of the Act.*

This assessment is intended to be carried out in accordance with this Code of Practice. Further, under Section 5.23 of the EP&A Act, an Aboriginal heritage impact permit under section 90 of the NPW Act is not required for an approved CSSI. Formal consultation under the *Aboriginal cultural heritage consultation requirements for*

*proponents 2010* (OEH, 2010) will be carried out. Further discussion regarding the proposed scope and approach for assessment of Aboriginal cultural heritage is provided in Section 6.12.

### 5.4.4 Heritage Act 1977

The Heritage Act protects the natural and historical cultural heritage in NSW. It is designed to protect both listed heritage items, such as standing structures, and potential archaeological remains or relics. Different parts of the Heritage Act deal with these different situations.

No known items of non-Aboriginal heritage are located in or around the Proposal Site. The Proposal is not expected to impact on any known heritage items.

### 5.4.5 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) is the principal legislation regulating pollution and waste management in NSW. All scheduled activities as listed in Schedule 1 of the POEO Act require an EPL. Schedule 1 (Clause 17) of the POEO Act includes:

- 'General electricity works', meaning the generation of electricity by means of electricity plant that uses any energy source other than wind or solar power, and
- 'Metropolitan electricity works (gas turbines)', meaning the generation of electricity by means of electricity plant that is based on, or uses, a gas turbine, and is situated in the metropolitan area or in the local government area of [Cessnock].

General electricity works are a scheduled activity if they have the capacity to generate more than 30 megawatts of electrical power, while metropolitan electricity works (gas turbines) are a scheduled activity if they have the capacity to burn more than 20 megajoules of fuel per second.

Therefore, the Proposal is defined as a Scheduled activity and will require an EPL to operate in compliance with the requirements of the POEO Act.

An EPL cannot be issued until a project has secured a planning approval. Once planning approval has been gained, an EPL cannot be refused, and any conditions attached to the licence must be substantially consistent with the conditions of approval for the project.

### 5.4.6 Roads Act 1993

The *Roads Act 1993* regulates the carrying out of various activities on public roads and provides for the declaration of TfNSW and other public authorities including Councils as a Roads Authority for different types of roads (classified and unclassified).

Under section 138 of the Roads Act, the consent of the appropriate Roads Authority is required before a person can erect a structure, carry out work in, on or over a public road or dig up or disturb the surface of a public road.

The construction of the Proposal may require works within public roads. However, as referred to in Table 5-1, under section 5.24 of the EP&A Act, any permit required under section 138 from the appropriate roads authority cannot be refused if it is necessary for carrying out approved CSSI, and is substantially consistent with the approval under Division 5.2.

### 5.4.7 Rural Fires Act 1997

The *Rural Fires Act 1997* facilitates the prevention, mitigation and suppression of bush and other fires in local government areas and parts of the State considered to be rural fire districts. The Proposal is considered to be located on bushfire prone land. However as referred to in Table 5-1, as the Proposal is critical SSI, under section 5.23 of the EP&A Act there is no requirement for a bush fire safety authority to authorise the Proposal under section 100B of the Rural Fires Act 1997.

## 5.5 Commonwealth legislation

### 5.5.1 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act is the primary Commonwealth legislation relating to the environment. Under Part 3 of the EPBC Act, approval from the Federal Minister for the Department of the Agriculture, Water and the Environment (Federal Minister) is required for an action that:

- Has, will have, or is likely to have a significant impact on a Matter of National Environmental Significance (MNES);
- Is undertaken on Commonwealth land and has, will have, or is likely to have a significant impact on the environment;
- Is undertaken outside Commonwealth land and has, will have or is likely to have a significant impact on the environment of Commonwealth land; and
- Is undertaken by the Commonwealth and has, will have or is likely to have a significant impact on the environment.

MNES include:

- World heritage properties;
- National heritage places;
- Wetlands of international importance (often called 'Ramsar' wetlands after the international treaty under which such wetlands are listed);
- Nationally threatened species and ecological communities;
- Migratory species;
- Commonwealth marine areas;
- The Great Barrier Reef Marine Park;
- Nuclear actions (including uranium mining); and
- A water resource, in relation to coal seam gas development and large coal mining development.

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. Snowy Hydro is a Commonwealth Agency for the purposes of the EPBC Act and will require approval under the EPBC Act if the Proposal will or is likely to have a significant impact on the environment inside or outside Australia.

A search of the Commonwealth Protected Matters Search Tool (PMST) on the 23 September 2020 has identified the following MNES listed under the EPBC Act, within 2 km of the Proposal area (refer to Appendix A):

- No World Heritage Properties;
- No National Heritage Places;
- No Commonwealth Marine Areas;
- Three listed Threatened Ecological Communities (TEC) may occur within the area:
- Central Hunter Valley eucalypt forest and woodland (Critically Endangered);
- Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community (Endangered);

- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered);
- 35 listed Threatened Species (includes 10 birds, two frogs, one insect, eight mammals, 13 plants and one reptile);
- 16 listed Migratory Species;
- No Commonwealth Listed Heritage places; and
- No areas of Commonwealth Land.

The search results indicate that MNES within the area of influence of the Proposal are limited to biodiversity. Based on the results of the Protected Matters search alone, the Proposal has a potential to impact on a matter of national environmental significance. Consideration and assessment of the Proposal's potential impacts on MNES will be provided in the Biodiversity Development Assessment Report (BDAR) as part of the Environmental Impact Statement (EIS).

A referral to the Department of the Agriculture, Water and the Environment (DAWE) will be made in respect of the Proposal. Should the action 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 Federal Minister would be required.

### 5.5.2 Native Title Act 1993

The *Native Title Act 1993* provides a legislative framework for the recognition and protection of native title rights that in certain circumstances allow Indigenous people to continue to hold rights to land and water, which come from their traditional laws and customs.

A search of the Register of Native Title claims on 24 September 2020 did not identify Native Title applications or determinations that affect the Proposal area. Further review will be undertaken during the EIS preparation.

# 6. Preliminary environmental assessment

The following provides an overview of the key issues to be assessed in the environmental impact statement (EIS). Potential environmental and social impacts associated with the use of existing electrical infrastructure and the proposed gas pipeline (refer Section 3.6 and Section 3.5, respectively) will not be assessed as part of the Proposal.

## 6.1 Air quality and greenhouse gases

### 6.1.1 Existing environment

Monitoring records of local air quality indicate that there are occasional exceedances of air quality criteria (particularly $PM_{10}$).

### 6.1.2 Potential impacts

The key air quality issue for the project will be the potential impact of emissions of products of combustion from power generation units on local and regional air quality. The primary emission from the turbines is oxides of nitrogen. Other emissions considered in the environmental assessment include carbon dioxide, carbon monoxide, sulphur dioxide and particulate matter.

Although the Proposal would generate electricity at a lower rate of greenhouse gas (GHG) emissions than black or brown coal, the GHG emissions from combustion of natural gas still needs to be considered. In the past, a majority of substation switchgear such as circuit breakers, disconnectors, and transformers, contained some sulphur hexafluoride (SF6) gas which is considered a greenhouse gas, the use of which in this development will be determined during detailed design.

The Proposal would not cause any significant odour concerns that would interfere with local amenity.

Potential air quality impacts associated with construction of the Proposal include:

- Dust creation during construction (site clearing, excavation and handling of soils, wind erosion from disturbed areas and stockpiles, site grading activities and vehicle movements); and
- Exhaust emissions from construction plant and equipment during construction.

### 6.1.3 Further assessment/recommendations

An air quality and greenhouse gas assessment will be completed as part of the EIS. The air quality assessment will be based on the quantitative prediction of potential air quality impacts in accordance with *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (EPA, 2016). The assessment will include review of the existing environment, inventory development, predicted emissions and air dispersion modelling.

The EIS will review the Proposal's ability to comply with the relevant regulatory framework, specifically the *Protection of the Environment Operations Act 1997* and the *Protection of the Environment Operations (Clean Air) Regulation 2010*.

Greenhouse gas emissions associated with construction and operation of the Proposal would be estimated. This may include potential impacts of SF6 contained in substation equipment. The assessment will include a high-level comparison with other power generation types as well as setting the emissions in the context of state and national emissions. The assessment will also detail any project inclusions which present a lower greenhouse gas emissions alternative. The assessment will be prepared in accordance with the principles of:

- AS14064-2 Greenhouse gases – project level (ISO 14064-2:2019);
- The GHG Protocol (World Business Council for Sustainable Development [WBCSD] – March 2004);

- *The National Greenhouse and Energy Reporting Act 2007* (NGER Act); and
- NSW Climate Change Policy Framework.

## 6.2 Plume rise and aviation hazard

### 6.2.1 Existing environment

Newcastle airport is about 30 kilometres south-east of the Proposal Site. The runway is shared between Department of Defence and commercial airline use.

The runway is used by the 16 squadrons based at RAAF Williamtown Air Base. Military aircraft routinely use the runway and regional airspace.

Newcastle Airport is the 13th busiest airport in Australia handling over 1.2 million passengers in 2017. It is serviced by five airlines to 10 direct destinations (Auckland, Adelaide, Ballina/Byron, Brisbane, Canberra, Dubbo, Gold Coast, Melbourne, Taree and Sydney). Around 40 commercial flights arrive and depart from Newcastle Airport each day.

Cessnock Airport is located in the vineyards area on Wine Country Drive at Pokolbin, approximately 7 km north of Cessnock and 13 km west of the Proposal Site. Cessnock Airport is a registered airport comprising a 1,097 m runway and parallel taxiway, aprons, terminal building, refuelling facilities and hangars. It is the base for three flying schools and several aircraft maintenance operations. Joy flights, hot air ballooning, helicopters and business/tourist charters also utilise the airport.

Maitland Airport, also known as Russell Field, is a general aviation airport located in the suburb of Rutherford, approximately 7 km west of Maitland and 9 km north of the Proposal Site. There are currently no airline services, with the airfield catering mostly to general aviation and recreational category aircraft. The airport has been owned and operated by the Royal Newcastle Aero Club since 1963.

### 6.2.2 Potential impacts

Exhaust stacks used during operation of the power station may be up to 45 metres in height depending on the design requirements, to be confirmed during the detailed design phase. Exhaust gases may rise in a plume and could potentially cause a hazard to aircraft depending on the plume velocity and aircraft flight height and type. The likelihood for the proposed power station to pose a hazard to nearby aircraft operations would be dependent on its final design and will be investigated as part of the EIS assessment.

A preliminary assessment of plume rise from the exhaust stacks and the potential impact on aeronautical activities within the area has already been completed.

The plume rise modelling was carried out in accordance with Civil Aviation Safety Authority (CASA) Advisory Circular *AC 139-05v3.0 - Plume Rise Assessments* (CASA, 2019). The main objective of the modelling was to provide estimates of plume rise height in order for CASA to determine any impact on Instrument Flight Rules (IFR).

