Hunter Power Project (Kurri Kurri Power Station)

Critical State Significant Infrastructure Assessment (SSI 12590060)

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Cover image: Proposed site of the project within the former Kurri Kurri Smelter remediation – site photo 30 September 2021.

Executive Summary

Background

The Hunter Power Project, also known as the Kurri Kurri Power Station, is a proposal by Snowy Hydro Ltd for an open cycle gas-fired power station and associated infrastructure, including a new electrical switchyard and substation infrastructure and transmission line augmentation to connect into the existing transmission network.

Gas would be supplied to the project from the existing Sydney to Newcastle gas distribution network via a new dedicated 17-kilometre pipeline. It is anticipated that APA Group will submit a separate project application for the pipeline in early 2022, known as the Kurri Kurri Lateral Pipeline Project, which also includes a high-pressure storage pipeline adjacent to the site.

These two projects together are classified as Critical State Significant Infrastructure (CSSI) under the *Environmental Planning and Assessment Act 1979* (EP&A Act), as they would contribute to energy security and reliability in NSW with the proposed closure of NSW coal-fired power stations over the next 15 years, including the Liddell Power Station by 2023. Consequently, both the Hunter Project (referred to as 'the project' in this report) and the Kurri Kurri Lateral Pipeline Project require determination by the Minister for Planning and Public Spaces.

The project is a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) because it is an action taken by a Commonwealth agency that is likely to have a significant impact in the environment.

The project would be located at the site of the former Kurri Kurri aluminium smelter in the suburb of Loxford, north of Kurri Kurri in the Cessnock City Council local government area. The site is currently zoned Rural RU2 (rural landscape) but there is currently a planning proposal for the smelter site and surrounding buffer lands to be rezoned, including a zoning of heavy industrial for the proposed power station site, with area around the site proposed to be zoned general industrial.

Project

The project involves the construction and operation of:

- a gas-fired power station, consisting of 2 open cycle gas turbines with a nominal output capacity of up to 750 megawatts (MW), capable of operating on natural gas or diesel fuel as a backup;
- other associated ancillary infrastructure, including a new electrical switchyard, substation infrastructure, and transmission line augmentation to connect into the National Electricity Market (NEM); and
- decommissioning of the gas-fired power station and site rehabilitation at the end of project's operating life.

The project is designed to provide dispatchable peaking energy and would operate using natural gas up to 10% of the year and diesel as a backup fuel up to 2% of the year. The project would be capable of using up to 10% hydrogen subject to the capability of the gas transmission network and planning approvals. It is anticipated that the power station would operate on average 2% of the year.

The project has a capital cost of $610 million and would generate up to around 250 full-time equivalent jobs during peak construction and 10 full-time equivalent jobs during operation. The project is funded by the Commonwealth Government.

Engagement

The Department exhibited the application and the Environmental Impact Statement (EIS) for the project from 13 May to 9 June 2021 and consulted with key government agencies and Cessnock City Council.

The Department received 247 public submissions during exhibition of the EIS, 26 from special interest groups and 221 from individuals. 241 of the public submissions objected to the project. The key issues raised in public submissions related to greenhouse gas and climate change impacts from the use of natural gas with diesel as a backup, the justification for the project to provide energy security compared to renewable energy alternatives, and local and regional air quality impacts.

The Department also received advice from 13 government agencies and Cessnock Council. None of the government agencies objected to the project. However, they provided comments on the key aspects of the project and recommended conditions of approval.

Assessment

The Department carried out a comprehensive assessment of the merits of the project in accordance with the objects of the EP&A Act, (including the principles of ecologically sustainable development, and the social and economic welfare of the community), and applicable Commonwealth and NSW Government policies and guidelines. The Department carefully considered the issues raised in submissions, agency advice and Snowy Hydro's response to issues raised during the assessments.

Energy Security and Reliability

The Department considered all relevant Commonwealth and NSW energy polices in the context of a rapidly changing electricity market with the transition to a low carbon emissions energy sector and the proposed closure of coal-fired power stations commencing with Liddell Power Station by 2023.

The Australian Energy Market Operator's (AEMO) *2020 Integrated System Plan* identified the need for 6-19 gigawatts (GW) of new dispatchable energy supply from a range of technology options in the NEM through to 2040 to back up variable renewable energy generation.

AEMO's most recent 2021 *Electricity Statement of Opportunity* identifies the proposed Hunter Power Station as a committed dispatchable power supply, along with other new generation and transmission projects, to fill an energy reliability gap with the upcoming closure of Liddell Power Station, and subsequent energy reliability gaps with the predicted closure of other Hunter Valley coal-fired power stations in the late 2020s to early to mid-2030s.

The Department considers that the development of a gas-fired power station would provide an important step in firming capacity to support the existing and growing energy supply from renewables.

Greenhouse Gas and Climate Change

The project would generate a peak of around 0.41 million tonnes (Mt) of CO_2 equivalent ($CO_{2\text{-}e}$) of Scope 1 and Scope 2 emissions a year, based on the operation of the power station at its proposed maximum capacity of up to 12% of the year. However, it is expected that the power station, in providing peaking power at times of high demand and low supply from intermittent variable sources, would only

operate on average 2% over a year, which would significantly reduce the predicted emissions. Peak operations would contribute 0.3% of NSW emissions (based on the latest available 2019 emissions inventory) and 0.05% based on a 2% average capacity factor.

The Department acknowledges that the NSW Government has recently announced through the *Net Zero Plan Stage 1: 2020-2030 Implementation Update* (2021), a target of reducing NSW's emissions by between 47-52% compared to 2005 levels by 2030 – with an emissions target of between 78.9 to 87.6 Mt that would be achieved through current policy settings.

Based on the NSW Government's latest emissions modelling information, the Department considers that the project would not significantly increase greenhouse gas emissions in NSW or constrain the ability to achieve the target of a 50% reduction in emissions by 2030. Further, the hydrogen capabilities of the project present the opportunity to further reduce the emissions of the project, where clean hydrogen is used in the fuel mix.

To ensure that the greenhouse gas emissions from the project are consistent with predictions, the Department has recommended conditions to limit the operation of the power station to a maximum cumulative period equivalent to 2% of the year on diesel and 12% of the year in total, subject to any request from AEMO for emergency operation. The Department has also recommended that Snowy Hydro continue to investigate opportunities to use hydrogen gas in power generation, which would be subject to further planning assessment.

Air Quality

Following a comprehensive technical review by the EPA, the Department accepts the air quality modelling predictions that there would only be a minor incremental increase in ambient concentrations of key air pollutants at sensitive receivers around the site. The Department notes that the modelling conservatively assumed that the power station was operating throughout the entire year to ensure representative climate conditions were modelled. This compares to proposed operations of maximum 12% of the year with a typical capacity factor of 2%.

However, the project is already located within an area where current $PM_{2.5}$ and ozone annual background concentrations have exceeded NSW annual ambient air quality limits in recent years due to a combination of natural, industrial and event-based sources (such as bushfires and hazard reduction).

The EPA advised that it was satisfied that it could regulate the site under an environment protection licence subject to strict conditions, including setting limits on annual operating time using gas and diesel, consistent with commitments in the EIS, stack discharge limits consistent with regulatory requirements and best practice, and validation testing and ongoing monitoring.

Other issues

The Department has considered a range of other issues in its assessment including but not limited to hazards and risks, contaminated land, noise impacts during construction, biodiversity and heritage impacts, management of waste streams, including broader social and economic aspects associated with the project. The Department considers that these impacts can be appropriately mitigated and/or offset in accordance with NSW government statutory requirements, guidelines and policy requirements.

Evaluation

The Department considers that the development of a gas-fired power station in the Hunter region would contribute to energy reliability and security in the NEM as it transitions away from coal-fired power station power generation over the next 10-15 years. The project is recognised as a committed project in the recent 2021 *Electricity Statement of Opportunities* as it would provide firming capacity to supplement the increasing supply of renewable energy and contribute to overall system reliability in the NEM.

The Department considers that project impacts have largely been avoided by site selection. The project is located on a highly disturbed brownfield site which has minimised potential impacts related to ground disturbance including to biodiversity and Aboriginal and non-Aboriginal heritage. The project site is located within an historic industrial setting surrounded by large areas of remnant vegetation and larger rural lots and commercial/ industrial operations, providing a buffer to minimise noise, air quality and visual impacts to residential receivers. The nearest residences are located in Loxford, around 1.2 kilometres (km) from the project site.

There is a current planning proposal over the broader Kurri Kurri smelter and buffer land which would rezone the site to heavy industrial while still retaining a significant buffer to proposed low density residential zoning. The Department considers that the proposed construction and operation of the power station at this location would be consistent with current and proposed land use, with sufficient buffer to sensitive receivers in relation to minimising amenity impacts.

The key issues raised in public submissions related to greenhouse gas and climate change impacts from the use of natural gas with diesel as a backup, the justification for the project to provide energy security compared to renewable energy alternatives, and local and regional air quality impacts.

As described in the *Australia's Long-Term Emissions Reduction Plan* (Australian Government, 2021), the Australian Government's pathway for achieving net zero emissions by 2050 is set out by deployment of low emissions technology at scale in all sectors, including electricity generation. This includes strategic investments in new and lower emissions storage and dispatchable power generation through pumped-hydro and battery projects as well as this proposal.

The Department considers that the project operating as a peaking plant, with an emission intensity significantly lower than coal-fired power generation, while also providing dispatchable power, has an important role to play in overall system reliability and security. The overall greenhouse gas emissions from the project are small compared to NSW and Commonwealth emissions inventories and would not constrain the NSW government's target to reduce greenhouse gas emissions by between 47 to 52% by 2030.

The Department and EPA consider that with the implementation of the project's mitigation measures and the recommended conditions, the project can be appropriately managed to minimise air quality impacts on local receivers and regional airshed.

Overall, the Department considers that the project has been designed in a way that avoids and minimises social and environmental impacts as far as practicable. The Department has carefully considered the residual potential impacts of the development on the environment, in consultation with key government agencies.

The Department has concluded that the residual impacts can be adequately minimised, managed, or offset, to an acceptable standard, subject to a comprehensive framework of recommended conditions

of approval. Consequently, the development can be carried out in a manner that is consistent with the principles of ecologically sustainable development.

Additionally, the project would deliver economic benefits to the Hunter Region and NSW as a whole by generating $610 million of capital investment, creating up to 250 construction jobs at the peak of construction and up to 10 operational jobs over the life of the project.

The Department considers the project is consistent with the relevant NSW and Commonwealth strategic policy framework regarding climate change and energy security.

On balance, the Department considers that the benefits of the Hunter Power Project outweigh its costs, and the project is in the public interest and approvable, subject to strict conditions.

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1 Introduction

Snowy Hydro Limited (Snowy Hydro) proposes to develop the Hunter Power Project (the project), also known as the Kurri Kurri Power Station, and associated infrastructure, including a new electrical switchyard, substation infrastructure, and transmission line augmentation to connect into the existing transmission network.

The project would be located within the site of the former Kurri Kurri aluminium smelter in the suburb of Loxford, north of Kurri Kurri, around 35 kilometres (km) west of Newcastle and 125 km north of Sydney in the Cessnock City Council local government area (see **Figure 1**).

The project is funded by the Australian Commonwealth Government and would be operated as a peaking power station to supply electricity at short notice when there is a requirement into the National Energy Market (NEM).

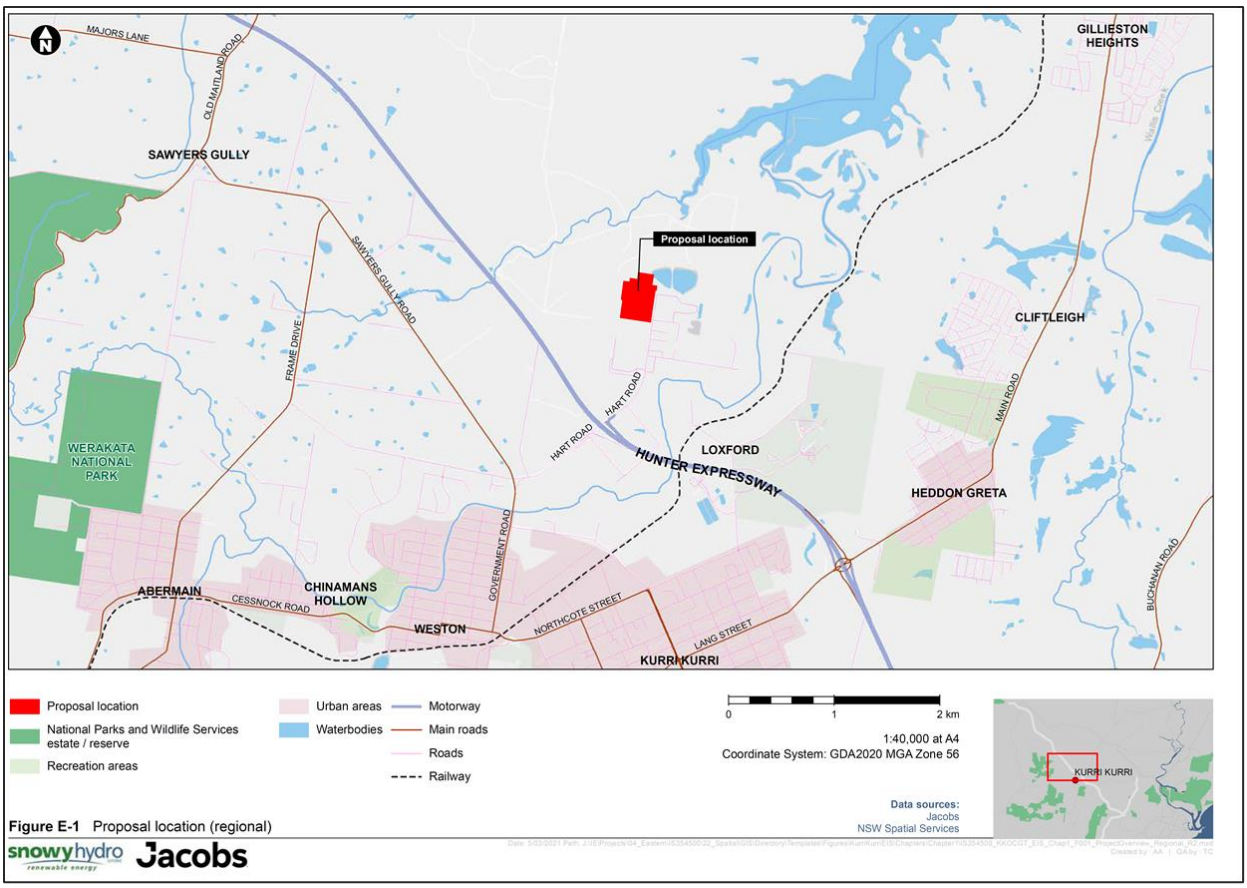

Figure 1 | Regional Context (Source: Environmental Impact Statement)

2 Project

2.1 Overview

The project involves the construction and operation of:

- a gas-fired power station, consisting of 2 open cycle gas turbines with a nominal output capacity of up to 750 MW, capable of operating on natural gas or diesel fuel as a backup;
- other associated ancillary infrastructure, including a new electrical switchyard, substation infrastructure, and transmission line augmentation to connect into the NEM; and
- decommissioning of the gas-fired power station and site rehabilitation at the end of project's operating life.

The main components of the project are summarised in **Table 1,** shown in Figure 2, and described in detail in the Environment Impact Statement (EIS), Submissions Report and additional Information (see **Appendix A**).

Table 1 | Main components of the project

Aspect	Description
Project Area	• Development footprint: 12.75 hectares (ha), covering the whole proposed project site and requiring 2.11 ha of vegetation clearing
Power Generation	• Technology – two F-Class open cycle gas turbines with nominal total generation capacity of 330 MW each – total capacity of 660 MW • Fuel - natural gas with diesel fuel as backup
Electricity Transmission	• 132 kilovolts (kV) electrical switchyard constructed to the north of the power station, connecting into Ausgrid's existing 132 kV transmission lines • Switchyard equipment would include either underground cables or overhead line support gantries.
Water and Wastewater	• Water – requiring 80 megalitres (ML) per year • Wastewater – generating about 16.2 ML per year • Potable and wastewater infrastructure would be provided up to the site boundary. Connections from the site boundary to the existing Hunter Water potable and wastewater network would be provided subject to a separate approval process (refer to **Section 3.5**) • Municipal sewage would be discharged to the sewer network. Other liquid waste streams would be discharged in accordance with Hunter Water trade waste requirements.
Ancillary Infrastructure	• Internal roads, parking areas and laydown areas • Diesel storage tanks • Control room, administration buildings, workshop and storage areas • Stormwater drainage system
Construction Period	• Up to 2 years, standard construction hours of 7 am - 6 pm weekdays, 8 am - 1 pm on Saturdays, and at no time on Sundays and public holidays • Out-of-hours works for delivery of large items
Operational Life	• 30 years – peaking power station with a proposed capacity factor of around 2% of the year on average, up to a maximum of 12% of the year (or around 1,100 cumulative hours per year), comprising of 10% on natural gas, and 2% on diesel fuel.

Aspect	Description
Rehabilitation	• Decommission the power station and rehabilitate the project site to for continued industrial use
Employment	• Construction - up to 250 full time equivalent (FTE) jobs • Operation – up to 10 FTE jobs for routine operations, and up to 50 FTE for major maintenance
Capital Cost	• $610 million

2.2 Power Generation

The project involves the construction and operation of a power station generating power from two F-Class open cycle gas turbines (OCGT), with a nominal output of up to 750 MW, with Snowy Hydro in its business case advising that two 330 MW gas turbines are proposed to be commissioned. Snowy Hydro would operate the project remotely from its control centre in Cooma as supported by approximately 10 FTE local staff.

The power station's start-ups would range from 50 to 200 occasions per year, with each start-up taking approximately 30 minutes to reach full capacity. The power station would be operational for 2% of the year on average, up to a maximum of 12% of the year (around 1,100 cumulative hours), comprising of up to 10% on natural gas and up to 2% on diesel fuel.

The turbine technology proposed to be used allows operation on natural gas blended with up to 10% hydrogen, with upgrades needed to operate with up to 30% hydrogen. However, Snowy Hydro would be required to seek further planning approval to use hydrogen as a fuel option, as use of hydrogen was not assessed in the EIS.

Natural gas would be supplied to the project site from the existing Sydney to Newcastle gas transmission network via a new lateral pipeline and connect to a gas receiving station within the project site boundary. The new lateral pipeline and gas receiving station are part of the Kurri Kurri Lateral Pipeline Project, which is subject to a separate planning approval process (refer to **Section 3.5**).

When natural gas is not available, the project would operate on diesel, compliant with *Fuel Quality Standards (Automotive Diesel) Determination 2019*. Diesel would be transported to the site via road and be stored in two 1.75 ML on-site storage tanks.

2.3 Timing

Subject to planning approvals, Snowy Hydro anticipates commencing construction of the project at the start of 2022, taking about 2 years, and the first open cycle gas turbine operational between August and December 2023 to coincide with the planned closure of Liddell Power Station in 2022-2023.

Snowy Hydro proposes to operate the project for 30 years and would be required to decommission the power station and rehabilitate the project site for continued industrial use at the end of project life.

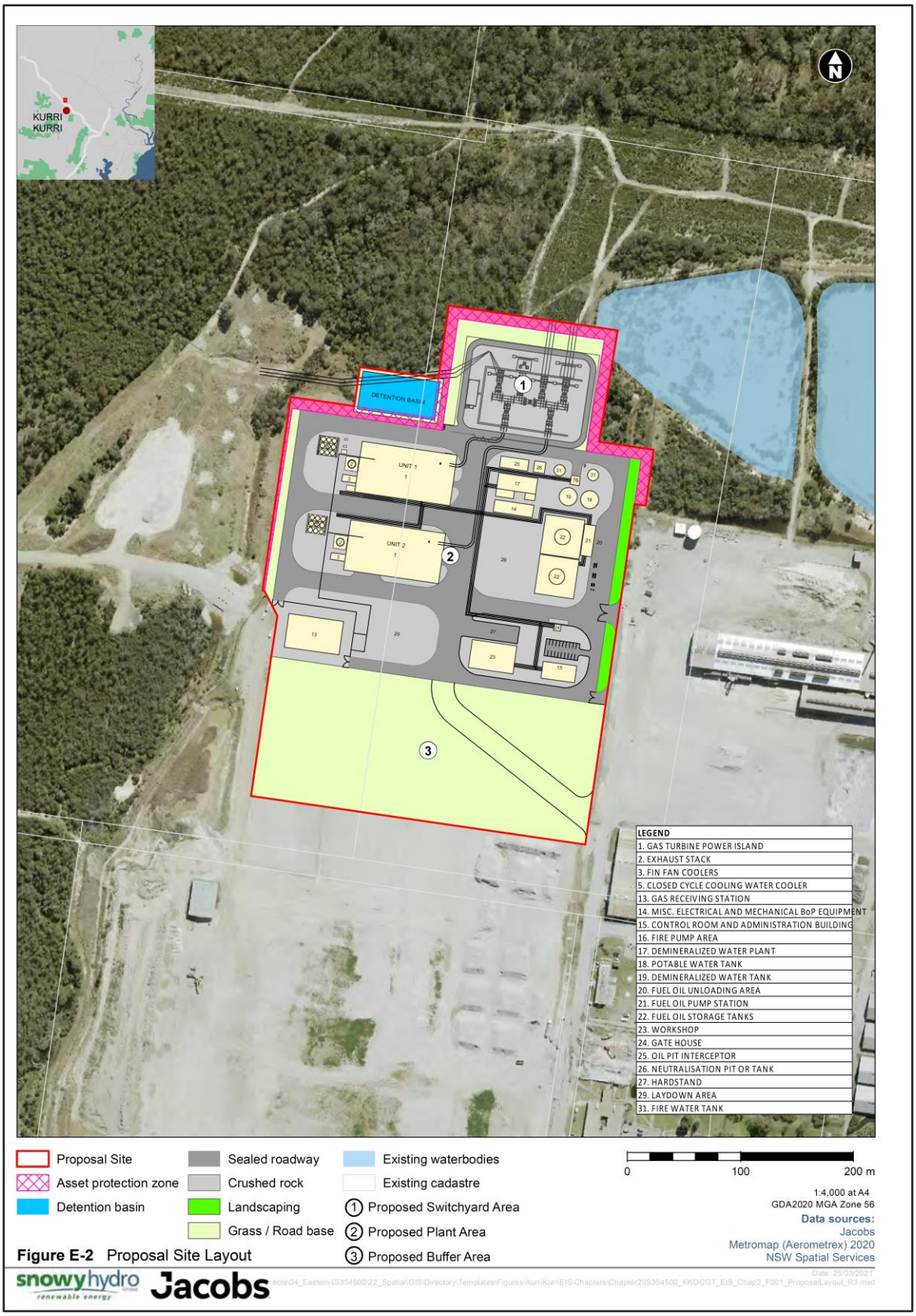

Figure 2 | The Project Site Layout (Source: Environmental Impact Statement)

2.4 Project Design

The project is located on a highly disturbed brownfield site which has minimised potential impacts related to ground disturbance including to biodiversity and Aboriginal and non-Aboriginal heritage. The project site is located within an historic industrial setting surrounded by large areas of remnant vegetation and larger rural lots and commercial/ industrial operations, providing a buffer to minimise noise, air quality and visual impacts to residential receivers. The nearest residences are located in Loxford, around 1.2 km from the project site (refer to **Section 3.2** for further detail).

Snowy Hydro has selected a F-Class gas turbine design which provides for a reduced emissions intensity compared to some of the existing open cycle gas turbines connected to the NEM. The turbine technology would allow the potential for operation on natural gas blended hydrogen which would provide the opportunity to further minimise greenhouse gas impacts, subject to future planning approval.

3 Strategic Context

This section describes the relevant strategic policy framework, site context and considers other projects relevant to the local context of the Hunter Power Project. As energy security and climate change are considered to be key assessments issues for the project, an outline of the strategic policy framework is provided in this section and detailed consideration is provided in **Section 6.1**.

3.1 Energy Security

The project was declared Critical State Significant Infrastructure (CSSI) by the Minister for Planning and Public Spaces in 2020 as the project would:

- mitigate the dispatchable energy security risks posed to the NEM by the scheduled closure of Liddell Power Station in 2022-2023 and other future planned coal-fired power station closures;
- facilitate NSW's transition to a low carbon emissions economy by providing firming power to existing and proposed intermittent renewable energy projects;
- mitigate potential electricity price increases associated with the closure of Liddell Power Station; and
- generate additional investment and jobs in NSW, including direct employment of up to 250 people during construction and a capital cost of $610 million.

The following key documents provide the strategic policy framework for energy security in NSW and Australia:

- the *NSW Electricity Strategy* (NSW Government, 2019);
- the *NSW Electricity Infrastructure Roadma*p (NSW Government, 2020);
- the *NSW Future of Gas Statement* (NSW Government, 2021);
- the Australian Energy Market Operator's (AEMO) *Integrated System Plan 2020;*
- AEMO's *Electricity Statement of Opportunities 2021 (ESOO 2021);*
- *State of the energy market 2021* (Australian Energy Regulator (AER), 2021); and
- *Report of the Liddell Taskforce* (Commonwealth of Australia and NSW Government, 2020).

This policy framework identifies the following:

- renewables are now the most economic form of new generation, with a mix of wind and solar firmed with gas, batteries and pumped hydro expected to be the most economic form of reliable electricity;
- coal-fired power stations are approaching the end of their lives, creating a need for substantial investment in replacement energy supply;
- dispatchable energy supply is increasingly important to complement variable renewable energy sources and facilitate the transition to a low carbon emissions energy sector. By 2040, 6-19 GW of new dispatchable resources are needed for firming capacity;
- synchronous energy supply is increasingly important to maintain the security of the energy system as coal-fired power stations are retired; and
- gas-fired power will continue to play a role in the energy transition to lower emissions sources by providing firming capacity and system security.