The key outcome of plume rise modelling was that the predicted maximum height at which the plume vertical velocity falls below the critical vertical velocity of 6.1 m/s was approximately 1,144 m above ground level and approximately 301 m above ground level at 10.6 m/s for the 2 x OCGT development scenario.

### 6.2.3 Further assessment/recommendations

The aeronautical assessment previously undertaken will be reviewed once the detailed design is completed to identify any potential issues of locating the power station at the Proposal Site.

Consultation would be undertaken with Cessnock Airport (Cessnock City Council), Maitland Airport (Royal Newcastle Aero Club), Newcastle airport, Air Services Australia, Department of Defence and the Civil Aviation

Safety Authority (CASA). Stack heights, plume rise modelling results and potential impacts on aeronautical activities within the area would be discussed and any necessary approvals sought.

## 6.3 Biodiversity

### 6.3.1 Existing environment

The Proposal Site has largely been cleared due to the decommissioning and demolition of the aluminium smelter, with the existing switchyard site also to be demolished prior to the power station construction. However, the Proposal Site's northern edges and the immediate surrounds include regrowth native vegetation and likely habitat including aquatic habitat.

No direct impacts are expected to vegetation, other than a small area at the perimeter of the proposed new 132kV switchyard. A preliminary site walkover and review of desktop information in October 2020 has identified the following key potential biodiversity values at the Proposal Site and surrounds:

- Native vegetation at the edges of the Proposal Site that is consistent with the Kurri Sand Swamp Woodland, which is a Threatened Ecological Community under the BC Act;
- DPIE mapping indicates habitat for the Regent Honeyeater. The Biodiversity Assessment Method (BAM) reports that the species should be assumed present and targeted surveys are not required. The Regent Honeyeater is listed as Critically Endangered under both the BC Act and The EPBC Act;
- At least three threatened ecological communities (TECs) listed under the NSW BC Act are known to be present in the surrounding landscape and may include one TEC listed under the EPBC Act;
- A preliminary assessment using the BAM calculator identified around 40 threatened species in the proposed study area, some of which have specific seasonal survey requirements.

Preliminary mapping of biodiversity values is shown in Figure 6-1.

### 6.3.2 Potential impacts

The surrounds of the Proposal Site contain a variety of biodiversity values and a range of threatened biota. Construction and operation of the Proposal could have the potential to impact on the biodiversity of the area. The following potential impacts may occur during the construction and operation of the Proposal:

- Vegetation clearing and disturbance at the north-west corner of the proposed switch yard;
- Noise and light associated with construction may disturb fauna species in the immediate vicinity of works areas;
- Erosion and sedimentation could result in water quality impacts to Black Waterholes Creek and tributaries, affecting aquatic flora and fauna; and
- Introduction and spread of invasive species and weeds.

### 6.3.3 Further assessment/recommendations

Based on available information and the findings of a preliminary site walkover, a Biodiversity Development Assessment Report (BDAR) is likely to be required, prepared by an accredited assessor in accordance with the Biodiversity Assessment Method (BAM) prescribed under section 6.7 of the NSW *Biodiversity Conservation Act 2016*. The BDAR will assess the impact that construction and operation of the project may have on flora and fauna species and ecological communities including potential direct and indirect impacts. The BDAR will also identify any requirement to implement flora and/or fauna offsets. A separate Credit Report will outline any ecosystem and species offset credits required.

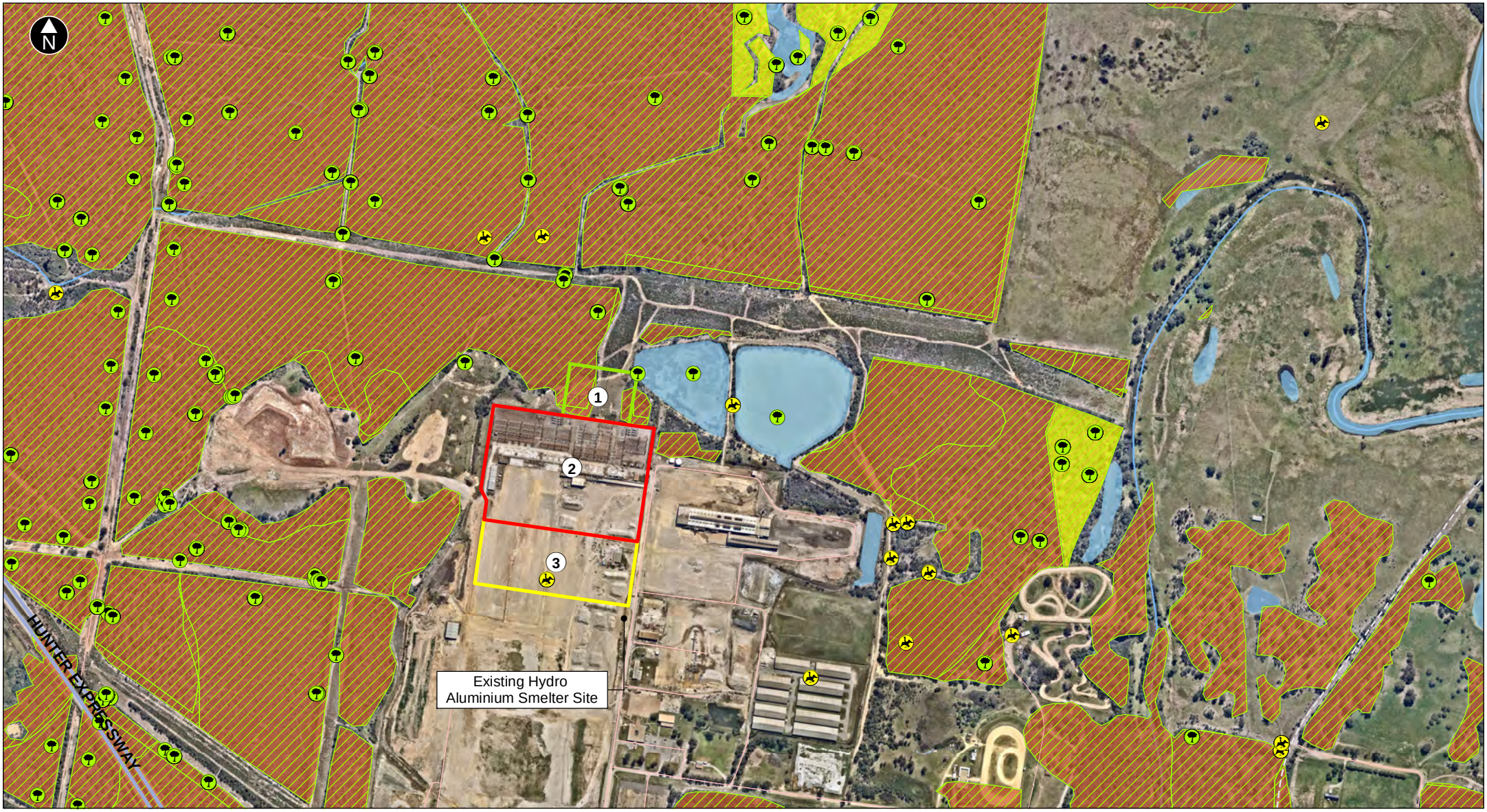


**Figure 6-1** Biodiversity values - Kurri Kurri Gas Fired Power Station

snowy hydro renewable energy Jacobs

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Review of State and Federal biodiversity databases and mapping would be completed to confirm a preliminary understanding of biodiversity at and surrounding the Proposal Site and to develop a field survey methodology.

A field survey will assess native vegetation, threatened ecological communities and vegetation integrity. Vegetation mapping would be ground-truthed by survey and Plant Community Types (PCTs) within the larger study area (including planted, or regrowth vegetation) will be mapped. Habitat suitability for threatened species will also be assessed by survey and targeted threatened species surveys completed for species with specific seasonal survey requirements.

The Proposal has been referred to the Commonwealth Department of Agriculture, Water and the Environment (DAWE) under the EPBC Act, due to the assumed presence of the critically endangered Regent Honeyeater in the vicinity of the Proposal Site. Assessment undertaken to date indicates that the Proposal is unlikely to result in a significant impact on this or any other Matter of National Environmental Significance (MNES), and that the Proposal is not expected to be declared a controlled action under the EPBC Act.

## 6.4 Soils and contamination

### 6.4.1 Existing environment

The Proposal Site and surrounds are primarily flat with an elevation of approximately 14 m AHD. The Proposal Site is heavily disturbed from previous aluminium smelter activities between 1969 and 2014.

An EIS for demolition and remediation of the former aluminium smelter site (Ramboll Environ, 2016) assessed in detail the condition of the site after the smelter's closure. Since 2016 an intensive, staged remediation program has been implemented across the former smelter site.

Prior to power station construction, the Proposal Site will have been remediated by the Developer of the Industrial Estate and Hydro Aluminium to a standard suitable for its proposed future industrial use. The outcomes will be verified through an EPA site audit statement, which would be prepared by an EPA accredited site auditor. These remediation and validation works will be undertaken prior to Snowy Hydro taking ownership of this portion of the land.

No acid sulphate soil (ASS) review/testing has been undertaken. However, Wentworth Swamp north of the Proposal Site is identified by mapping as high probability of ASS (refer Figure 6-2).

### 6.4.2 Potential impacts

The following impacts upon soils and contamination have been considered as having potential to occur during the construction of the Proposal:

- Excavations and earthworks may cause soil erosion and sedimentation (including potential for sediment laden run-off);
- Disturbance of acid sulphate soils (ASS); and
- Construction and operation of the Proposal would also involve the storage, treatment or handling of fuels, chemicals, building materials, wastes and other potential contaminants. Potential for chemical and fuel spills during construction or operation may result in localised contamination of soils.


**Figure 6-2** Acid Suplhate Soils Risk - Kurri Kurri Gas Fired Power Station

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### 6.4.3 Further assessment/recommendations

The EIS will provide a comprehensive summary of the work done by others to date, in relation to assessment and remediation of soil and water contamination at the former Hydro Aluminium smelter site. The EIS will document all the conclusions and outcomes from this process to date, to provide an understanding of the expected condition of the Proposal Site at the time that Snowy Hydro takes possession of the land. It is expected that the EIS will conclude that no further investigation, assessment or remediation of the Proposal Site is required prior to development of the Proposal.

It is proposed that the EIS scope includes an assessment of the Proposal's potential for land contamination impacts during operation. The desktop study would also incorporate observations from a site walkover inspection by a contaminated soils specialist.

An assessment of topography, soil and geology, to investigate potential impacts of the Proposal and mitigation options would be undertaken.

A desktop acid sulphate soils (ASS) assessment would be included as part of the soils and contamination assessment. The assessment would rely on NSW Department of Planning, Industry and Environment ASS risk maps, as well as existing bore log data from previous assessment programs. Relevant data and screening information relating to potential and actual acid sulphate soils (ASS) will also be sourced from any geotechnical studies completed at the Proposal Site.

Previous investigations undertaken by others to date indicate a low probability of acid sulfate soils being found anywhere on the Proposal Site, and it is unlikely that the Proposal would result in any significant change to existing groundwater levels. Based on existing available information about the Proposal Site's geology and topography, interaction with or disturbance of ASS or potential ASS is considered unlikely.

## 6.5 Groundwater

### 6.5.1 Existing environment

Swamp Creek and Black Waterholes Creek are east and north of the Proposal Site, respectively, and lead to the Wentworth Swamp wetlands north-east of the Proposal Site, as shown in Figure 6-3. The Hunter River is about 9 km north-east at Maitland. These sensitive environmental receptors host either identified Groundwater Dependent Ecosystems (GDEs) or are of high likelihood of hosting GDEs and/or water dependent riparian vegetation.

Groundwater hydrology is likely to vary considerably across the Proposal Site due to the nature of the alluvial aquifer and drains installed across the site. A shallow water table has previously been intercepted at between 1 m and 10 m below ground level however there may be up to three distinct aquifers present: shallow and deep alluvium and a bedrock aquifer. There may be areas of sub-artesian pressures caused by semi-confined aquifers. Groundwater mounding has been identified near the Proposal Site associated with the adjacent settling ponds and perhaps also associated with historic irrigation of stormwater.

Groundwater flow is to the north and north-east, toward Wentworth Swamps and the Hunter River.

Contamination assessments completed as part of remediation of the former aluminium smelter site indicate that historical discharges from the aluminium smelter have impacted groundwater quality, mostly around the existing ponds and waste areas. The Proposal Site is also located adjacent to a known mine subsidence area (Glen Ayr Colliery) which may impact local groundwater levels and quality.

Swelling clays soils have been identified at the Proposal Site and may complicate observed groundwater levels and any required dewatering activities.

WaterNSW records indicated that there are up to 17 existing groundwater bores on or near the former Hydro Aluminium smelter site (none of which are on the Proposal Site), including 11 monitoring bores and 6 bores of unknown purpose. No private bores used for domestic, stock or irrigation water consumption are registered within 3 km of the Proposal Site.

### 6.5.2 Potential impacts

The following potential groundwater impacts are identified during construction and operation of the Proposal:

- Groundwater extraction for temporary construction dewatering and associated impacts to groundwater aquifers;
- The storage, treatment or handling of fuels, chemicals, building materials, wastes and other potential contaminants. Potential for chemical and fuel spills during construction or operation could result in groundwater contamination;
- Stormwater and wastewater discharges during construction and operation would need to be managed to avoid contamination of underlying groundwater;
- Soil compaction could lead to groundwater displacement and groundwater level changes;
- Excavations could disturb acid sulphate soils (ASS); and
- Associated impacts to groundwater dependent ecosystems and the Wentworth Swamp wetlands.

### 6.5.3 Further assessment/recommendations

An assessment of potential impacts of the Proposal on groundwater aquifers and groundwater dependent ecosystems having regard to the *NSW Aquifer Interference Policy* and relevant Water Sharing Plans. Potential groundwater connectivity to the Wentworth Swamp wetlands and the risk of groundwater contamination from the Proposal Site impacting on the wetlands would be determined in conjunction with the contamination assessment. Quantification of any temporary construction dewatering would be established, and a site water balance prepared for the Proposal, including water supply and wastewater disposal arrangements.

A desktop study will be completed to characterise existing hydrogeological conditions at the Proposal Site including aquifers, depth to groundwater, groundwater quality, groundwater flow directions, existing groundwater users, groundwater dependent ecosystems and groundwater-surface water interaction.

Contamination risks during operation 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 during construction, clean-up and any necessary remediation would be implemented immediately.


**Figure 6-3** Wetlands - Kurri Kurri Gas Fired Power Station

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## 6.6 Hydrology and flooding

### 6.6.1 Existing environment

The Proposal Site is located at the north-western portion of the former Kurri Kurri aluminium smelter site adjacent to two existing ponds which formed part of the former site's stormwater management system. The Proposal Site is on the fringe of the Hunter River floodplain and is also surrounded by the following watercourses:

- Black Waterholes Creek, located immediately to the west of the Proposal Site and which flows from south to north;
- Swamp Creek, 900 m to the east of the Proposal Site, which flows in a northward direction;
- Both Black Waterholes Creek and Swamp Creek drain to Wentworth Swamp about 1.5 km north of the Proposal Site, which drains to the Hunter River at Maitland.

The Proposal Site is located on raised ground at the north-western corner of the former smelter site. The eastern half of the site drains to the existing ponds, with pipe outlets discharging to a drainage channel which runs along the eastern site boundary northward to the ponds. The western side of the site drains via overland runoff and pipes which drain to Black Waterholes Creek to the west. Open channels are located along the northern boundary of the site, facilitating drainage to the existing ponds and to Black Waterholes Creek. The site is partly paved, and consists mostly of hardstand areas.

Peak flood depths at the Proposal Site are dictated by Hunter River flooding, rather than flooding from Black Waterholes Creek and Swamp Creek. The 1% AEP flood level is 9.7 m AHD and the Probable Maximum Flood (PMF) level 12.2 m AHD (WMAwater, 2010) for the current climate (no climate change). The existing Proposal Site is raised by filling such that the site is almost entirely above and not at risk from the PMF, with the possible exception of the far north-western corner of the site. Detailed survey of ground elevations and site boundary would confirm the PMF extent in relation to the site boundary. Raising the existing ground levels on the far north-western corner to above the PMF level would translate to nil regional flood risk for the Proposal Site.

Overland flows and overland flooding were not quantified in existing studies. However, a hydrologic model was developed in this assessment to estimate the peak 1% AEP overland flows in the existing open channel, on the eastern boundary of the Proposal Site, which drains to the existing ponds. The peak 1% AEP overland flows in this channel are conservatively estimated to be 12.8 $m^3/s$. This may affect the eastern end of the Proposal Site. This is a preliminary flow estimate and the actual risk of overland flood impacts to the Proposal Site are dependent on the final ground levels and drainage arrangements of the sub-division of the former smelter site.

### 6.6.2 Potential impacts

There is potential for minor increase in stormwater runoff rates and volume. Under the proposed new master plan for the Industrial Estate (see Section 2.1.2), consideration would be given to a new stormwater basin to be provided at the north of the site. During the Proposal's detailed design development, and in collaboration with the Industrial Estate developer, drainage designs would be developed to ensure that new drainage infrastructure is adequate for future stormwater flow management.

Increases in downstream flooding are expected to be negligible as a result of minor volume of filling of the site and increased peak site discharge rates and volumes given the large size of the downstream floodplains and flood storages of Wentworth Swamp and the Hunter River. No existing development would be impacted.

### 6.6.3 Further assessment/recommendations

The surface water hydrology and flooding assessment will review consistency with any floodplain risk management plans, demonstrate compatibility with the flood hazard of the land, and assess whether the project will significantly adversely affect the environment or cause erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses.

Further assessment of potential stormwater discharge impacts will be completed as part of the EIS including identification of stream classes and any sensitive downstream receiving environments. Based on initial review of the study area including receiving environments, a qualitative assessment of impacts and mitigation is considered appropriate.

No further drainage or flood hydraulic modelling is proposed as part of the EIS.

## 6.7 Water quality

### 6.7.1 Existing environment

As described in Section 6.6.1, Black Waterholes Creek and its tributaries adjacent to the Proposal Site and Swamp Creek flow north and converge to Swamp Creek which continues flowing north and drains a large network of low lying, floodplain environments known as Wentworth Swamp. Swamp Creek ultimately flows into Wallis Creek about 10 km downstream of the project and Wallis Creek joins the Hunter River about 7 km further downstream.

Water quality data was requested from the following agencies:

- Maitland City Council;
- Cessnock City Council;
- Department of Planning, Industry and Environment (DPIE);
- Hunter Water; and
- Local Land Services (LLS).

At the time of writing this scoping report, Maitland City Council, Cessnock City Council and DPIE confirmed that they do not monitor the above mentioned waterways. Local Land Services advised that they have water quality data collected by community groups which due to QA/QC is not of an acceptable quality to use in environmental assessments. A response has not yet been received from Hunter Water.

Existing water quality data that was readily available for review included three years of monitoring data (2015 to 2017), collected during a surface water monitoring program undertaken by Hydro Aluminium as a condition of the EPL for the Kurri Kurri aluminium smelter. Monitoring was carried out monthly at 16 sites in 2015, 18 sites in 2016 and 20 sites in 2017 (Hydro Aluminium, 2015; Hydro Aluminium, 2016; Hydro Aluminium, 2017). Monitoring sites were located across the Hydro Aluminium property and encompassed the creek systems of Wentworth Swamp, ephemeral ponds located on surrounding land also owned by Hydro Aluminium and catchment dams located between 2 km and 7 km downstream of the smelter. Monitoring results in the annual environmental monitoring reports were compared against ANZECC (2000) (now ANZG, 2018) water quality guidelines for stock watering (fluoride only), irrigation (pH and fluoride), and aquatic ecosystems (pH, conductivity and free cyanide). Total Suspended Solids (TSS) and Total Dissolved Solids (TDS) were also part of the monitoring suite.

In general, the monitoring data across the three years suggests that the smelter effect on surface water was mostly limited to higher fluoride concentrations at sampling sites. The sampling locations most effected consisted of ephemeral ponds within the buffer zone of the smelter, with fluoride levels increasing between significant rainfall periods.

Water quality parameters that were not monitored in the Hydro Aluminium surface water monitoring program but would be required to adequately assess existing water quality and potential water quality impacts of the Proposal with respect to protection of aquatic ecosystems include:

- Nutrients, such as total phosphorus (TP), filterable reactive phosphorus (FRP), oxidised nitrogen ($NO_x$) and total nitrogen (TN);

- Dissolved Oxygen (DO);
- Turbidity; and
- Heavy metals and other chemical toxicants (particularly indicators such as calcium, fluoride, aluminium, boron, and zinc which are relevant to existing land use).

### 6.7.2 Potential impacts

Potential water quality impacts during construction include:

- Erosion and sedimentation to downstream receiving environments associated with construction earthworks and stormwater runoff; and
- Pollutants from accidental spills or leaks of fuels and/or oils during maintenance or refuelling of construction plant, equipment and vehicles.

Potential surface water quality impacts during operation of the project include increased stormwater runoff from the Proposal Site and therefore increased discharge (in terms of peak flows and flow volumes) to the receiving watercourses. This could result in increased suspended sediment in waterways which can subsequently impact aquatic ecosystem health.