AEMO's *Electricity Statement of Opportunities 2021* (published July 2021) provides the most current forecasting and modelling, including consideration of potential shortfalls in electricity supply to maintain energy reliability in the NEM. This is discussed further in **Section 6.1**.

3.2 Site and Surrounds

The project would be located within land currently zoned as RU2 - Rural Landscape under the *Cessnock Local Environmental Plan 2011* at the site of the former Kurri Kurri aluminium smelter (the smelter) in Loxford NSW. The smelter was operational from 1969 to 2012 and was closed in 2014. Land use around the project site is primarily RU2 - Rural Landscape, with small pockets of surrounding land zoned E2 - Environmental Conservation, and the Hunter Expressway zoned as SP2 – Infrastructure (refer to **Figure 3**).

The project site and surrounding area is generally flat and within a highly disturbed brownfield site due to its former land use, with native vegetation coverage limited to the north, east and west and low density rural and semi-rural land uses to the south and east, including semi-rural residential properties. Nearby watercourses include a tributary of Black Waterholes Creek, located immediately to the west of the project site and Swamp Creek, located 900 m to the east (refer to **Figure 4**).

The nearest residences are located in Loxford, around 1.2 km southeast of the project site on Dawes Avenue and 1.2 km southwest of the project site on Bishops Gate Road respectively. These residences are rural residential properties and are identified as RR1 and RR2 in **Figure 5**. The township of Kurri Kurri is located around 2.5 km to the south, and the Hunter Expressway is located around 1.5 km to the south with access to the project site via Hart Road.

Preparation of the project site, including demolition and remediation of the smelter site is to be completed by January 2021 prior to the commencement of the construction of the project, as part of the Hydro Kurri Kurri Aluminium Smelter Remediation Project (SSD 6666) (refer to **Section 3.5**). Ausgrid's existing 132 kilovolts (kV) overhead transmission infrastructure, which provided power for the smelter, is located adjacent to the project site and would be used and connected to the project's new switchyard.

It is noted that there is a planning proposal currently being considered by Cessnock City Council and the Department to rezone the former smelter site to IN3 - Heavy Industrial. Further details regarding the planned rezoning is provided in **Section 3.5**.

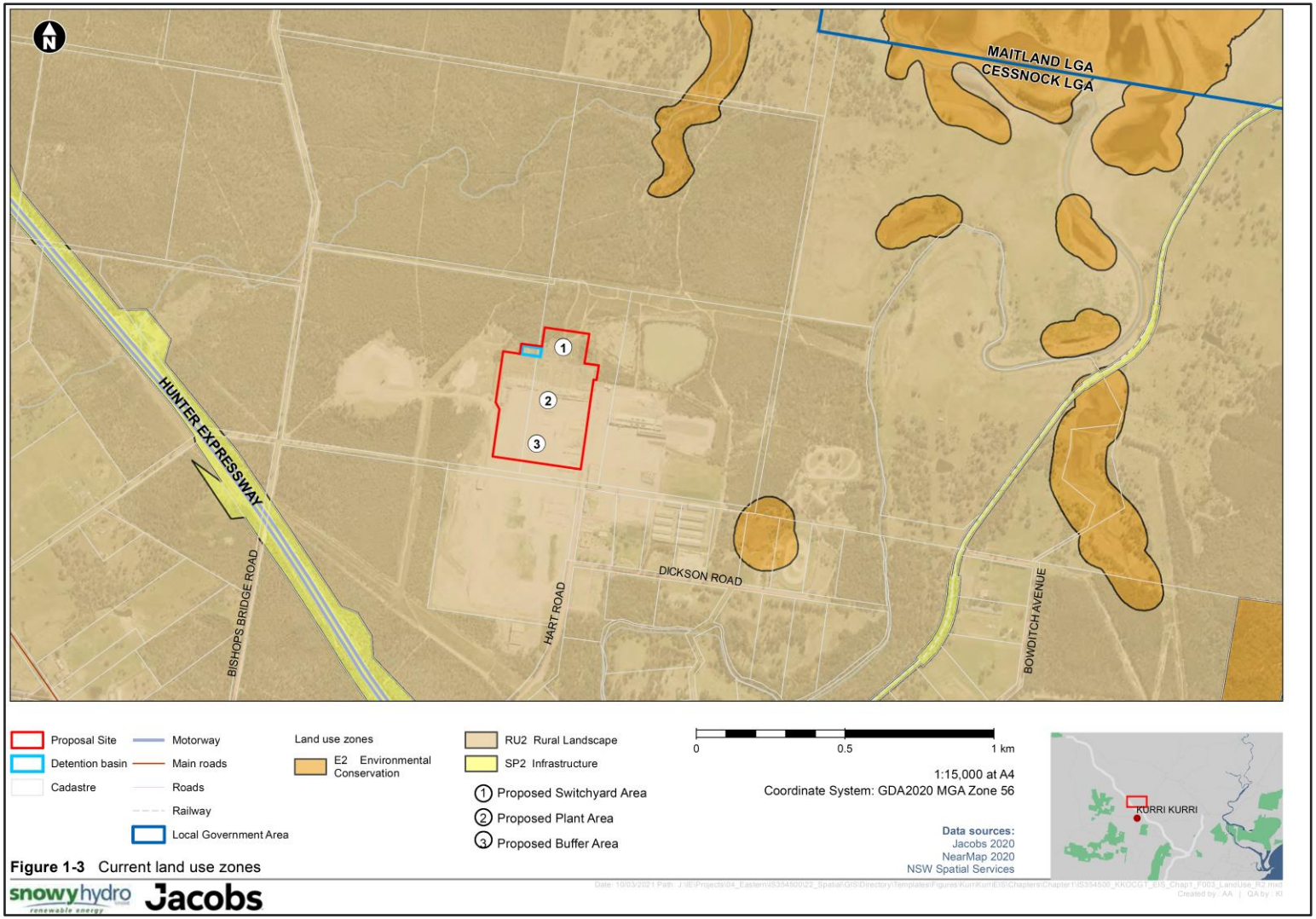

Figure 3 | Project land zoning (Source: Source: Environmental Impact Statement)

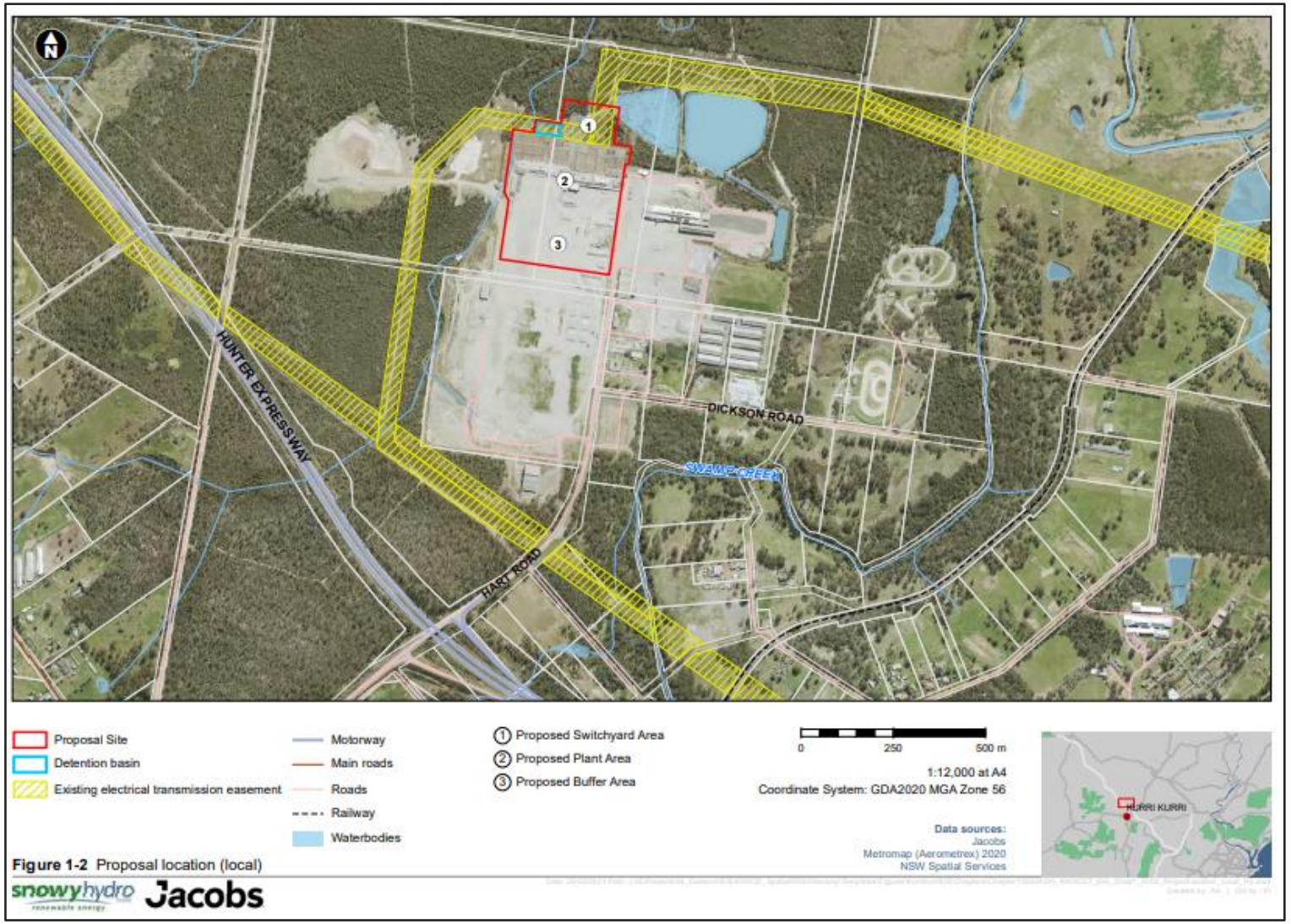

Figure 4 | Local context (Source: Environmental Impact Statement)

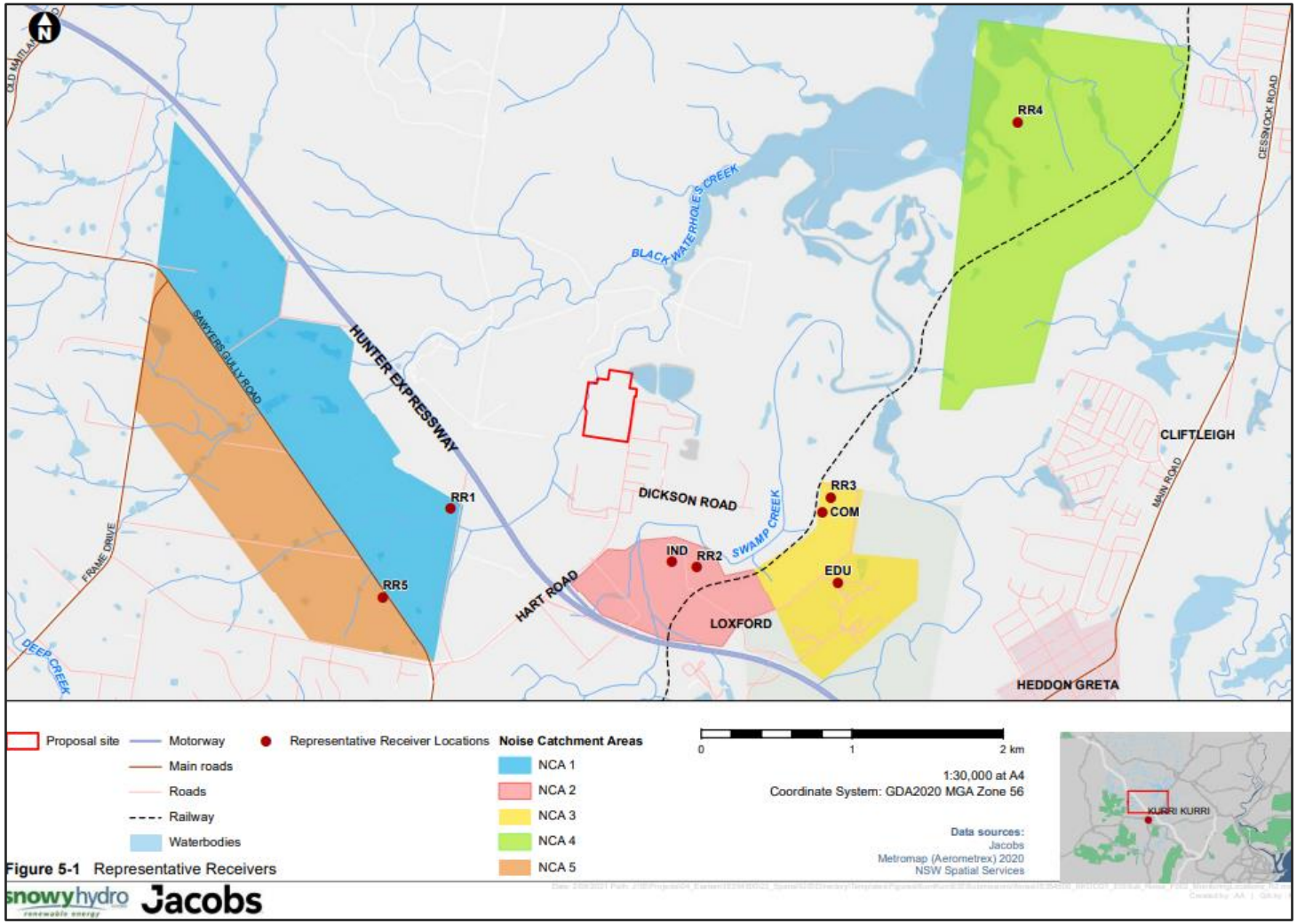

Figure 5 | Nearby representative sensitive receivers (Source: Environmental Impact Statement)

Note: The figure identifies representative receivers and the noise catchment areas assessed in the noise impact assessment

3.3 Greenhouse Gas and Climate Change

The strategic policy context for the national and NSW state response to addressing climate change is captured in the Paris Agreement, *Australia's Long-Term Emissions Reduction Plan* (Australian Government, 2021) and *Net Zero Plan Stage 1: 2020-2030* (NSW Government, 2020). Australia is one of 187 countries that have committed to keeping global temperature rises to well below 2°C under the Paris Agreement.