### 6.7.3 Further assessment/recommendations

A water quality assessment will be undertaken as part of the Environmental Impact Statement referencing the following guidelines:

- *NSW Water Quality and River Flow Objectives* (DECCW, 2006);
- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG, 2018);
- *ANZECC Guidelines and Water Quality Objectives in NSW* (DEC, 2006); and
- *Managing Urban Stormwater: Soils and Construction Volume 1* (Landcom, 2004) and Volume 2 (DECC, 2008).

The water quality assessment would involve:

- Further characterisation of waterways with the potential to be impacted by the Proposal, including Black Waterholes Creek and tributaries and Swamp Creek;
- Identification of potential indicators of concern based on proposed activities;
- Identification of relevant NSW Water Quality Objectives and their nominated environmental values for waterways within the assessment study area. Relevant water quality indicators and the guideline trigger values outlined in ANZG (2018) would also be identified;
- Surface water quality will be assessed under existing conditions based on available data, and potential sources of contamination will be identified. Results will be compared against the ANZG (2018) water quality objectives and nominated environmental values to determine if they are currently being achieved; and
- Identification of potential impacts of the Proposal on water quality and determining if relevant water quality objectives are likely to be achieved during construction and operation.

Conceptual strategies to mitigate identified impacts, including erosion and sediment control options and water quality management measures, would be recommended.

## 6.8 Traffic and access

### 6.8.1 Existing environment

The Proposal Site at Loxford is well serviced by the existing road network which is well suited to heavy haulage vehicles. Vehicle access to the Proposal Site will be off the M15 Hunter Expressway via Hart Road. The Proposal Site is approximately 1.5 km north from the M15 Hunter Expressway and access to and from the east is made available by an off-ramp and on-ramp with Hart Road. Hart Road is a sealed two-way Council owned road. These roads would be the major transport route for light and heavy vehicles during construction and operation.

To travel west, an interchange is available at the intersection of the M15 Hunter Expressway and Main Road, approximately 3 km east of the Proposal Site, allowing all traffic movements including east-bound traffic to turn around and head west on the M15. However, access and egress to the Proposal Site is expected to be primarily to and from the east towards Newcastle.

### 6.8.2 Potential impacts

Construction traffic could potentially contribute to local road network volumes, congestion and noise. Construction traffic could also potentially cause road safety issues for other road users, pedestrians and cyclists. These potential impacts can be exacerbated by concurrent developments also under construction nearby, if any.

The use of Oversized or Overmass (OSOM) vehicles will be required to transport certain equipment for the power station from the Port of Newcastle to the Proposal Site. The required vehicles or combinations are expected to require an access permit from the National Heavy Vehicle Regulator (NHVR) and be subject to route restrictions, maximum dimension/mass limits and operating conditions.

The power station is proposed to be fully automated, with operations able to be monitored and controlled remotely and therefore a workforce of approximately 10 persons would be required to attend the Proposal Site, with increased attendance during maintenance events. Operational traffic volume is therefore expected to be negligible. Heavy vehicles would occasionally need to access the power station for delivery of diesel fuel, repairs, maintenance or any plant upgrades.

Private property access would be unaffected and no off-site parking would be required. No significant road or intersection upgrades would be required for construction or operation of the Proposal. The Industrial Estate developer will provide sufficient vehicle access to the Proposal Site to allow construction and operation of the power station. If required, this would be subject to a separate planning approval and environmental assessment related to the property subdivision.

### 6.8.3 Further assessment/recommendations

The EIS will include a qualitative assessment of potential impacts on the surrounding road network and road users during construction and operation. The assessment will include review of the existing road network, assessment of the suitability of heavy vehicle and oversized vehicle routes, site access provisions, road safety including pedestrians and cyclists, and potential cumulative traffic impacts due to concurrent nearby developments.

A detailed route survey will be completed to assess Oversized or Overmass (OSOM) vehicles routes from Port of Newcastle to the Proposal Site and determine feasibility requirements for transportation subject to approval from the National Heavy Vehicle Regulator (NHVR).

## 6.9 Noise and vibration

### 6.9.1 Existing environment

As described in Section 2, the Proposal Site is predominantly surrounded by regrowth vegetation, and the former aluminium smelter and M15 Hunter Expressway to the south. The nearest residential receptors are rural residential properties about 1.25 km south-east in Loxford. The main township of Kurri Kurri is located approximately 2.5 km directly south of the proposal, while the suburbs of Cliftleigh, Heddon Greta, Weston and Sawyers Gully are located approximately 2.5 km east, south-east, south-west and west of the Proposal Site, respectively. Other notable receptors include the Loxford Speedway 750 m south-east of the proposal, and Kurri Kurri TAFE 1.7 km south-east of the Proposal Site.

The closest residential zoned land is suburban areas of Kurri Kurri, approximately 2 km south and south-west of the Proposal Site. Further residential areas at Heddon Greta and Cliftleigh are situated approximately 2.5 km to the east.

Based on the proposed rezoning master plan discussed in Section 2.1.2, all neighbouring developments to the power station would be zoned either Heavy Industrial or General Industrial land use. Under the NSW EPA *Noise Policy for Industry 2017* (NPI), non-residential land uses are assigned a 'noise amenity level' criteria which new and adjacent developments must meet. Regardless of the actual land use zone (under the relevant Council local environmental plan), the noise amenity level for industrial land use is set at 70 dB(A) for any times when the industrial facility is in use.

### 6.9.2 Potential impacts

The following key noise and vibration sources have been considered as having potential impacts during construction and operation of the Proposal:

- Construction noise associated with earth works and building activities;
- General operational noise from the power station including low frequency noise from gas turbines;
- Operational noise from the exhaust stacks and ducts;
- Transformer noise.

### 6.9.3 Further assessment/recommendations

A detailed noise and vibration assessment prepared for the EIS would compare predicted noise and vibration associated with construction and operation of the project to relevant criteria and recommend reasonable and feasible mitigation measures accordingly. Background noise levels would be established by representative monitoring and noise levels associated with each stage of construction and each operational configuration would be determined. A noise model would be developed to determine predicted noise levels at each nearby identified sensitive receiver.

Construction of the Proposal 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.

The framework for the assessment and management of operational noise is the NSW EPA *Noise Policy for Industry 2017* (NPI). The NPI sets out noise trigger levels to assess the potential for noise from industrial premises to impact nearby residential and commercial receptors. The NPI also provides levels for assessing noise impacts at non-residential receptors, and a level for assessing sleep disturbance.

Design specific noise attenuation will likely be required for the gas turbine plant in order for the plant to comply with adopted noise criteria at the power station boundary.

Additional design specific noise attenuation measures to reduce low frequency noise (dBC) levels may also be required to assist with reducing the overall noise levels emitted from the plant.

Assessment of construction and operational transport noise is not proposed to be carried out. This is because of the short distance between the main transport artery, the M15 Hunter Expressway and the Proposal Site, and the absence of any sensitive receivers adjacent to the route from the Expressway to the Proposal Site. The Proposal is not considered likely to result in any transport-related noise impacts during construction or operation.

## 6.10 Landscape character and visual amenity

### 6.10.1 Existing environment

The Proposal Site is located entirely within a former industrial area, on land formerly occupied by the Hydro Aluminium Kurri Kurri smelter which closed permanently in 2014 and is still undergoing demolition and remediation. The land is currently zoned RU2 Rural Landscape under the Cessnock LEP. As described in Section 2.1.2 however, the DPIE is currently considering a proposal to rezone the former smelter site and surrounding lands, for a mix of uses including industrial, commercial, special purpose, residential, recreational and environmental protection.

Also as described at Section 2.1, the Proposal Site is located approximately 3 km north of the township of Kurri Kurri and approximately 1 km north of the M15 Hunter Expressway. It is approximately 2.5 km west of the suburb of Cliftleigh. A small number of scattered rural residential dwellings are located about 1.25 km south-east of the Proposal Site.

The landscape in the immediate Proposal area has been cleared for the existing aluminium smelter and is otherwise surrounded by forested areas. Cleared landscape also exists to the north and west for an existing high voltage transmission corridor.

The visual character of the Proposal Site and surrounding area is predominately that of industrial and electrical utility uses, that are generally screened by surrounding vegetation from areas such as Kurri Kurri and major roads.

### 6.10.2 Potential impacts

Construction of the proposed power station would be consistent with existing and proposed surrounding industrial land uses.

The Proposal has the potential to impact upon landscape character and visual amenity during construction and operation. However, as the Proposal Site is largely isolated from major roads and other public areas, these impacts are likely to be limited to few public viewers.

Potential construction impacts relevant to visual amenity include:

- Construction facilities, including laydown areas and temporary structures;
- Presence of construction equipment, heavy machinery (potentially including tall cranes), traffic management and lighting; and
- Removal of vegetation, earthworks and civil works.

Once operational, the power station would be a new feature in the landscape with limited visual amenity impacts due to the surrounding forested area, and neighbouring industrial use planned for the Industrial Estate. The components of the power station that may be visible to non-industrial neighbours include the elevated infrastructure such as exhaust stacks and the switchyard. Views to the Proposal would depend on viewer location and localised features such as topography and vegetation.

### 6.10.3 Further assessment/recommendations

Potential impacts on surrounding land uses will be considered further within the EIS. A Landscape Character and Visual Impact Assessment (LCVIA) prepared as part of the EIS would include:

- Characterisation of the Proposal Site and surrounding areas including land uses and permissible uses;
- Relevant strategic, policy and planning context;
- Establishment of a viewshed (visual study area) of the Proposal based upon height of proposed infrastructure;
- Desktop theoretical visibility analysis of the project (seen area analysis);
- A landscape character assessment of the study area;
- Identification of potential sensitive visual receptors and assessment of visual impact; and
- Potential mitigation options.

## 6.11 Hazard and risk

### 6.11.1 Existing environment

A description of the Proposal Site and proposed construction activities are outlined in Section 2.1 and Section 3.10 respectively. A description of the power station operating process is outlined in Section 3.

### 6.11.2 Potential impacts

Potential hazards and risks associated with the Proposal include:

- Isolated major incidents (e.g. onsite / offsite emergencies, equipment failure);
- Storage and handling of dangerous goods and hazardous chemicals;
- Risks associated with liquid fuel including leakage, fire/explosion and transport; and
- Quantities of other dangerous goods and hazardous chemicals delivered to the power station and used in process operations of the facility.

### 6.11.3 Further assessment/recommendations

*State Environmental Planning Policy No.33 Hazardous and Offensive Development* (SEPP 33) aims to identify hazards and manage risks associated with hazardous or offensive industries. A Level 1 Preliminary Hazard Analysis (PHA) will be prepared in accordance with the SEPP 33 policy and guidelines. The PHA will include a hazard identification (HAZID) risk screening process reviewing the project design, operating characteristics, land use, environmental aspects and potential environmental impacts. The PHA will cover all aspects of the project which may impose public risks and will be prepared in accordance with:

- *Hazardous Industry Planning Advisory Paper No. 4 – Risk Criteria for Land Use Safety Planning* (DPE, 2011);
- *Hazardous Industry Planning Advisory Paper No. 6 – Hazard Analysis* (DPE, 2011);
- *Hazardous Industry Planning Advisory Paper No. 10 - Land Use Safety Planning* (HIPAP 10, DPE, 2011);
- *SEPP 33 Assessment Guideline: Multi-Level Risk Assessment* (DPE, 2011); and
- *AS ISO 31000:2018 Risk Management Guidelines* (Standards Australia, 2018).

Land use safety planning will contribute to the proposed development's hazard assessment by informing the EIS on:

- Strategic Land Use Safety Planning;

- Development Assessment and Control;
- Risk Criteria for Land Use Safety Planning; and
- Emergency Planning and Response.

Risk assessment for the Proposal will draw on qualitative assessment methods, extending to semi-quantitative methods for parts of the analysis.

## 6.12 Aboriginal heritage

### 6.12.1 Existing Environment

The Proposal lies within the catchment area of the Upper Hunter which contains a range of ecological zones within a relatively small area. Major rivers and smaller watercourses would have provided relatively easy access to fresh water across most of the region. Ecological communities would have varied considerably from low lying watered areas around rivers and streams, to open and forested areas on valley floors, hills and mountainous regions bordering the valley to the north, south and west. The area would likely have supported a large population of Aboriginal people.

Modification of the landscape by Aboriginal people took place through the use of fire farming and reed planting/weir development, but little evidence of such activities is likely to have been preserved in the archaeological record due to the perishable nature of the materials used and the consequent alteration of the landscape through non-Aboriginal occupation. Evidence of campsites, through deposits of stone artefacts and shell, hearths or middens are, in contrast, likely to be found where the landscape has not suffered severe ground disturbance or sedimentation.

Scarred trees, which were a result of the production of items such as canoes, containers, shelters and bowls also have the potential to be present within the region. Other sites, such as grinding grooves, stone quarries, burials and ceremonial grounds (bora rings, stone arrangements), while rare, are known to be focal points within the current cultural landscape.

The majority of the Proposal area has been subject to extensive prior disturbance for the construction and operation of the former Hydro aluminium smelter. Further, since the smelter's decommissioning, recent demolition and remediation works have resulted in further disturbance. From available information, there remains only a very small area of land on the northern edge of the Proposal Site that is less disturbed and is covered by fringe regrowth vegetation.

A preliminary search of the AHIMS database (August 2020) identified 33 registered Aboriginal sites recorded within a 1 km radius of the Proposal Site. Although the Proposal Site has been subject to previous disturbance, the absence or presence of Aboriginal objects and cultural values needs to be identified and assessed. It is recognised that the AHIMS database identifies only officially recorded Aboriginal sites and therefore does not necessarily represent a complete record of Aboriginal sites within the area.

### 6.12.2 Potential impacts

Although the Proposal area has been subject to previous disturbance by vegetation clearance, extensive earthworks, construction, demolition and remediation works, there is still potential for the Proposal to disturb Aboriginal items, in particular during any deeper earthworks or excavation that may be necessary to construct the Proposal's foundations.

The likelihood of the Proposal impacting on Aboriginal objects will depend on whether these works result in new disturbance of deeper (and older) alluvium of the Upper Hunter River floodplain. The presence of any previously undisturbed alluvial soils during earthworks for the Proposal would increase the likelihood of impacting Aboriginal cultural heritage items and values.

### 6.12.3 Further assessment/recommendations

An Aboriginal cultural heritage assessment would be provided with the EIS. The assessment will be prepared in accordance with relevant Heritage NSW guidelines including the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW, 2010A) and *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW, 2010B). The assessment will identify the presence or absence and nature of any Aboriginal objects and cultural values that may be present at the Proposal Site by means of an initial desktop assessment and site survey. These activities will then determine the need for any sub-surface test excavations that may be required. Due to prior disturbance, it is not expected that test excavations would be required at the Proposal site. Appropriate management and mitigation measures will be developed to allow suitable protection and management of Aboriginal cultural heritage values throughout the life of the Proposal.

## 6.13 Non-Aboriginal heritage

### 6.13.1 Existing Environment

Due to the extensive previous disturbance, there is little likelihood that the Proposal Site would contain material of heritage significance. A search of local heritage databases showed that the nearest known (listed) heritage item is 950 m away from the Proposal Site – a local heritage item 'South Maitland Railway System' (Cessnock LEP ID# I212). Other locally listed items are within a 5 km radius. Bushland to the east of Kurri Kurri also contains a number of heritage items managed by the NSW National Parks and Wildlife Service (NPWS), identifying a potential for currently unregistered/ unidentified heritage values within forested land surrounding the Proposal Site.

### 6.13.2 Potential impacts

Given the extent of prior disturbance at the Proposal Site, it is unlikely that the Proposal would impact on any items of heritage significance. As such construction and operation of the Proposal is not expected to result in non-Aboriginal heritage impacts. However, there is a low residual risk that unexpected finds may be discovered during construction activities.

### 6.13.3 Further assessment/recommendations

It is considered that a desktop assessment of potential non-Aboriginal heritage would be sufficient to address the Proposal's potential impacts. This can be achieved through primary and secondary historical research of the Proposal area, including thorough review of known and potential archaeological sites in the vicinity of the Proposal, and review of previous heritage assessments related to the Proposal area.

Potential risk of any unexpected finds would be managed with standard unexpected finds safeguards and management measures which would be documented in the EIS, for implementation during construction.

## 6.14 Other environmental aspects

### 6.14.1 Bushfire risk

**Existing environment**

A review of NSW Rural Fire Service bushfire mapping indicates that the Proposal would be partly located within and near bushfire prone land (refer to Figure 6-4). While the Proposal Site itself is largely cleared of native vegetation, it is bound to the west and north by parcels of native forest, which are mapped as Category 1 bushfire prone land. The Proposal Site falls within the 100-metre buffer of the Category 1 native vegetation and is therefore bushfire prone.

There are a number of 132kV transmission easements in the vicinity of the Proposal Site, which provide separation of the site from the surrounding areas of bushland. These easements are regularly maintained, and

vary in width from 25 m to approximately 100 m. The presence of these cleared easements would be taken into account in any bushfire planning that is undertaken to satisfy Rural Fire Service requirements during the Proposal's design.

**Potential impacts**

During construction, the primary sources of bushfire and potential risks and impacts is expected to be from:

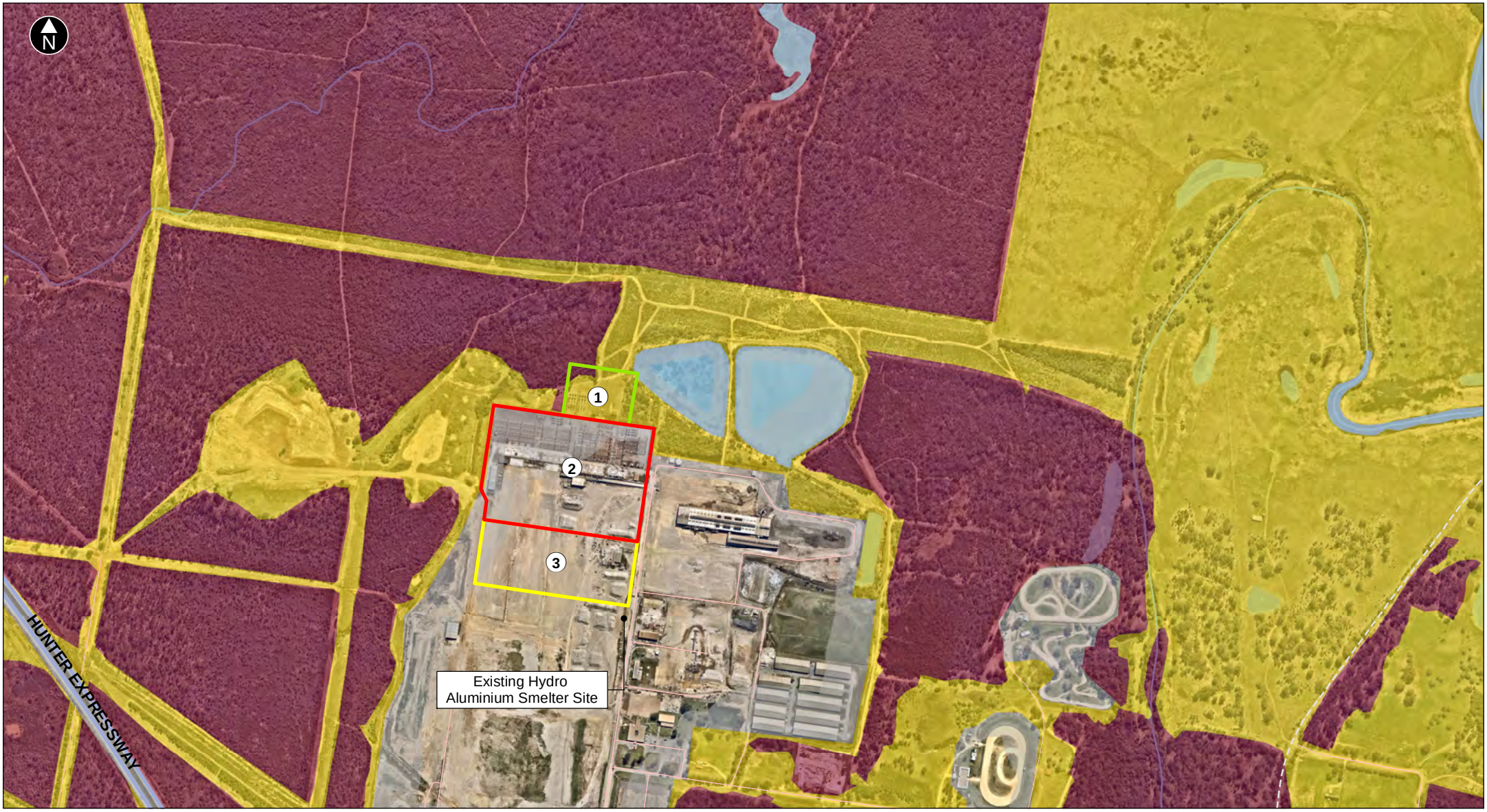
- Hot works such as welding igniting surrounding vegetation and causing a bushfire;
- Inadequate bushfire emergency response system in place; and
- Insufficient training of construction workers dealing with bushfire risk.

During operation of the power station, an automatic fire suppression system and appropriate asset protection areas would mitigate bushfire risk. Bushfire risk during operation of the power station would be managed with the implementation of a site Operational Environmental Management Plan (OEMP). A Bushfire Management Plan for the Proposal Site may be prepared depending on the outcomes of a bushfire risk assessment prepared as part of the EIS.