Australia's Long-Term Emissions Reduction Plan outlines the Australian Government's strategic investments in new dispatchable generation to achieve net-zero emissions by 2050. The plan identifies that declining technology costs would enable the sector to achieve near zero emissions, with variable renewable energy providing more than 85% of total generation, with gas generation remaining in the electricity grid by 2050.

The NSW Government's objective is to achieve net zero emissions by 2050, consistent with the Australian Government target. The *Net Zero Plan Stage 1: 2020–2030* (2020) sets out how the NSW Government will deliver on this objective over the next decade. In the *Net Zero: Stage 1: 2020-2030 Implementation Update (2021)*, the NSW Government committed to halving emissions by 2030 compared to 2005 levels.

The *NSW Electricity Infrastructure Roadmap* provides an outline of how the State's electricity infrastructure will transition to cleaner, cheaper and more reliable energy sources. Along with investing in renewable energy zones and battery storage systems, the roadmap identifies that gas peaking power stations are one of a number of technologies required to provide dispatchable energy to offset decrease in capacity when supply from intermitted renewable sources cannot meet demand. The roadmap notes new gas-fired power stations should be designed to be 'hydrogen-ready'.

3.4 Energy Policy

Emissions Reporting

The Commonwealth *National Greenhouse and Energy Reporting Act 2007* (NGER Act) provides a scheme for a single national framework for Australian developers, particularly for reporting greenhouse gas emissions, energy production and energy consumption.

The *National Greenhouse and Energy Reporting Regulations 2008* (NGER Regulations) sets out specific details to achieve compliance and procedures for administering the NGER Act in relation to scopes 1 and 2 emissions and energy consumption/production of a facility.

The Clean Energy Regulator, an independent statutory authority by the *Clean Energy Regulator Act 2011*, sets out obligations for facilities with annual Scope 1 emissions exceeding the safeguard threshold of 100 kt of CO_2 equivalent ($CO_{2\text{-}e}$) emissions. Responsible facilities are required to register under the NGER Act and reduce the facility's net emissions or offset the excess emissions; e.g. by purchasing and surrendering Australian carbon credit units (ACCUs).

This additional safeguard mechanism is administered through the NGER scheme, and the Clean Energy Regulator publishes the relevant information about the responsible facilities in a reporting year, including the baseline emissions number in force for that year, total reported emissions, the responsible emitter(s) for each facility, and any ACCUs surrendered.

Natural Gas and Hydrogen

Natural gas demand and production are forecast in AEMO's *Gas Statement of Opportunities 2021 (GSOO 2021).* The GSOO identifies that NSW currently consumes around 117 petajoules (PJ) of gas per year.

The GSOO 2021 forecasts sufficient gas supply to at least 2026 based on current committed projects, including the Port Kembla Gas Terminal. A shortfall is forecast beyond 2026 for the east-coast gas market, unless more gas supply is developed, or pipeline limitations are addressed.

There are a number of approved and proposed projects that have potential to increase gas supply and pipeline limitations in NSW including the Narrabri Gas Project, Queensland-Hunter Gas Pipeline and proposed Newcastle Gas Terminal Project.

The GSOO 2021 notes industrial demand for natural gas is not forecast to grow in the next 20 years and could potentially reduce significantly as industrial users in the gas sector start to decarbonise. Hydrogen is also anticipated to reduce overall natural gas consumption and greenhouse gas emissions in the energy sector.

Hydrogen manufacturing is an emerging industry in Australia and *Australia's National Hydrogen Strategy* (Council of Australian Governments Energy Council, 2020) and *Australia's Long-Term Emissions Reduction Plan* identifies Australia has the potential to become a significant manufacturer and exporter of hydrogen. The strategy identifies that there are not any significant implications for gas quality or safety from blending up to 10% hydrogen by volume in gas distribution networks.

In October 2021, the NSW Government released the NSW Hydrogen Strategy to help scale up the hydrogen industry in NSW, including a target of up to 10% hydrogen in the gas network by 2030.This initiative is part of the NSW Government's *Net Zero Plan Stage 1: 2020-2030* since 2020, and at least $70 million funding has been allocated to develop hydrogen hubs in the Hunter and Illawarra regions.

The *NSW Electricity Infrastructure Roadma*p identifies that new gas peaking power stations must be hydrogen-ready.

3.5 Related projects

Kurri Kurri Lateral Pipeline Project

The Kurri Kurri Lateral Pipeline Project would supply gas to the Hunter Power Project via a new lateral pipeline connection from the existing eastern Australia gas transmission network. This project was included in the CSSI declaration for the Hunter Power Project but is a separate project subject to separate assessment and approval. The Planning Secretary's Environmental Assessment Requirements for the Kurri Kurri Lateral Pipeline Project were issued in July 2021 and it is anticipated that an EIS for this project will be lodged in Q1 2022.

The Kurri Kurri Lateral Pipeline Project would include a new lateral transmission pipeline, storage pipeline and gas receiving station.

The gas receiving station would be established inside the project site for the Hunter Power Project and would comprise facilities for gas metering, pressure regulation, heating stations piping and valves and potential provision for flaring. The gas fuel system would be designed to provide gas at a pressure and

temperature as required by the gas turbines. The terminating point for this proposal is the outlet flange of the gas receiving station.

Water and Wastewater Connections (Hunter Water)

Potable and wastewater connections from the existing Hunter Water network to the site boundary would be provided by Hunter Water. The connections are subject to a separate assessment and approval process including the preparation of a Review of Environmental Factors. The connections would be delivered by Hunter Water, subject to approval.

The connection point to the existing network would be at the intersection of Hart Road and Dickson Road (located about 500 metres to the south of the project site). Hunter Water have confirmed that potable and wastewater/trade waste services are available to serve the project subject to Hunter Water application and permitting processes.

Kurri Kurri Hydro Aluminium Smelter Remediation Project and Planning Proposal

The Kurri Kurri Hydro Aluminium Smelter Remediation Project (SSD 6666) was approved in December 2020.

The existing aluminium smelter property is currently owned by Hydro Aluminium Kurri Kurri Pty Ltd (Hydro Aluminium). Since the closure and demolition of the smelter, extensive remediation works have been carried out as part of SSD 6666 including the first stage of the removal of existing structures, asbestos removal, and recycling of waste materials.

Prior to the construction of the project the demolition and remediation works required as part of SSD 6666 at the project site are proposed to be completed to a standard suitable for subsequent industrial use. This includes the second stage of demolition works, further remediation and the demolition of below ground infrastructure in accordance with conditions of approval for that project.

Snowy Hydro has agreed to only take possession of the land comprising the project site and commence the construction of the project after a contaminated land site audit statement has been prepared by an Environment Protection Authority (EPA) accredited site auditor, stating that the land is suitable for heavy industrial use. It is anticipated the works for SSD 6666 within the project site would be completed by early 2022.

While remediation works within the project site would be completed at this time, demolition and remediation works in other areas of the aluminium smelter property would be carried out concurrently with the construction of the Hunter Power Project. The remediation works are anticipated to be completed by late 2023.

In conjunction with the remediation of the smelter site, there is a joint planning proposal by Cessnock City Council and Maitland City Council to rezone land owned by Hydro Aluminium including the project site. The objective of the proposed rezoning is to promote the development of an industrial estate. The project site is proposed to be rezoned as IN3 – Heavy Industry.

A gateway determination for the rezoning proposal was granted by the Department on 1 December 2020 and the plans were exhibited for public comment until 1 February 2021. **Figure 6** shows the proposed rezoning, including the proposed heavy industrial zoning for the power station site. Importantly, the rezoning includes additional low-density (R2) residential land to the south of the site,

with a minimum lot size of 450 m^2. This proposed residential re-zoning is located proximate to or further away from the project site compared to existing rural residential receivers. Noise and air quality impacts to potential future residences in this area would therefore be consistent with those described in the respective assessments for the project (refer to **Section 6.3** and **Section 6.4** for further detail).

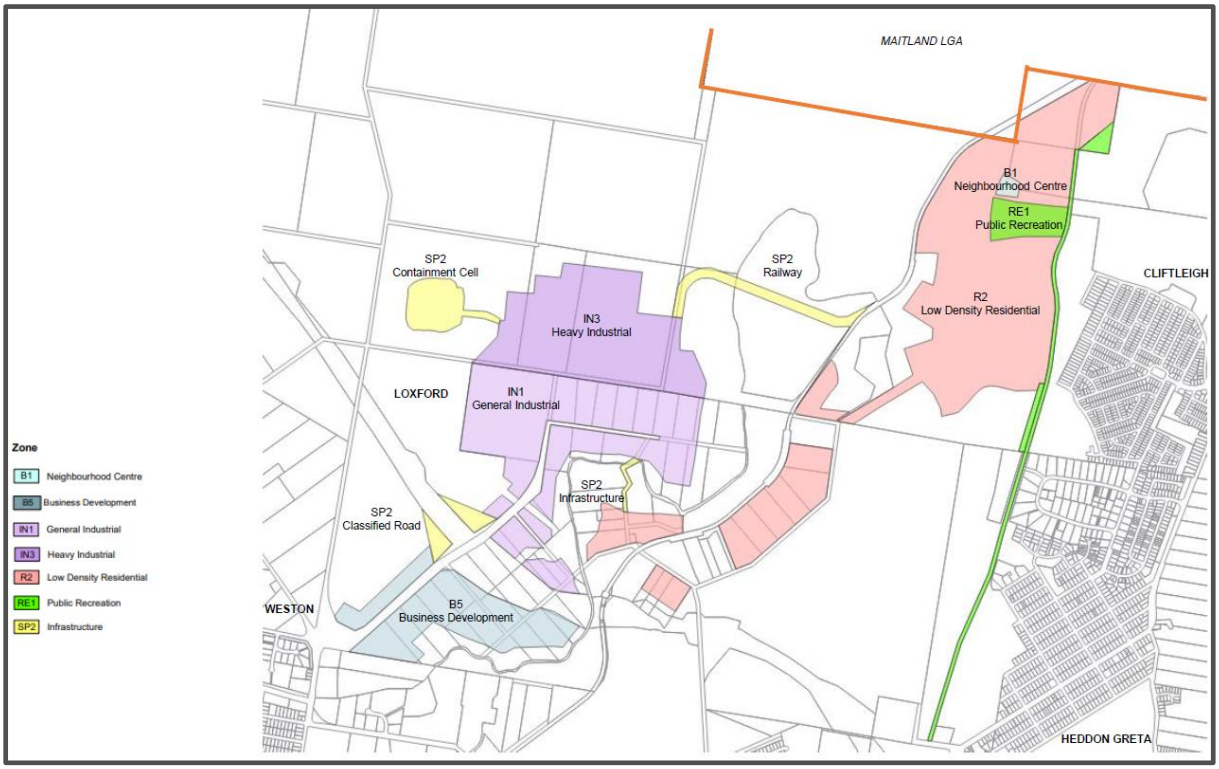

Figure 6 | Planning Proposal - Former Smelter Site (Source: Cessnock City Council)

4 Statutory Context

4.1 Planning Approvals

Critical State Significant Infrastructure

On 16 December 2020, the Minister for Planning and Public Spaces determined that the project was essential to NSW for environmental, economic or social reasons and declared the project to be critical State significant infrastructure (CSSI) under Section 5.13 of the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act), as it would strengthen energy security in NSW. The project is listed under Clause 12 of Schedule 5 of the *State Environmental Planning Policy (State and Regional Development) 2011* (State and Regional Development SEPP). Consequently, the project must be determined by the Minister for Planning and Public Spaces.

The CSSI declaration included the Kurri Kurri Lateral Gas Pipeline Project (SSI-22338205) to supply natural gas for the project from the existing Sydney to Newcastle Pipeline (Plumpton to Hexham Northern Trunk), and is subject to a separate planning approval under the EP&A Act (refer to **Section 3.5** of this report).

Application of *Biodiversity Conservation Act 2016*

The *Biodiversity Conservation Act 2016* (BC Act) applies to the project, in particular, Section 7.9 of the BC Act requires that applications for approval under Division 5.2 of the EP&A Act to carry out State significant infrastructure must be accompanied by a Biodiversity Development Assessment Report (BDAR). Section 6.12 of the BC Act also requires that the BDAR be completed in accordance with the Biodiversity Assessment Method and specify the class of biodiversity credits required to offset the residual impacts on biodiversity values.

A BDAR was provided in the EIS and subsequently updated to address comments from the Department's Biodiversity, Conservation and Science Directorate (BCS).

The assessment concluded that the project is unlikely to have significant impacts on any biodiversity values of the area provided mitigation measures are applied during construction and operation of the project.

Exempt Approvals

Under Section 5.23 of the EP&A Act, the following approvals are not required for CSSI projects:

- permits under Sections 201 and 219 of the *Fisheries Management Act 1994*;
- excavation and Aboriginal heritage impact permits under the *National Parks and Wildlife Act 1974 and Heritage Act 1977*;
- a bushfire safety authority under Section 100B of the *Rural Fires Act 1997*; and
- approvals for water use, management or an activity (other than an aquifer interference approval) under Sections 89 to 91 of the *Water Management Act 2000*.

Nevertheless, the Department's comprehensive assessment considered relevant matters under the EP&A Act, including consultation with relevant agencies, and included provisions in the recommended conditions of approval to ensure the heritage, bushfire and water impacts of the project would be managed and minimised.

Environmental Planning Instruments

In accordance with Section 5.22(2) of the EP&A Act, no Environmental Planning Instruments (EPI) substantially govern the carrying out of a CSSI project other than the *State and Regional Development* SEPP. Notwithstanding this, consideration was given to the following EPIs:

- *State Environmental Planning Policy (Infrastructure) 2007*: Clause 34(1) allows for the development for the purpose of electricity generating works to be carried out by any person with consent on any land in a prescribed zone (the project would be located in the prescribed rural zone).
- *State Environmental Planning Policy No. 33 – Hazardous and Offensive Industries* (SEPP 33): the project is a potentially hazardous industry. Snowy Hydro has prepared a Preliminary Hazard Analysis (PHA) in accordance with Clause 12 of the SEPP.
- *State Environmental Planning Policy No. 55 – Remediation of Land*: Snowy Hydro has provided details of the contamination assessments undertaken for the site. The Department is satisfied that site would be suitable for the intended uses, subject to the completion of works approved by SSD 6666.

Objects of the Act

The objects of the EP&A Act, incorporating ecologically sustainable development principles, are the underpinning principles for all decision making under the Act. The Department has assessed the project against the objects found in section 1.3 of the EP&A Act. **Appendix B** provides a summary of how these objects have been considered.

4.2 Other NSW Approvals

A number of additional approvals and licenses would be required if the project was to proceed. These include licenses under the following relevant legislation:

- *Roads Act 1993* (Roads Act): which requires a permit under Section 138 of the Roads Act for all construction works within the road reserve. The Department has undertaken extensive consultation with TfNSW and Council during its assessment process to ensure the project's impacts are appropriately managed and minimised; and
- *Protection of the Environment Operations Act 1997* (POEO Act)*:* the construction and operation project would be subject to an Environment Protection Licence (EPL) issued by the NSW EPA.

4.3 Commonwealth Approval

On 30 March 2021, a delegate of the Commonwealth Minister for the Department of the Agriculture, Water and Environment (Commonwealth Minister) determined that the project was a controlled action under Section 75 of *the Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The project is a Commonwealth action under section 28 of the EPBC Act because it is an action taken by a Commonwealth agency that is likely to have a significant impact on the environment.

The Commonwealth Minister identified that the project is likely to have a significant impact in the environment, including but not limited to:

- generating emissions and pollutants which may impact air quality; and
- potentially disturbing contaminated and/or acid-sulphate soils in the proposed action area with potential flow on impacts to surface or groundwater".

Consequently, the project requires the approval of the Commonwealth Minister for the Environment in addition to any State approvals before the project may proceed. The Commonwealth has accredited the NSW assessment process under EP&A Act for the assessment of all Commonwealth matters under the EPBC Act. Under this accreditation, the Department is required to:

- assess the likely impacts of the project on Commonwealth matters in accordance with any relevant agreement, policies or guidelines; and
- prepare an assessment for the Commonwealth Minister, including any recommended conditions.

As a Commonwealth action, the project also requires a whole of environment assessment including impacts on plants, animals, water resources, pollutants, chemicals and toxic substances, landscapes and soils, people and communities and heritage matters.

The Department has worked closely with its Biodiversity Conservation and Science Directorate (BCS) and the NSW EPA in assessing the project's impacts on biodiversity, contamination and air quality and Commonwealth matters under the EPBC Act, and considers that the project would be unlikely to have significant impacts subject to the proposed management measures and recommended conditions of approval. A summary of the Department's consideration of the matters identified by the Commonwealth Minister is provided in **Table 2**.

Table 2 | Consideration of matters raised by Commonwealth Minister

Assessment issue	Summary of Department's consideration	Location in this report
Generating emissions and pollutants which may impact air quality and greenhouse gas emissions	The Department considers that Snowy Hydro has undertaken a comprehensive assessment of potential impacts of the project on local and regional air quality based on anticipated and worst-case modelling scenarios. The Department considers that with the implementation of the project's mitigation measures and the recommended conditions, the air quality impacts are not significant and can be appropriately managed to minimise air quality impacts on the local and regional receiving environment. The Department considers that the project would not significantly increase greenhouse gas emissions in NSW or constrain the ability to achieve the target of a 50% reduction in emissions by 2030.	**Section 6.3** **Section 6.2**
Potentially disturbing contaminated and/or acid-sulphate soils in the proposed action area with potential flow on impacts to surface or groundwater	The project site is subject to remediation works as part of SSD 6666. Snowy Hydro has agreed to only take possession of the land comprising the project site and commence the construction of the project after a site audit statement has been prepared by an Environment Protection Authority (EPA) accredited site auditor An approved site audit statement registers the site as having acceptable low risk to human health and the environment and that any long-term management controls in place are suitable for ongoing protection. The Department considers that with the implementation of the project's mitigation measures and the recommended conditions, the potential contamination impacts are not significant and can be appropriately managed.	**Section 6.4**
Whole of environment assessment of a Commonwealth Agency	The Department has considered impacts of the proposed action on plants, animals, water resources, pollutants, chemicals and toxic substances, landscapes and soils, people and communities and heritage matters. The Department considers that these impacts can be appropriately mitigated and/or offset in accordance with NSW government statutory requirements, guidelines and policy requirements.	**Section 6.4**

The Department has given consideration to the *Significant impact guidelines 1.2 - Actions on, or impacting upon, Commonwealth land and Actions by Commonwealth Agencies* (Commonwealth of Australia, 2013) in its assessment.

The Commonwealth Minister will consider the Department's assessment report, conditions imposed by the NSW Government (should the project be approved) and any other relevant information before making a final decision on the project under the EPBC Act.

5 Engagement

5.1 Department's Engagement

The Department has consulted with the community, special interest groups, and government agencies during its comprehensive assessment of the project, including:

- making all the information on the project publicly available on the Department's website;
- exhibiting the EIS from 13 May to 9 June 2021 (28 days):
- advertising the exhibition in the Sydney Morning Herald, Daily Telegraph, The Australian, Cessnock Advertiser, Newcastle Herald and Hunter Valley & North Coast Town and Country Leader and notified landowners near the project site;
- notified the relevant government agencies and Cessnock Council (the local Council);
- publishing all the submissions on the Department's website;
- requiring Snowy Hydro to submit a formal response to the issues raised in the submissions;
- on-going consultation with the government agencies on the assessment of the key issues; and
- meeting with the Australian Institute and the Gas Free Hunter Alliance.

The Department conducted a site visit on 30 September 2021.

5.2 Snowy Hydro's Engagement

Stakeholder consultation completed by Snowy Hydro included:

- consultation with government agencies, including EPA, Civil Aviation Safety Authority, the Department's Hazards division, BCS, TfNSW, Cessnock City Council
- consultation with asset owners and landowners including Hunter Water Corporation;
- community engagement including;
    - establishment of a community working group, which met on three occasions during the preparation of the EIS;
    - a dedicated website, email address and 1800 phone number;
    - door knocking and letterbox drops; and
    - one-on-one meetings with nearby residents as requested.

5.3 Submissions

The Department received a total of 247 public submissions during exhibition of the EIS, 26 from special interest groups and 221 from individuals. 241 of the public submissions objected to the project. Five submitters were located in the Cessnock local government area (Weston and Kurri Kurri) and 37 submitters were located in adjacent local government areas. The Department also received advice from 13 government agencies and Cessnock City Council.

A break-down of the submitters positions is provided in **Table 3**, and copies of all submissions and agency advice were made available on the Department's website (see **Appendix A2**). A summary of the submissions is in the following sections and the Department's consideration of the matters raised is described in **Section 6** of this report.

Table 3 | Summary of Public Submissions

Group	Submissions	Support	Object	Comment
General Public	**221**	1	217	3
Special interest groups	**26**	1	24	1
Total	**247**	**2**	**241**	**4**

The Department also received over 850 community representations (including general public and special interest groups) in the period following the formal exhibition period. The representations generally objected to the project and raised issues consistent with those raised in formal submissions.

5.4 Key Issues – General public

The key issues raised in community submissions from the general public related to greenhouse gas and climate change impacts and the justification for the project with regard to energy security. Other issues included:

- alternatives to the project, including renewable energy;
- cost and funding of the project;
- the potential for the project to increase electricity prices; and
- air quality impacts to nearby residents.

A summary of how these issues have been addressed is in **Appendix C**.

5.5 Key Issues – Special Interest Groups

Of the 26 special interest groups that provided a submission, 11 were dedicated climate action groups and the remaining groups were organisations with an interest in broader environmental issues and opposition to gas projects. The special interest groups primarily raised concern regarding climate change impacts, noting the greenhouse gas emissions that would be generated through the use of natural gas and diesel fuels. The groups suggested that renewable energy should be developed as an alternative to the project.

In addition to written submissions, the Department met with representatives of the Hunter Gas Free Alliance and the Australia Institute in October 2021, who raised the following concerns regarding the project:

- greenhouse gases and climate change impacts;
- justification for the project in providing dispatchable energy into the NEM, with renewable energy alternatives available or likely available with technology advancements;
- use of Commonwealth funding and concerns over the financial viability and business case;
- gas supply constraints on the Jemena's Sydney to Newcastle distribution network;
- lack of long-term economic benefits to the Cessnock and Hunter regions;
- lack of consultation for the project; and
- adverse health impacts from air quality emissions from the project.

5.6 Key Issues - Government Agencies

None of the government agencies objected to the project. However, they provided comments on the key aspects of the project and recommended conditions of approval. A summary of the key matters raised in the government agency submissions and recommendations is provided in **Table 4**.

In addition, the Department sought advice from its Hazards team which confirmed the adequacy of the Preliminary Hazards Assessment (PHA) in the EIS.

Advice from government agencies primarily related to the adequacy of technical assessment documentation and consistency with relevant guidelines.

The Department's considerations of the matters raised is provided in **Section 6** of this report.

Table 4 | Summary of Government Agency Advice

Government Agency	Key Issues
Environment Protection Authority (EPA)	• Air quality: request for additional detail and assessment of maximum incremental impacts, ozone impacts, emissions variability from plant start-ups and shutdowns, calculation of SO_2 emissions and background air quality data. • Noise: request for additional background noise monitoring, revision of noise amenity criteria and other queries regarding the assessment methodology
Heritage NSW – Aboriginal Cultural Heritage (NSW ACH)	• Request to update to heritage significance assessments • Request to provide further detail regarding proposed excavation monitoring program • Request to provide further detail regarding assumptions in predictive model
Transport for NSW (TfNSW)	• Noted Snowy Hydro must ensure road pavement on Hart Road is suitable for heavy vehicle movements
Civil Aviation Safety Authority (CASA) - Aviation Group	• Noted the project would not create unacceptable impacts to the safety of aircraft operations in the vicinity of the project site • Requested update to the plume rise assessment based on the detailed design of the project
Commonwealth Department of Defence (Defence)	• Requested further consultation based on detailed design
Biodiversity Conservation and Science Division (BCS)	• Biodiversity: - request for the results of fauna surveys and field data sheets - justification for disturbance of habitat for the regent honeyeater • Hydrology and flooding: - justification for the assessment of flooding impacts - further assessment of groundwater impacts - request for additional or revised stormwater pollution measures.
Water Group	• Further assessment of groundwater impacts including likely volume of inflows • Impacts to waterfront land

Government Agency	Key Issues
Fire & Rescue NSW (FRNSW)	• Fire safety and hazards, including a requirement for the Fire Safety Study to be prepared in consultation with the FRNSW.
NSW Health	• Air quality and noise, including requirements to comply with the EPA's criteria, and the cooling towers to be compliant with the relevant NSW Health policies and guidelines to avoid the growth of *Legionella*.
Cessnock Council (Council)	• No concerns were raised during the formal exhibition period • Council later requested development contributions for the project
Crown Lands	• No issues raised and/or provided no comments.
Hunter Water	• Noted requirements for separate approval for water connections outside the project site boundary
Transgrid	• Noted no Transgrid assets affected by the project

5.7 Response to Submissions

Submissions Report

Following the exhibition of the EIS, the Department requested Snowy Hydro provide a response to the issues raised in submissions. In August 2021, Snowy Hydro provided a Submissions Report to the Department (see **Appendix A3**). The Submissions Report included revised or additional assessment of environmental aspects in response to submissions and agency advice.