**Further assessment/recommendations**

A bushfire risk assessment will be completed in accordance with *Planning for Bush Fire Protection 2019* (NSW Rural Fire Service, 2019). The assessment will include review of legislative and regulatory requirements and characterisation of bushfire risk factors at the Proposal Site. Management measures will be developed to mitigate risks to the facility from bushfires and the risk to public safety of bushfire ignitions at the Proposal Site during the facility's construction and operation.

The assessment will consider how weather-related bushfire risks may change over the operating life of the proposed facility in response to projected climate change.




1. Proposed Switchyard Area
2. Proposed Plant Area
3. Proposed Buffer Area
Waterbodies

Motorway
Roads
Railway

Bushfire Prone Land
Category 0
Category 1
Category 3

0 250 500 m

1:10,000 at A4

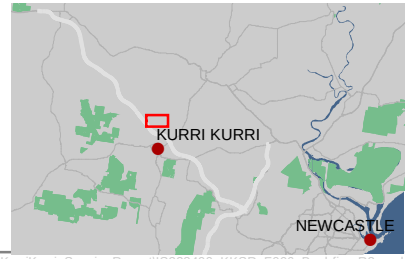



**Figure 6-4** RFS Bushfire Prone Land - Kurri Kurri Gas Fired Power Station

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snowy hydro renewable energy Jacobs

### 6.14.2 Social and economic

**Existing environment**

The Cessnock City Council LGA has an area of 1,966 square kilometres and a population estimated to be approximately 60,000 (ABS ERP, 2019). The main employment industries within the Cessnock LGA are tourism (accommodation and food services), retail trade, health care and social assistance, education and training, manufacturing, public administration and safety, and construction.

The closest population centre to the proposed power station is Kurri Kurri approximately 2.5 km to the south. The next sizeable population centres are Maitland and Rutherford which are located approximately 8.5 km north-east of the Proposal Site.

**Potential impacts**

Potential and temporary social and economic impacts during construction include:

- Amenity related impacts on the local community such as noise and vibration, air quality, traffic and visual impacts;
- Increased housing and accommodation demand due to construction workforce; and
- Increased demand on local community infrastructure.

Local contract employment would be generated by construction and operation of the Proposal. During the approximately 14-15 months of construction, the Proposal would generate an immediate 40-50 jobs at commencement, ramping up to around 250 jobs at the peak of construction activity, before dropping back to around 40 jobs in the commissioning phase. Electrical connection works would generate a further 30-40 jobs during construction, over and above those jobs brought by construction of the power station.

During operation, the Proposal would generate around 10 permanent positions, with some additional labour required during periodic maintenance events or special projects.

Potential social and economic impacts during operation of the Proposal would be primarily related to any reduced amenity resulting from other environmental impacts such as noise and vibration, air quality, traffic and visual impacts.

The Proposal would provide increased reliability in the National Electricity Market and increased electricity supply may provide an overall downward pressure on energy prices.

**Further assessment/recommendations**

The EIS will include an assessment of the likely social and economic impacts of the Proposal on the local community. The assessment will review background information and identify key social issues, establish a baseline of social and economic characteristics and values in the study area, incorporate findings from community and stakeholder consultation, and evaluate the significance of identified impacts based on the *Social Impact Assessment Guideline for State significant mining, petroleum production and extractive industry development* (NSW Government, September 2017).

The assessment will include consideration of potential property impacts, local business and industry impacts, demands on Council infrastructure and construction workforce accommodation, and amenity related impacts such as noise and vibration, air quality, traffic and visual impacts. The benefits of additional employment during construction and, to a lesser extent, during operation will also be outlined.

### 6.14.3 Waste

**Existing environment**

A description of the Proposal Site and proposed construction activities are outlined in Section 2.1 and Section 3.10 respectively.

**Potential impacts**

Construction of the power station would generate waste, especially from packaging waste, and surplus building materials (e.g. concrete, steel, some plastics). Site earthworks may also generate spoil that cannot be reused on site, and which therefore requires removal or disposal.

Wastewater would be generated by the operation of the proposed power station. Otherwise operation of the power station would likely generate only minor quantities of waste. These will be disposed of at appropriately licenced facilities.

**Further assessment/recommendations**

The EIS would identify potential waste streams associated with construction and operation of the Proposal and would include standard management practices compliant with the *Waste Avoidance and Resource Recovery Act 2001* and other relevant policies and guidelines.

The proposed groundwater assessment includes a site water balance including water supply and wastewater disposal arrangements (refer Section 6.5.3).

### 6.14.4 Electric and magnetic fields

**Existing environment**

Electric and magnetic fields (EMF) are part of the natural environment. 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.

**Potential impacts**

As described in Section 3.6, the power station would connect into the National Electricity Market via a new 132 kV switchyard and three existing Ausgrid operated 132 kV transmission lines. The transmission lines are currently in operation and connected into the existing Hydro Aluminium switchyard, which will be decommissioned and demolished.

The proposed switchyard would introduce some EMF at the Proposal Site.

**Further assessment/recommendations**

Potential exposure to EMF would be considered for operational contractors and staff as part of operational health and safety management plans for the power station. Design of electrical equipment within the switchyard would consider EMF risks and any necessary buffer areas to potential adjacent future land uses.

EMF hazards associated with the proposed switchyard would be assessed as part of the EIS as required by the SEARs.

### 6.14.5 Mine subsidence

**Existing environment**

The Proposal Site is located outside of but adjacent to a mine subsidence area (Glen Ayr Colliery).

**Potential impacts**

The Proposal would not involve any underground or mining works and no mine subsidence impacts are anticipated.

**Further assessment/recommendations**

No further assessment of mine subsidence is proposed as part of the EIS.

### 6.14.6 Cumulative impacts

**Existing environment**

No specific development proposals have been identified near the Proposal Site that would result in cumulative environmental, social or economic impacts. However, as described in Section 2.1.2 the surrounding area is currently the subject of a master plan application to rezone and subdivide large areas of land for long term development for an industrial estate, business, residential and open space uses (see Figure 2-4). Future proposals for industrial developments on neighbouring or nearby sites may have implications for construction of the proposed power station and its future operations.

Removal of structures associated with the former Hydro Aluminium smelter and remediation of land is already well progressed. The overall objective of the demolition and remediation activities is to prepare the former Hydro Aluminium smelter site for future development and re-use, through the removal of building fabric and materials, contaminated material and other waste. Snowy Hydro would therefore purchase and take possession of a cleared, remediated brownfield parcel of industrial land.

**Potential impacts**

Due to the sequencing of the Proposal's construction relative to other potential future developments at the former Hydro Aluminium smelter site, there may be little or no cumulative impacts during construction with other occupiers of the Industrial Estate.

However, given the likelihood that the former Hydro Aluminium smelter site will be redeveloped in the near future, some cumulative impacts are likely. There is likely to be cumulative positive effects to employment and economic growth in the Hunter Valley region as a result of new developments being planned for Kurri Kurri. The proposed master plan and rezoning discussed in Section 2.1.2, if realised, is likely to stimulate further development and growth in the region in the medium to long term. This is expected to have positive economic and social impacts through increased employment opportunities, increased supply of housing in close proximity to employment in three key regional centres (Kurri Kurri, Cessnock and Maitland).

**Further assessment/recommendations**

Potential cumulative impacts of the Proposal would be further considered as part of the EIS.

# 7. Stakeholder engagement

The Proposal is likely to generate stakeholder interest, given that there is already community awareness of the Proposal from recent media announcements that Snowy Hydro is investigating the development of a gas fired power station in Kurri Kurri. Further, the Proposal is likely to attract interest for reasons associated with employment, regional development, and potential environmental impacts during construction and operation.

A Community and Stakeholder Engagement Plan has been prepared to guide stakeholder engagement activities throughout the preparation of the EIS and the EIS display period. The plan will identify and target the Proposal's key stakeholders, with the aim of supporting consultation objectives of:

- Building awareness of the Proposal's benefits for stakeholders and the local community;
- Facilitating ongoing and effective communication with key stakeholders and the community;
- Building a positive relationship with landholders adjacent to the Proposal; and
- Allowing potential stakeholder concerns to be addressed prior to the EIS submissions where possible.

The consultation process and its outcomes will be documented in the EIS and relevant technical studies.

Hydro Aluminium Kurri Kurri Pty Ltd (Hydro Aluminium), the current owner of the Proposal Site and former operator of the smelter, has convened a Community Reference Group[12] that has met regularly since July 2014. The Community Reference Group has sought to bring together community stakeholders with an interest in the future of the former smelter site and the ongoing plans to rezone and redevelop the site and its surrounds. Where feasible, Snowy Hydro will integrate into these (and any other) existing networks to reach stakeholders and build upon the work already initiated by Hydro Aluminium.

## 7.1 Government agencies and utilities

Consultation will be undertaken with government agencies as required during the preparation of the EIS. Some of the key stakeholders include:

- NSW Planning, Industry and Environment cluster regarding the environmental assessment and land use implications of the Project and full suite of environmental impacts;
- NSW Office of Environment, Energy and Science (EES) (formerly Office of Environment and Heritage (OEH));
- NSW Office of Water;
- Hunter Water Corporation;
- Ausgrid;
- TransGrid;
- Australian Energy Market Operator (AEMO);
- Telecommunication providers;
- NSW EPA and State government in relation to management of legacy contamination;
- Commonwealth Department of Agriculture, Water and the Environment (DAWE);
- Civil Aviation Safety Authority;

[12] Regrowth Kurri Kurri, Newsletter Winter 2017 (most recent available) https://www.hydro.com/Document/Index?name=Newsletter%20Winter%202017%20%28June%2C%202017%29&id=5611 Accessed 6 October 2020

- Cessnock City Council regarding impacts to Council services as well as a full suite of environmental impacts;
- Maitland City Council;
- Transport for NSW (Roads and Maritime Projects) regarding impacts to the road network and the need for oversize over mass transport; and
- Hunter Local Land Services;
- NSW Rural Fire Service.

Snowy Hydro is continuing to engage in formal discussions with Ausgrid regarding the electrical connection aspects for the Proposal. Further consultation with Ausgrid and AEMO to secure the necessary connection agreements will continue and run in parallel to the environmental assessment process.

## 7.2 Community and other stakeholders

Community engagement will aim to keep neighbours and key stakeholders informed of the assessment process and anticipated impacts from the Proposal such that concerns can be addressed and managed through the design process and EIS. This is expected to be achieved through direct consultation with immediate neighbours, advertising the Proposal and directing stakeholders to sources of information such as local media, and general information sessions prior to and during EIS exhibition.