The Department made the Submissions Report publicly available on its website and referred it to relevant government agencies. Snowy Hydro also provided an erratum to the Submissions Report, correcting errors identified after the report was published. This erratum was also placed on the Department's website.

Heritage NSW, Transport for NSW, CASA and Defence advised that they were satisfied with the Submission Report and recommended conditions to minimise potential impacts, if the project was approved.

5.8 Residual Issues – Government Agencies

The EPA, BCS and Water Group requested additional information to address residual concerns, including:

- EPA - further revision of the air quality impact assessment consistent with relevant guidelines; and
- BCS/ Water Group - consideration of the design of stormwater management infrastructure to avoid the need for a detention basin.

Snowy Hydro revised the air quality impact assessment and additional information prepared was provided on the Department's website. The EPA was satisfied with the revised assessment and recommended conditions to minimise potential impacts.

BCS and Water Group recommended conditions to revise the stormwater management infrastructure in detailed design and minimise potential impacts to biodiversity and water resources.

6 Assessment

The Department has assessed the merits of the project in accordance with the requirements of the EP&A Act and applicable NSW and Commonwealth Government policies and guidelines. The Department has also considered the issues raised in submissions, Snowy Hydro's Submissions Report, further advice from key agencies, and Snowy Hydro's response to these residual issues.

The Department considers the key assessment issues relate the justification for the project with regard to energy security, greenhouse gas and climate change impacts and impacts to air quality. The Department's consideration of these matters is provided in the following sections. The Department's assessment of other relevant issues is provided in **Section 6.4**.

6.1 Justification for the Project in the National Energy Market

The key concern raised in submissions and representations was the justification for the project to provide energy into the electricity grid at a time when there should be divestment in new fossil fuel projects due to climate change impacts.

Electricity Market Context and Renewable Generation

The project is considered in the context of a rapidly changing electricity market and generation mix associated with the transition to a low carbon emissions energy sector. The key changes to the market relevant to the project as noted in *NSW Electricity Infrastructure Roadmap* include:

- coal-fired power stations are approaching the end of their lives, creating a need for substantial investment in replacement infrastructure; and
- the variability of wind and solar increases the need for complementary investment in storage and firming capacity.

Modelling for the *2020 Integrated System Plan* 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.*

The project aims to respond to the changing electricity market by providing the dispatchable generation required to firm renewables and respond to shortfalls in generation capacity.

The forecast energy mix for NSW in 2036-37 compared to 2020-21 is shown in **Figure 7**. The forecast identifies the significant reduction of power from black coal and increased proportion of renewables as part of the energy mix, which will require increased firming capacity (from peaking gas, pumped hydro and battery storage).

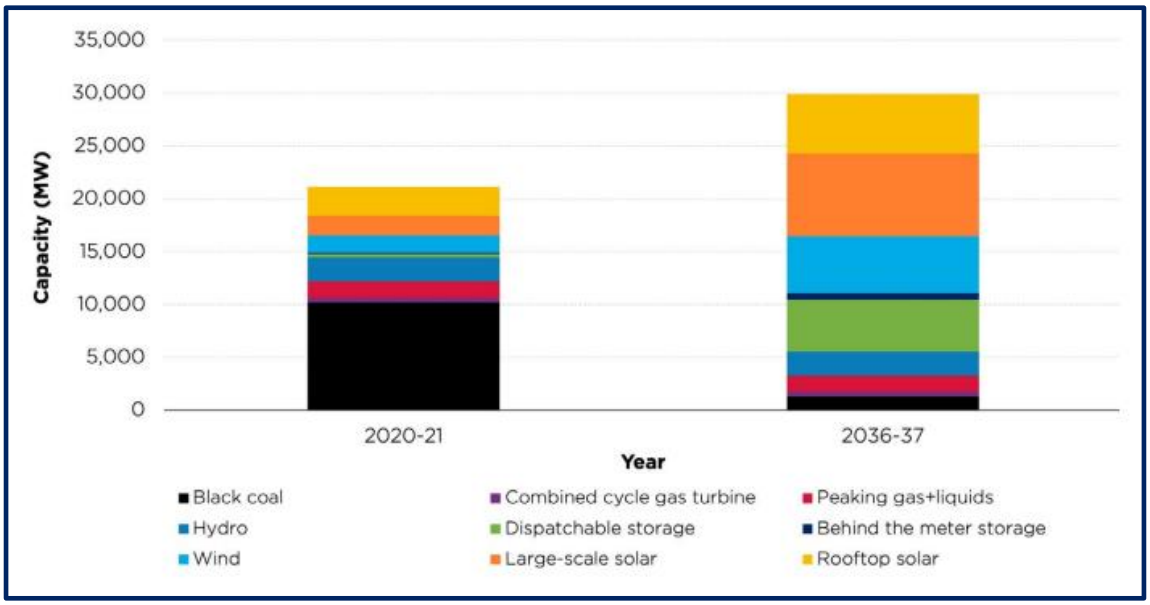

Figure 7 | Forecast for NSW Generation Capacity (AEMO ISP 2020)

Dispatchable generation, firming capacity and intermittent renewables

Dispatchable generation are sources of electricity that can be provided on-demand at the request of the market operator when the needs of electricity consumers are highest. The output of dispatchable energy can be scaled up or down to meet the specific needs of the market.

Electricity generation from solar and wind is intermittent because it is dependent on weather conditions and is therefore not dispatchable (it cannot be turned on or off or scaled up or down). Firming capacity from dispatchable energy sources is therefore required to maintain the output from these intermittent power sources to achieve a reliable energy supply at times when demand is high and supply may not be available from wind and solar (for example, in the evening peak).

Firming capacity is an important product in the NEM for renewable generators. Firming capacity can be sold as a 'hedge' product which allows renewable generators to manage intermittent supply, manage the risk of volatile wholesale electricity prices and support smooth revenue flows and financing for new projects.

The majority of dispatchable generation has historically come from coal-fired power stations, however these assets are scheduled to exit the market over the next two decades (see **Figure 7**) and there is a risk that the exit of these assets may occur sooner than currently reported. As more non-dispatchable, intermitted renewables enter the market, more dispatchable generation is required to firm supply. Gas-fired power is one option to provide firming supply.

The *2020 Integrated System Plan* identifies the need for 6-19 GW of new flexible dispatchable energy supply from a range of technology options in the NEM through to 2040 to back up variable renewable energy generation. The Department considers the project would contribute to meeting this target and provide firming for intermittent renewables.

System security

Power system security relates to maintaining the power system within technical operating limits needed to keep it safe and stable. Synchronous generators (those that use spinning turbines synchronised with

the frequency of the system) are required in the power system to create physical properties called 'inertia' and 'system strength' to keep the power system stable and secure.

Wind and solar generators are not synchronised to the frequency of the power system. These energy sources connect to the power system via an inverter which converts the DC current to the AC current operating in the grid. These inverters are generally not capable of providing system security services. Inverters with system security capabilities are currently being developed, however they are currently not cost-effective for solar and wind generation. Advancements in technology are allowing batteries to contribute to system security through grid-forming inverters.

Inertia produced by synchronous generators slows the impact of a sudden disturbance to the system. The rotation of plant's turbine and alternator create this inertia as they rotate in sync with system frequency. A system with low inertia has a higher risk that frequency deviations will cause generators to disconnect from the power system.

System strength refers to the ability of the power system to respond to voltage changes caused by a system fault. A strong voltage is required to locate and clear faults in the power systems. Dispatchable power is needed to be supplied and absorbed in the power system to manage these fluctuations. Wind and solar plants need a smooth and stable voltage wave form to operate properly, so diminishing system strength makes it harder for them to connect to the grid.

As the energy system transitions towards increased renewable generation, and as older synchronous coal-fired power plants retire, sources of inertia and system strength will require replacement to maintain system security (AER, 2021). Based on current trends, it is anticipated that inertia in NSW will drop below an acceptable level by around 2031-2033 (TransGrid, 2021). The project is a synchronous generator and would therefore contribute to contribute to system security.

Energy Reliability

Retirement of Liddell Power Station

Liddell Power Station has a nameplate capacity of 2,000 MW (1,680 MW is available to the NEM) and has been a significant contributor to the NEM. The power station is scheduled to be progressively retired over the 2022 and 2023 calendar years. The withdrawal of this significant supply from the NEM is being carefully managed by the Commonwealth Government, NSW Government, AEMO and others to prevent potential risks to energy reliability.

The Department notes the view in some community submissions that the objective of the project is to 'replace' the Liddell Power Station. However, the Liddell Power Station operates continuously for extended periods whereas the project would be a peaking power station, operating at times of high demand. Therefore, the project could only be considered to 'replace' the dispatchable supply from Liddell Power Station at those specific times of high demand in the NEM which could not be met from other sources.

For reference in 2019-20 Liddell Power Station produced 10,545 GWh of electricity. The project is estimated to produce 778 GWh annually from Year 2 onwards (around 7% compared to Liddell Power Station), based on operating up to a peak of 12% of the year.

The project is therefore not a like-for-like replacement of the Liddell Power Station and generation from Liddell Power Station would be largely 'replaced' by other new generation entering the NEM.

Notwithstanding, the project is important to contribute dispatchable supply during those specific periods of high demand once Liddell Power Station is no longer operating.

Reliability forecasting

AEMO forecasting identifies potential energy 'reliability gaps' where supply cannot meet demand in specific scenarios including where there is high demand, generation outages and extreme weather. A forecast reliability gap can only be addressed by new dispatchable generation as the supply must be available at any time.

The *2020 Electricity Statement of Opportunities* had previously forecast a reliability gap in the next five years for New South Wales, primarily associated with the retirement of the 2,000 MW Liddell Power Station in 2022-23. With the inclusion of the project and other new generation and transmission projects in revised modelling as part of the *2021 Electricity Statement of Opportunities*, this forecast reliability gap has been closed.

The inclusion of the project has also addressed previously forecast reliability issues in Hunter, Sydney and Wollongong region following the proposed closure of Vales Point Power Station in 2029. Following the closure of the power station it was forecast that these regions would require dispatchable supply from generation outside the area during peak demand periods, but transmission constraints would not allow this supply, presenting a reliability risk. The project would reduce this risk to an acceptable level by providing dispatchable supply from within the region.

With the inclusion of the project and other new generation, there is no forecast reliability gap in NSW until 2029-30 where there is a forecast gap of 120 MW, increasing to 970 MW in 2030-31. This reliability risk generally aligns with closure of one unit of Eraring Power Station in 2030, however other anticipated projects may delay this risk. This forecast shortfall would be greater without the project, should it not proceed.

Given the above, the Department considers the project is important for maintaining energy reliability in New South Wales.

Potential early closure of power stations

Modelling completed by AEMO and the NSW Government considers the retirement of coal-fired power stations based on the 'expected closure year' reported by operators. However, it is understood by AEMO that there is a risk that the exit of coal-fired generation may occur sooner than currently reported, largely due to increased renewable generation impacting the competitiveness of coal-fired generation, and costs associated with maintaining aging coal-fired power generators.

There have been a number of recent prolonged unit outages including at Callide Power Station in Queensland (2021) and at Loy Yang and Mortlake in Victoria (2019). Since 2020, the planned retirements of Yallourn Power Station (Victoria) and two units of Eraring Power Station (New South Wales) have been brought forward and one unit at Torrens Island Power Station (South Australia) has been mothballed in response to market conditions.

TransGrid's *Energy Vision* (2021) document also identifies the growth of renewables is challenging the economic viability of ageing coal-fired power generators which may lead to closures ahead of planned closure dates. Based on current trends, it is anticipated that 7 GW of coal capacity will be withdrawn from the NEM by 2030, which is 2 GW more than currently anticipated by planned closure dates.

The *2021 Electricity Statement of Opportunities* also notes that the early exit of coal-fired power stations may present reliability risks where there is insufficient time to develop new generation solutions and may have system strength risks where there a few synchronous generation sources online to provide essential system services. Gas-fired power is a synchronous generation source.

The *2021 Electricity Statement of Opportunities* included a sensitivity analysis for the scenario where all coal-fired power stations retired two years earlier than planned. The analysis identified reliability risks from point of the closure of Vales Point and Eraring power stations, requiring around 2,500 MW of new dispatchable capacity. This would be mitigated in part if the HumeLink transmission project is approved and proceeds (not yet committed or included in modelling) which would unlock 2,000 MW of capacity from Snowy 2.0 from 2026. It is noted the project is included in the 2021 *Electricity Statement of Opportunities* modelling and so the forecast shortfall under the sensitivity analysis would be greater without the project, should it not proceed.