Groups that will be included in the consultation process during the preparation of the EIS are expected to include:

- Local Councillors and State and Federal Members of Parliament;
- Hydro Aluminium Kurri Kurri Pty Ltd;
- Local pilots representative organisation, Cessnock airport (Maitland City Council) and Maitland airport (Royal Newcastle Aero Club);
- Mindaribba Local Aboriginal Land Council and Aboriginal stakeholder group(s);
- Kurri Kurri Business Chamber;
- The community; and
- Other potentially affected and interested landowners.

Snowy Hydro will consult with the community through the development and operation of the Proposal. Community consultation activities for the Proposal would likely include website information, newsletters, factsheets, community information sessions such as drop-in sessions (or virtual webinar sessions as required), and face to face meetings as allowed depending on the COVID-19 restrictions imposed at the time.

## 7.3 Consultation to date

As part of the Proposal development works, Snowy Hydro has already undertaken consultation activities with certain key stakeholders beginning in early 2020. This has included meetings with the following:

- NSW Department of Planning, Industry and Environment;
- Jemena regarding gas capacity;
- The Industrial Estate developer;
- Hunter Water Corporation; and
- Ausgrid.

## 7.4 Anticipated stakeholder concerns

Due to the Proposal's location and the nature of the proposed development, stakeholder concerns are likely to include:

- Social and amenity impacts including visual amenity, transport, traffic, noise and vibration, air quality impacts, risks and hazards;
- Impacts to biodiversity;
- Impacts to Aboriginal heritage;
- Impacts to water;
- Whether other options were considered in the development phase;
- Rehabilitation and ongoing remediation of the smelter site; and
- Local and regional economic issues including employment.

The EIS will review and address these likely concerns as part of the overall assessment process.

# 8. Conclusion

Snowy Hydro proposes to develop a new gas fired power station at Kurri Kurri, in the Hunter Valley region. The Proposal would involve the development of a power station as well as an electrical switchyard, connections into the existing electricity transmission network, and other associated auxiliary infrastructure. The gas lateral pipeline to the proposed power station is to be developed by others and subject to a separate planning approval. It is not part of this application.

The Minister has declared the Proposal to be Critical State Significant Infrastructure under Division 5.2 of the EP&A Act and accordingly, it would be assessed through the preparation of an environmental impact statement.

The key environmental issues that require further assessment as part of an EIS have been identified as:

- Aboriginal heritage;
- Biodiversity;
- Air quality and greenhouse gases;
- Plume rise and aviation hazard;
- Soils and contamination;
- Surface water and hydrology;
- Noise and vibration.

Other environmental issues have also been identified for further assessment as part of an EIS.

This Scoping Report forms part of Snowy Hydro's project application. It provides a description of the Proposal, existing information on environmental context and potential for environmental impacts and has been prepared in support of an application for the Secretary's environmental assessment requirements (SEARs) for the Proposal. An EIS will then be prepared addressing the SEARs and submitted to the Secretary.

# 9. References

Department of Planning and Environment, 2016. Hunter Regional Plan 2036

EPA, 2016. Approved Methods for the Modelling and Assessment of Air Pollutants in NSW

Office of Environment and Heritage, 2016. NSW Climate Change Policy Framework

PCB, 2018, *Hydro Aluminium Kurri Kurri Stormwater Management Report - Flood Modelling and Hydrology Review*

WMAwater, 2010, *Hunter River: Branxton to Green Rocks Flood Study*

ANZECC/ARMCANZ, 2000. *National Water Quality Management Strategy - Australian and New Zealand Guidelines for Fresh and Marine Water Quality.* Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand.

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Department of Environment and Conservation, 2006. *Using the ANZECC Guidelines and Water Quality Objectives in NSW*, ISBN 1-74137-9180, June 2006.

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Department of Environment, Climate Change and Water, 2006. *NSW Water Quality and River Flow Objectives – Hunter River*. Department of Environment, Climate Change and Water, 2006.

Department of Infrastructure, Planning and Natural Resources, 2004, *A guide to the Water Sharing Plan for the Hunter Regulated River Water Source*, September 2004

Environmental Protection Authority, 2013, *Hunter Catchment Salinity Assessment – Final Report*, Office of Environment and Heritage ISBN: 978 1 74359 322 6

Landcom, 2004. *Managing Urban Stormwater - Soils and Construction, Volume 1*, 4th Edition (known as the Blue Book Volume 1): Sydney, 2004.

Hydro Aluminium, 2015. *2015 Annual Environment Report – Hydro Aluminium Kurri Kurri Smelter*, Hydro Aluminium.

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Hydro Aluminium, 2017. *2017 Annual Environment Report – Hydro Aluminium Kurri Kurri Smelter*, Hydro Aluminium.

# Appendix A. EPBC Protected Matters Search Tool

Australian Government
Department of the Environment and Energy

# 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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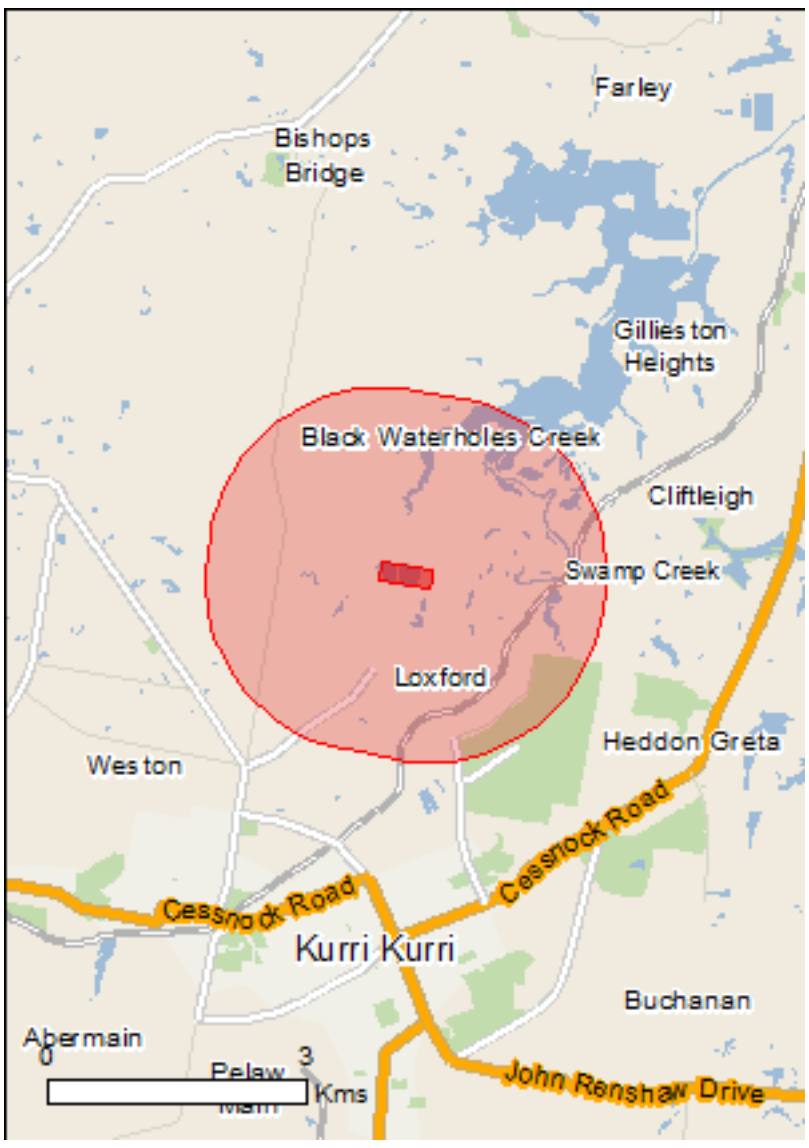


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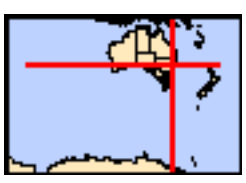

# Summary

## 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: | 1 |
| Great Barrier Reef Marine Park: | None |
| Commonwealth Marine Area: | None |
| Listed Threatened Ecological Communities: | 3 |
| Listed Threatened Species: | 35 |
| Listed Migratory Species: | 16 |

## 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: | None |
| Commonwealth Heritage Places: | None |
| Listed Marine Species: | 22 |
| Whales and Other Cetaceans: | None |
| 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: | None |
| Regional Forest Agreements: | 1 |
| Invasive Species: | 44 |
| Nationally Important Wetlands: | None |
| Key Ecological Features (Marine) | None |

# Details

## Matters of National Environmental Significance

### Wetlands of International Importance (Ramsar) [ Resource Information ]

| Name | Proximity |
|---|---|
| Hunter estuary wetlands | 10 - 20km upstream |

### 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 |
|---|---|---|
| Central Hunter Valley eucalypt forest and woodland | Critically Endangered | Community may occur within area |
| Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community | Endangered | Community may occur within area |
| White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland | Critically Endangered | Community may occur within area |

### Listed Threatened Species [ Resource Information ]

| Name | Status | Type of Presence |
|---|---|---|
| Birds | | |
| Anthochaera phrygia<br>Regent Honeyeater [82338] | Critically Endangered | Species or species habitat known to occur within area |
| Botaurus poiciloptilus<br>Australasian Bittern [1001] | Endangered | Species or species habitat likely to occur within area |
| Calidris ferruginea<br>Curlew Sandpiper [856] | Critically Endangered | Species or species habitat may occur within area |
| Erythrotriorchis radiatus<br>Red Goshawk [942] | Vulnerable | Species or species habitat likely to occur within area |
| Falco hypoleucos<br>Grey Falcon [929] | Vulnerable | Species or species habitat likely to occur within area |
| Grantiella picta<br>Painted Honeyeater [470] | Vulnerable | Species or species habitat likely to occur within area |
| Hirundapus caudacutus<br>White-throated Needletail [682] | Vulnerable | Species or species habitat known to occur within area |
| Lathamus discolor<br>Swift Parrot [744] | Critically Endangered | Species or species habitat likely to occur within area |
| Numenius madagascariensis<br>Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species habitat may occur within area |

| Name | Status | Type of Presence |
|---|---|---|
| Rostratula australis | | |
| Australian Painted Snipe [77037] | Endangered | 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 likely to occur within area |
| **Insects** | | |
| Synemon plana | | |
| Golden Sun Moth [25234] | Critically Endangered | Species or species habitat may 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 likely to occur within area |
| Petauroides volans | | |
| Greater Glider [254] | Vulnerable | Species or species habitat likely to occur within area |
| Petrogale penicillata | | |
| Brush-tailed Rock-wallaby [225] | Vulnerable | Species or species habitat may 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 may 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 | Foraging, feeding or related behaviour known to occur within area |
| **Plants** | | |
| Acacia bynoeana | | |
| Bynoe's Wattle, Tiny Wattle [8575] | Vulnerable | Species or species habitat known to occur within area |
| Cynanchum elegans | | |
| White-flowered Wax Plant [12533] | Endangered | Species or species habitat may occur within area |
| Eucalyptus glaucina | | |
| Slaty Red Gum [5670] | Vulnerable | Species or species habitat known to occur within area |
| Eucalyptus parramattensis subsp. decadens | | |
| Earp's Gum, Earp's Dirty Gum [56148] | Vulnerable | Species or species habitat known to occur within area |
| Euphrasia arguta | | |
| [4325] | Critically Endangered | Species or species habitat may occur within area |