AEMO is currently exploring mechanisms to manage the exit of coal-fired generation to avoid reliability shocks to consumers. Notwithstanding, there is a risk of a shortfall of dispatchable capacity associated with the potential early exit of coal fired power.

The Department considers the project would contribute to mitigating this risk by providing a source of fast-start dispatchable capacity in the event there is a shortfall associated with the early retirement of coal-fired power.

Alternatives

Renewable energy as an alternative to the project

The Department is required to consider the project on its merits in accordance with the relevant Commonwealth and NSW legislation, policy and guidelines. While an EIS must include "*an analysis of any feasible alternatives to the carrying out of the development, activity or infrastructure, having regard to its objectives*" under the EP&A Regulation, it is not the role of the Department in its assessment of the project to consider all potential alternatives.

The Department considers the project is consistent with the relevant strategic policy framework (refer to **Section 3**), which identifies that a combination of gas, pumped hydro and batteries is the most effective way to provide firming capacity to the NEM.

Notwithstanding, given alternatives to the project were a key issue raised in community submissions, an overview of these alternatives and consideration of the relative benefits of the project is provided below.

Given the objective of the project to provide dispatchable generation, potential alternatives to the project primarily include pumped hydro and battery storage, as noted in community submissions. Solar and wind do not provide dispatchable generation and are therefore not feasible alternatives.

Pumped hydro provides comparable reliability outcomes compared to open cycle gas. However, as noted in the *NSW Electricity Infrastructure Roadmap* pumped hydro projects are constrained by geography and have long development lead times (up to eight years to plan, design and build). Generation from pumped hydro can also be constrained during prolonged periods of drought. There is insufficient committed pumped hydro capacity that could be delivered in time to address the shortfall associated with the retirement of Liddell Power Station in 2022-23 (the Snowy 2.0 pumped hydro project is anticipated to become available gradually between 2025-26 and 2026-27).

Batteries can provide firming capabilities for the NEM; however, as noted in the *NSW Electricity Infrastructure Roadmap*, current battery technology is capable of providing short duration storage (up to a few hours) and long duration storage is not currently economic, but may become economic in the future.

Based on the capacity of the high pressure storage pipeline for the proposed Kurri Kurri Lateral Pipeline Project (see **Appendix A4**), the project would be capable of operating at full capacity on gas for up to ten hours, as extended by the use of diesel fuel where needed.

Community submissions raised concern the project would come at the expense of other renewable energy projects. The Department notes there is significant investment in NSW occurring in renewable energy projects including 140 projects totalling about 22,700 MW of large-scale renewable energy projects either approved or progressing through the New South Wales planning system, representing about $34 billion in investment.

Existing dispatchable generation from peaking power stations

Concern was raised in community submissions that the project would only operate 2% of the year and that other gas-fired peaking power stations do not typically operate at their maximum capacity, questioning whether the project is needed.

The Department considers:

- forecasting by AEMO includes the supply from existing peaking stations and notwithstanding had previously forecast a shortfall in the short term and continues to forecast a shortfall towards 2030;
- the capacity of all available dispatchable generation may be required in extreme circumstances such as the extended outage of a major generator (for example, the failure of Callide C Power Station in Queensland in May 2021), transmission events and extended periods of drought where the capacity of pumped-hydro can be constrained.

Electricity Prices

There is the potential for increases to electricity prices if there are shortfalls in supply following the retirement of coal-fired power stations without sufficient supply replacement and if intermittent renewables are not adequately firmed.

Unanticipated price increases in the NEM were observed following the closure of Hazelwood Power Station in Victoria in 2017. However, the Department notes the situation is not directly comparable to the closure of Liddell Power Station with the key difference being that only five months' notice was given for the closure of Hazelwood. High fuel costs at the time also influenced prices. The closure of Liddell was announced in August 2019, around two and half years prior to the closure of the first unit of Liddell in April 2022, providing more time to for replacement supply to enter the NEM.

Modelling of electricity prices associated with the closure of Liddell was completed for the Report of the Liddell Taskforce. The modelling considered information available in 2019 and at that time adequate supply (including the project) had not been committed to replace Liddell Power Station following its closure. The modelling identified that "*NSW NEM Region wholesale electricity prices would be significantly higher without Liddell if there is no further investment beyond currently fully committed projects or Snowy 2.0".*

Given the project would contribute to addressing the reliability gap associated with the retirement of Liddell, the Department considers the project would contribute to avoiding the price increase for the scenario described in the Report of the Liddell Taskforce. The Department notes the report identifies some increase to electricity prices irrespective of whether Liddell closes in 2022-23.

The *Future of Gas Statement* notes investments in gas-fired electricity generation are important to place downward pressure on electricity prices.

Summary

The project was declared CSSI by the Minister for Planning and Public Spaces as it was considered essential to NSW as it would strengthen energy security in NSW. The Department's assessment confirms the importance of the project as it would:

- contribute to closing the previously forecast reliability gap in 2023-2024 following the retirement of Liddell Power Station;
- mitigate electricity supply scarcity for the Hunter, Sydney and Wollongong regions associated with the retirement of Vales Point Power Station in 2029;
- mitigate reliability risks associated with the potential early exit of coal-fired power stations ahead of planned closure timeframes;
- provide an ongoing source of synchronous energy to contribute to system security; and
- contribute to avoiding electricity price increases following the closure of Liddell Power Station for the scenario described in the Report of the Liddell Taskforce.

6.2 Greenhouse Gas Emissions and Climate Change

Concerns were raised in submissions that the project would contribute to climate change impacts through use of natural gas as a fuel, with diesel as a backup, and that there would be limited benefits compared to coal-fired power generation it would be replacing.

Greenhouse Gas Emissions

Snowy Hydro completed a greenhouse gas assessment in accordance with National Greenhouse Accounts guidance, to estimate emissions for the construction and operational phases of the project.

The project would generate greenhouse gas emissions as outlined in **Table 5**, with 406,259 tonnes of $CO_{2\text{-}e}$ of Scope 1 (direct) emissions estimated to be generated per year from Year 2 onwards. It is noted that the calculation is based on the operation of the power station at its maximum capacity (up to 12% of the year including 2% of the year using diesel), however it is expected that likely operation of the project would result in an average capacity factor of 2% in any given year and therefore the emissions outlined below represent a worst case scenario.

Table 5 | Project's greenhouse gas emissions at capacity factor of 12%

Scenario	Scope 1 (t $CO_{2\text{-}e}$)	Scope 2 (t $CO_{2\text{-}e}$)	Scope 3 (t $CO_{2\text{-}e}$)	Total
Construction	3,237	486	10,740	14,763
Operation Year 1	243,585	468	48,925	292,978
Operation Year 2-30 (per annum)	406,259	468	93,572	500,299

The project would contribute around 0.3% to New South Wales annual Scope 1 and 2 emissions (136.6 Mt in 2019) and around 0.09% to Australian annual Scope 1 and 2 emissions at peak operations. At an average capacity factor of 2%, the project would contribute around 0.05% of New South Wales annual emissions.

The Department acknowledges that the NSW Government has recently announced through the *Net Zero Plan Stage 1:2020-2030 Implementation Update (2021)*, a target of reducing NSW's emissions by between 47-52% compared to 2005 levels by 2030 – with an emissions target of between 78.9 to 87.6 Mt that would be achieved through current policy settings.

Comparative Emissions to Coal-fired Power Generation

The concern from the community that the objective of the project is to replace the Liddell Power Station was often made in the context of one fossil fuel generator replacing another with concern raised that this is counter to efforts to reduce emissions in the energy sector and broader efforts to address climate change.

As outlined in **Section 6.1**, the project is not a like-for-like replacement of Liddell Power Station and would produce at its peak up to 7% of the power generation of Liddell Power Station. Notwithstanding, a comparison of the emissions for the project and the Liddell Power Station is provided in **Table 6**.

Table 6 | Comparative greenhouse gas emissions – the project and Liddell Power Station

Facility	Electricity production (MWh)	Scope 1 (t CO_{2-e}) emissions	Scope 2 (t CO_{2-e}) emissions	Emissions intensity (t CO_{2-e}/MWh)
Liddell Power Station (2019-2020)	10,544,579	9,970,686	40,748	0.93
Hunter Power Project (Year 2)	778,405	406,259	468	0.52

The project would generate around 4% of the direct emissions compared to Liddell Power Station and would be around 55% less emissions intensive. The Department notes that at the likely capacity factor of the project (around 2% of the year), emissions are likely to be substantially less than the predictions above. At a realistic average capacity factor of 2% per year this would equate to 0.6% of direct emissions compared to Liddell.

Transition to Low-emissions Energy Sector

As described in **Section 6.1**, firming capacity is critical to support the existing and growing energy supply from intermittent renewables.

The firming capacity from the project would provide greater certainty for the development of new renewable energy facilities for Snowy Hydro, or the ability to contract the purchase of further renewable energy from wind and solar power stations.

The project would be a synchronous generation source, which is important for energy system security as older synchronous generators are retired.

Hydrogen Capability

The hydrogen capability of the project presents the opportunity to further reduce emissions with the use of clean hydrogen in the fuel mix. With capability to operate the turbines on a 10% mix of hydrogen, the Department considers that the project is 'hydrogen ready', consistent with the *NSW Electricity Infrastructure Roadmap*. Snowy Hydro advised that up to 30% hydrogen could be used in the turbines with minor upgrades. However, as noted above, the use of hydrogen would likely require a modification to the project approval (if approved), as operating with hydrogen has not been included in the impact assessment, including importantly in the hazard assessment.

The Department notes that while the project has capability to accept an increased concentration of hydrogen in the gas supply, potential increases are also constrained by the transmission network, which currently does not permit injection of hydrogen, apart from a trial currently underway at Jemena's Horsley Park facility. However, as described above, the *NSW Net Zero Plan – Stage 1:2020-2030* (2020) sets an aspirational target of up to 10% of hydrogen within the NSW gas network by 2030 using renewable energy sources.

Greenhouse Gas Emissions Reporting

As described in **Section 3.3**, the project would be required to report emissions in accordance with the NGER scheme. The project would likely be subject to the Safeguard Mechanism where an emissions baseline would be determined by the Commonwealth Clean Energy Regulator and emissions above this baseline would be required to be offset through the purchase and retirement of carbon credits.

Recommended Conditions

To minimise greenhouse impacts from the project, the Department has recommended conditions to:

- restrict the operation of the power station using diesel fuel to 2% of the year and operations using natural gas to 10% of the year, except as directed by AEMO under emergency provisions; and
- prepare and implement a hydrogen strategy to investigate opportunities for the increased use of hydrogen in the fuel supply for the development.

Summary

As a peaking power station firming intermittent renewables, the project would operate when it is needed to maintain reliability in the NEM and provide firming capacity. Supply would otherwise be provided by other generation, which is increasingly from renewables (refer to **Section 6.1**). The Department notes that with regard to greenhouse gas impacts, pumped-hydro and battery storage are alternatives for dispatchable supply, however these alternatives are not considered to be suitable to meet the objectives of the project, including to maintain energy reliability in the short and medium term (refer to **Section 6.1**).

No new coal fired power stations are proposed in New South Wales. The future exit of Liddell Power Station and the replacement of its capacity by the project and other new generation (which is increasingly from renewables) represents a net reduction of emissions in the energy sector which will continue as other coal-fired power stations are retired.

As coal-fired power stations retire, firming supply and synchronous generation becomes increasingly important in the transition to a low carbon emissions energy sector and the Department considers the

project would play an important role in this transition and is consistent with the strategic policy framework for energy reliability and greenhouse gas and climate change (refer to **Section 3**). .

6.3 Air Quality

The project has the potential to impact on local and regional air quality through emissions of fine particulate matter with a diameter of below 2.5 micrometre ($PM_{2.5}$) and indirectly through stack emissions contributing to the generation of ozone, which would cumulatively add to an already constrained Hunter Valley airshed. Submitters were concerned about localised impacts from emissions from the power station.

The nearest residential sensitive receptors are located about 1.2 km southeast of the project site on Dawes Avenue (receiver RR2 on **Figure 5**) and 1.2 km southwest of the project site on Bishops Gate Road (receiver RR1 on **Figure 5**). The planning proposal identifies additional low density rural residential in the Dawes Avenue area (see **Figure 6**), which are located proximate to or further away from receiver RR2.

Construction

During construction, temporary air pollution mainly in the form of dust emissions would occur from ground disturbance, vegetation clearing, earthworks, construction vehicle and machinery movements (including exhaust emissions) and landscaping. Air quality modelling undertaken for the AQIA did not include construction activities and assumed the associated impacts would be minor following implementation of the proposed best practice management and mitigation measures, including rehabilitation of the disturbed ground and use of water sprays.

The EPA did not raise any issues about air quality impacts during construction, and given the distance to nearest residential receivers, the short-term nature of the proposed construction activities and with implementation of the proposed best practice mitigation measures, the Department considers that the potential impacts would be not be significant.