| Name | Status | Type of Presence |
|---|---|---|
| Grevillea parviflora subsp. parviflora<br>Small-flower Grevillea [64910] | Vulnerable | Species or species habitat known to occur within area |
| Persicaria elatior<br>Knotweed, Tall Knotweed [5831] | Vulnerable | Species or species habitat may occur within area |
| Persoonia hirsuta<br>Hairy Geebung, Hairy Persoonia [19006] | Endangered | Species or species habitat may occur within area |
| Prasophyllum sp. Wybong (C.Phelps ORG 5269)<br>a leek-orchid [81964] | Critically Endangered | Species or species habitat may occur within area |
| Pterostylis gibbosa<br>Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood [4562] | Endangered | Species or species habitat may occur within area |
| Rhizanthella slateri<br>Eastern Underground Orchid [11768] | Endangered | Species or species habitat may occur within area |
| Rutidosis heterogama<br>Heath Wrinklewort [13132] | Vulnerable | Species or species habitat likely to occur within area |
| Syzygium paniculatum<br>Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307] | Vulnerable | Species or species habitat likely to occur within area |
| Reptiles | | |
| Delma impar<br>Striped Legless Lizard, Striped Snake-lizard [1649] | Vulnerable | Species or species habitat may 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 | | |
| Apus pacificus<br>Fork-tailed Swift [678] | | Species or species habitat likely to occur within area |
| Migratory Terrestrial Species | | |
| Cuculus optatus<br>Oriental Cuckoo, Horsfield's Cuckoo [86651] | | Species or species habitat may occur within area |
| Hirundapus caudacutus<br>White-throated Needletail [682] | Vulnerable | Species or species habitat known to occur within area |
| Monarcha melanopsis<br>Black-faced Monarch [609] | | Species or species habitat known to occur within area |
| Monarcha trivirgatus<br>Spectacled Monarch [610] | | Species or species habitat may occur within area |
| Motacilla flava<br>Yellow Wagtail [644] | | Species or species habitat may occur within area |
| Myiagra cyanoleuca<br>Satin Flycatcher [612] | | Species or species habitat likely to occur within area |

| Name | Threatened | Type of Presence |
|---|---|---|
| [Rhipidura rufifrons](#)<br>Rufous Fantail [592] | | Species or species habitat likely to occur within area |
| **Migratory Wetlands Species** | | |
| [Actitis hypoleucos](#)<br>Common Sandpiper [59309] | | Species or species habitat may occur within area |
| [Calidris acuminata](#)<br>Sharp-tailed Sandpiper [874] | | Species or species habitat likely to occur within area |
| [Calidris ferruginea](#)<br>Curlew Sandpiper [856] | Critically Endangered | Species or species habitat may occur within area |
| [Calidris melanotos](#)<br>Pectoral Sandpiper [858] | | Species or species habitat may occur within area |
| [Gallinago hardwickii](#)<br>Latham's Snipe, Japanese Snipe [863] | | Species or species habitat may occur within area |
| [Numenius madagascariensis](#)<br>Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species habitat may occur within area |
| [Pandion haliaetus](#)<br>Osprey [952] | | Species or species habitat likely to occur within area |
| [Tringa nebularia](#)<br>Common Greenshank, Greenshank [832] | | Species or species habitat may occur within area |

## Other Matters Protected by the EPBC Act

| 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](#)<br>Common Sandpiper [59309] | | Species or species habitat may occur within area |
| [Apus pacificus](#)<br>Fork-tailed Swift [678] | | Species or species habitat likely to occur within area |
| [Ardea alba](#)<br>Great Egret, White Egret [59541] | | Species or species habitat known to occur within area |
| [Ardea ibis](#)<br>Cattle Egret [59542] | | Species or species habitat may occur within area |
| [Calidris acuminata](#)<br>Sharp-tailed Sandpiper [874] | | Species or species habitat likely to occur within area |
| [Calidris ferruginea](#)<br>Curlew Sandpiper [856] | Critically Endangered | Species or species habitat may occur within area |

| Name | Threatened | Type of Presence |
|---|---|---|
| Calidris melanotos<br>Pectoral Sandpiper [858] | | Species or species habitat may occur within area |
| Chrysococcyx osculans<br>Black-eared Cuckoo [705] | | Species or species habitat likely to occur within area |
| Gallinago hardwickii<br>Latham's Snipe, Japanese Snipe [863] | | Species or species habitat may occur within area |
| Haliaeetus leucogaster<br>White-bellied Sea-Eagle [943] | | Species or species habitat likely to occur within area |
| Hirundapus caudacutus<br>White-throated Needletail [682] | Vulnerable | Species or species habitat known to occur within area |
| Lathamus discolor<br>Swift Parrot [744] | Critically Endangered | Species or species habitat likely to occur within area |
| Merops ornatus<br>Rainbow Bee-eater [670] | | Species or species habitat may occur within area |
| Monarcha melanopsis<br>Black-faced Monarch [609] | | Species or species habitat known to occur within area |
| Monarcha trivirgatus<br>Spectacled Monarch [610] | | Species or species habitat may occur within area |
| Motacilla flava<br>Yellow Wagtail [644] | | Species or species habitat may occur within area |
| Myiagra cyanoleuca<br>Satin Flycatcher [612] | | Species or species habitat likely to occur within area |
| Numenius madagascariensis<br>Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species habitat may occur within area |
| Pandion haliaetus<br>Osprey [952] | | Species or species habitat likely to occur within area |
| Rhipidura rufifrons<br>Rufous Fantail [592] | | Species or species habitat likely to occur within area |
| Rostratula benghalensis (sensu lato)<br>Painted Snipe [889] | Endangered* | Species or species habitat likely to occur within area |
| Tringa nebularia<br>Common Greenshank, Greenshank [832] | | Species or species habitat may occur within area |

# Extra Information

## 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** | | |
| Acridotheres tristis<br>Common Myna, Indian Myna [387] | | Species or species habitat likely to occur within area |
| Alauda arvensis<br>Skylark [656] | | Species or species habitat likely to occur within area |
| Anas platyrhynchos<br>Mallard [974] | | Species or species habitat likely to occur within area |
| Carduelis carduelis<br>European Goldfinch [403] | | Species or species habitat likely to occur within area |
| Columba livia<br>Rock Pigeon, Rock Dove, Domestic Pigeon [803] | | Species or species habitat likely to occur within area |
| Lonchura punctulata<br>Nutmeg Mannikin [399] | | Species or species habitat likely to occur within area |
| Passer domesticus<br>House Sparrow [405] | | Species or species habitat likely to occur within area |
| Passer montanus<br>Eurasian Tree Sparrow [406] | | Species or species habitat likely to occur within area |
| Pycnonotus jocosus<br>Red-whiskered Bulbul [631] | | Species or species habitat likely to occur within area |
| Streptopelia chinensis<br>Spotted Turtle-Dove [780] | | Species or species habitat likely to occur within area |
| Sturnus vulgaris<br>Common Starling [389] | | Species or species habitat likely to occur within area |
| Turdus merula<br>Common Blackbird, Eurasian Blackbird [596] | | Species or species habitat likely to occur within area |
| **Frogs** | | |
| Rhinella marina<br>Cane Toad [83218] | | Species or species habitat known to occur within area |
| **Mammals** | | |

| Name | Status | Type of Presence |
|---|---|---|
| Bos taurus<br>Domestic Cattle [16] | | Species or species habitat likely to occur within area |
| Canis lupus familiaris<br>Domestic Dog [82654] | | Species or species habitat likely to occur within area |
| Felis catus<br>Cat, House Cat, Domestic Cat [19] | | Species or species habitat likely to occur within area |
| Feral deer<br>Feral deer species in Australia [85733] | | Species or species habitat likely to occur within area |
| Lepus capensis<br>Brown Hare [127] | | Species or species habitat likely to occur within area |
| Mus musculus<br>House Mouse [120] | | Species or species habitat likely to occur within area |
| Oryctolagus cuniculus<br>Rabbit, European Rabbit [128] | | Species or species habitat likely to occur within area |
| Rattus norvegicus<br>Brown Rat, Norway Rat [83] | | Species or species habitat likely to occur within area |
| Rattus rattus<br>Black Rat, Ship Rat [84] | | Species or species habitat likely to occur within area |
| Sus scrofa<br>Pig [6] | | Species or species habitat likely to occur within area |
| Vulpes vulpes<br>Red Fox, Fox [18] | | Species or species habitat likely to occur within area |
| **Plants** | | |
| Alternanthera philoxeroides<br>Alligator Weed [11620] | | Species or species habitat likely to occur within area |
| Anredera cordifolia<br>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<br>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<br>Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473] | | Species or species habitat likely to occur within area |
| Cabomba caroliniana<br>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<br>Bitou Bush, Boneseed [18983] | | Species or species habitat may occur within area |
| Chrysanthemoides monilifera subsp. monilifera<br>Boneseed [16905] | | Species or species habitat likely to occur within area |

| Name | Status | Type of Presence |
|---|---|---|
| Chrysanthemoides monilifera subsp. rotundata<br>Bitou Bush [16332] | | Species or species habitat likely to occur within area |
| Cytisus scoparius<br>Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934] | | Species or species habitat likely to occur within area |
| Dolichandra unguis-cati<br>Cat's Claw Vine, Yellow Trumpet Vine, Cat's Claw Creeper, Funnel Creeper [85119] | | Species or species habitat likely to occur within area |
| Eichhornia crassipes<br>Water Hyacinth, Water Orchid, Nile Lily [13466] | | Species or species habitat likely to occur within area |
| Genista sp. X Genista monspessulana<br>Broom [67538] | | Species or species habitat may occur within area |
| Lantana camara<br>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 |
| Opuntia spp.<br>Prickly Pears [82753] | | Species or species habitat likely to occur within area |
| Pinus radiata<br>Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780] | | Species or species habitat may occur within area |
| Rubus fruticosus aggregate<br>Blackberry, European Blackberry [68406] | | Species or species habitat likely to occur within area |
| Sagittaria platyphylla<br>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<br>Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497] | | Species or species habitat likely to occur within area |
| Salvinia molesta<br>Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665] | | Species or species habitat likely to occur within area |
| Senecio madagascariensis<br>Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624] | | 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

-32.783665 151.481208,-32.783674 151.481208,-32.784414 151.486551,-32.786164 151.486294,-32.785325 151.480908,-32.783665 151.481208

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-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
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-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

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


Department of the Environment
GPO Box 787
Canberra ACT 2601 Australia
+61 2 6274 1111