Operation

Snowy Hydro engaged Jacobs Group (Australia) Pty Limited to complete an Air Quality Impact Assessment (AQIA) for the project, in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (EPA, 2016) (Approved Methods) and the *Tiered Procedure for Estimating Ground-Level Ozone Impacts from Stationary Sources* (EPA, 2011).

Methodology

The AQIA included worst-case scenarios for operating on natural gas and diesel and included a highly conservative approach by assuming the power station would be continuously operated through the entire year, to ensure all meteorological conditions were considered in the assessment.

The AQIA was revised twice to address issues raised by EPA, including further clarification on emissions and background data, cumulative impacts, ozone and impacts from the start-up and shut-down of the station. Snowy Hydro provided further information, including a revised AQIA and addendum report (see **Appendix A4**). The EPA advised that it was satisfied with the revised AQIA and recommended conditions to manage potential residual impacts.

Background concentrations included in the assessment considered the post closure of the smelter period (2015-2019) using the ambient air quality and meteorological monitoring data collected at the Department's Environment, Energy and Science Division's closest monitoring stations to the project site in Beresfield, Newcastle and Wallsend in the Lower Hunter Valley. The background ambient concentrations of the key air pollutants during this period have been below the EPA assessment criteria, except for $PM_{2.5}$ and O_3 at Beresfield (the closest station to the project site), occurring due to bushfire smoke and higher temperatures during heatwaves.

Key air emissions assessed against the EPA assessment criteria included carbon monoxide (CO), nitrogen dioxide (NO_2), sulphur dioxide (SO_2), $PM_{2.5}$, volatile organic compounds (VOCs - formaldehyde and acrolein), polycyclic aromatic hydrocarbons (PAHs), along with contribution of emissions to ozone formation. PM_{10} emissions were not considered, as the particulate emissions from the combustion of natural gas or diesel for the power station would mostly be in the $PM_{2.5}$ size range.

Worst-case scenario modelling for the project operating on either natural gas or diesel found that the impacts on the ground level concentrations of CO, NO_2, SO_2, VOCs and PAHs would be insignificant, as the predicted incremental increases to these emissions would be minor and would not exceed the EPA criteria at the sensitive receiver locations, including consideration of cumulative impacts.

Particulates

While the incremental increase in $PM_{2.5}$ is very low compared to the annual and 24-hour EPA criteria, the cumulative impact assessment identified that the project would result in exceedances as a result of background concentrations already exceeding the criteria (see **Table 7**).

Table 7 | $PM_{2.5}$ criteria exceedances at highest impacted representative receiver location

Fuel	Averaging period	EPA criteria ($\mu g/m^3$)	Background ($\mu g/m^3$)	Predicted maximum cumulative (incremental increase) ($\mu g/m^3$)
Natural gas	24 hours	25	24.92	25.08 (+0.16)
	Annual	8	8.67	8.69 (+0.02)
Diesel	24 hours	25	24.92	25.26 (+0.34)
	Annual	8	8.67	8.71 (+0.04)

It is noted that incremental impacts from the worst-case highly conservative operational scenarios would be minor, and the predicted exceedances would be due to the existing elevated background $PM_{2.5}$ concentrations.

Ozone formation

Based on the EPA 2011 guideline for estimating ground level ozone impacts from stationary sources, the project site is in an area classified as 'non-attainment' for ambient ozone, as measured O_3 from the Beresfield monitoring station exceeded relevant EPA assessment criteria over the past 5 years.

As summarised in **Table 8**, the project would result in a minor increase to the ambient ozone levels and would exceed the screening impact level of 0.5 ppb and the maximum allowable increment of 1 ppb for ozone non-attainment areas.

Table 8 | Worse-case ground level O_3 incremental increases and existing background

Average period	EPA criteria (ppb)	Maximum background* (ppb)	Predicted incremental increase (ppb)	
			Natural Gas	Diesel
1-hour	100	98.9	1.9	2.7
4 hours	80	83.8	1.2	1.7

* Based on measured concentrations at the Department's Environment, Energy and Science Division's Beresfield monitoring station between 2016 and 2020.

The 8-hour average ozone concentration at Beresfield station currently exceeds the new 2021 *National Environment Protection Council's National Environment Protection Measures* (NEPMs) standard for O_3 (65 ppb averaged over 8 hours) during summertime and mainly due to bushfire events and heatwaves. The estimated worst-case incremental increase in 8-hour average ozone concentration due to the project's operation would be up to 1 ppb.

The photochemical modelling results in the Department's 2020 report (*Air Quality Study for the NSW Greater Metropolitan Region, A Sydney Air Quality Study Program Report. Environment, Energy and Science, DPIE, EES 2020/0488, November 2020*), identified contribution of power stations to O_3 concentrations in the NSW Greater Metropolitan Area as minor when compared to the natural sources contribution (maximum 1-hour averages of 0.1 - 1 ppb vs. 18.4 – 22 ppb).

Overall, the EPA noted that there would be small incremental increases in $PM_{2.5}$ and ozone and that the exceedance was due to the high background concentration, and advised that it was satisfied with the assessment subject to its recommended conditions. If approved, the EPA would regulate air emissions from the site through its environment protection licence. Key recommendations are outlined below.

Recommended Conditions

To minimise air quality impacts from the project, the Department has recommended conditions in consultation with the EPA including:

- limiting the power station's operation for up to 1,100 cumulative hours per calendar year with diesel powered operations limited to maximum of 175 cumulative hours per calendar year;
- requiring diesel fuel to comply with relevant fuel quality standards;
- submission of a revised AQIA and a final design verification based on the final plant design prior to commencing construction of the gas turbines to the Planning Secretary and the EPA;
- undertaking an air quality verification program within 6 months of commissioning the power station and submitting a post commissioning verification report;
- complying with strict point source discharge limits, including routine monitoring to demonstrate compliance; minimise dust emissions from the site, and carry out any activity or operate any plant on-site using reasonably practicable means to prevent or minimise air pollution;
- ensuring all trucks entering and leaving the site have dust generating materials covered at all times, except during loading and unloading; and
- requiring that no offensive odour to be emitted beyond the boundary of the site.

Summary

The Department and the EPA consider that Snowy Hydro's assessment of potential impacts of the project on local and regional air quality based on anticipated and worst-case modelling scenarios has been undertaken in accordance with NSW government guidelines.

While the project is predicted to exceed $PM_{2.5}$ and ozone ambient criteria, this is due to high background levels. The AQIA predicts a very minor increase in particulates and ozone formation as a result of the project based on highly conservative assumptions, assuming the power station would be operating continuously over a representative year.

The EPA and the Department have recommended conditions requiring Snowy Hydro to minimise air quality impacts of the project during both construction and operations. This includes the preparation of a construction air quality management sub-plan into the Environmental Management Strategy (EMS) required for the project.

The Department considers that with the implementation of the project's mitigation measures and the recommended conditions, the project can be appropriately managed to minimise air quality impacts on the local and regional receiving environment.

6.4 Other Issues

The Department's consideration of other issues is provided in **Table 9**.

Table 9 | Assessment of other issues

Issue	Department's Consideration	Recommended conditions
Commonwealth funding	• Submitters raised concerns that the project would not be an appropriate use of Commonwealth funding and questioned the financial viability of the project. • The Department is required to consider the merits of the project in accordance with the relevant Commonwealth and NSW legislation, policy and guidelines. The Department considers that the justification for Commonwealth funding arrangements are not within the scope of its assessment. • Notwithstanding, the concern was often raised in the context of greenhouse gas impacts, the justification for the project in the NEM and potential impacts to electricity prices. The Department's consideration of these issues is provided in **Section 6.1** and **6.2** and the Department's evaluation of the project is provided in **Section 7**. • The Department notes that the Commonwealth Government is the sole shareholder of Snowy Hydro, from which it receives an annual dividend. The Business Case for the project has estimated an asset internal rate of return of 12.3%.	• None required
Market share	• Submitters raised concern regarding Snowy Hydro's high market share of dispatchable generation. • The Department notes the Australian Competition and Consumer Commission (ACCC) and AER is responsible for ensuring there is appropriate competition in the NEM. AER's *Wholesale electricity market performance report* (2020) did not identify any concerning exercise of market power as at December 2020.	• None required.
Gas supply	• Submitters raised concern there is not an adequate gas supply for the project, that the existing transmission network between Sydney and Newcastle has constrained supply, and the project is dependent on a separate gas pipeline project. • The gas supply outlook is outlined in **Section 3.4.** • At capacity factors of 2% (realistic) to 10% (worst case), the power station would consume between 1-6 PJ of gas per annum.	• None required.

Issue	Department's Consideration	Recommended conditions
	• There is sufficient gas supply through to 2026 and there are a number of approved and proposed projects that have potential to increase gas supply and pipeline limitations in NSW beyond this date, including additional gas imports. • The Kurri Kurri Lateral Pipeline project would include a high-pressure storage pipeline capable of storing 70 terajoules of gas to supply up to 10 hours of continuous operation of the power station. The storage pipeline would be capable of refilling over a period of around 24 hours. The pipeline would be bidirectional and capable of supplying gas back into the network if required. • The gas pipeline is included as part of the CSSI declaration for this project and would be subject to a separate application and assessment (refer to **Section 3.5**).	
Aviation safety	• The operation of the exhaust stacks for the project would result in the emission of a high velocity plume of air above the stacks which has the potential to impact aircraft operations originating from nearby aerodromes including Maitland Aerodrome, Cessnock Aerodrome and the Royal Australia Airforce Base at Williamtown and associated Newcastle Airport. • Snowy Hydro completed a Plume Rise Assessment and Aeronautical Risk Assessment which identified that the project would not create unacceptable impacts to the safety of aircraft operations in the vicinity of the project site. • Snowy Hydro consulted with the Civil Aviation Safety Authority, Department of Defence and other relevant industry stakeholders during the assessment of potential impacts to aircraft operations. • Mitigation measures have been identified to inform local aerodromes of the project and to encourage pilots to not fly overhead the power station at low altitudes. • With the implementation of mitigation measures, the project would not limit the use of the surrounding airspace.	• Complete an updated plume rise assessment based on the detailed design of the project.
Hazard and risk	• The project is defined as a potentially hazardous industry based on the volume of dangerous goods and hazardous chemicals proposed to be stored within the project site. • Potential hazards and risks associated with the project include aircraft safety, bushfire risks and potential risks to the community associated with chemical storage and the ignition of gas. • The more hazardous project elements (infrastructure for the supply and handling of natural gas) have been located within the site at the furthest point from proposed future industrial development. The	• Prepare a Fire Safety Study. Hazard and Operability Study and Final Hazard Analysis prior to construction. • Prepare an Emergency Plan and Safety Management system prior to operations.

Issue	Department's Consideration	Recommended conditions
	project site also includes a buffer zone to proposed industrial land uses to the south of the proposed station. • Snowy Hydro completed a Preliminary Hazard Analysis (PHA) and bushfire risk assessment in accordance with relevant guidelines. The Department's Hazard's team reviewed the PHA and concluded that the assessment was adequate and consistent with relevant guidelines. • The key risk identified in the PHA would be due to an ignited release of gas from the gas supply network. Modelling completed for the PHA identified the project is unlikely to generate an ignited gas release event that would impact outside the boundary of the project site beyond a small area along the western boundary adjoining rural bushland. • The PHA considered indicative potential impacts associated with the gas receiving station which would be delivered by the proponent of the lateral pipeline (subject to approval). The PHA identified the risk of an ignited gas release event which would extend to neighbouring industrial land-use allotments, but not to any residential or sensitive land-use zones. • The likelihood of the risks associated with the project is within the range of the safe land-use criteria under relevant guidelines. • A range of bushfire protection methods have been identified for construction and operation of the project. • The Department considers the hazards and risks associated with the development can be adequately managed and mitigated.	• Complete a hazard audit after 12 months and every subsequent three years.
Noise and vibration	• Potential noise sensitive receivers around the project site include: - Vacant industrial land directly to the south and east which is proposed to be developed into industrial lots; - Rural residential receivers around Sawyers Gully with the nearest receiver located on Bishops Gate Road around 1.2 km to the west/ south west of the site; and - Rural residential receivers and industrial/ commercial premises located in Loxford, from around 1.2 km southeast of the project site on Dawes Avenue. • There would be noise and vibration impacts from the project during construction from the operation of plant and equipment, and from construction traffic movements. There would be noise impacts during operation primarily from the operation of the gas turbines, generator and exhaust stack.	• Limit construction to standard hours as required by the ICNG, with provision for out of hours construction activities where necessary. • Prepare a Construction Noise Management plan. • Comply with operational noise limits set in accordance with the EPA's NPfI. • Undertake noise validation and ongoing noise compliance monitoring.

Issue	Department's Consideration	Recommended conditions
	• Snowy Hydro completed a Noise Impact Assessment (NIA) in accordance with the *Interim Construction Noise Guideline* (ICNG) (DECCW, 2009), *NSW Road Noise Policy* (RNP) (DECCW, 2011) and *Noise Policy for Industry* (NPfI) (NSW EPA, 2017). Snowy Hydro completed a revised NIA as part of the Submissions Report to include additional noise assessment as requested by EPA. The assessment included modelling of potential noise impacts. • Background noise monitoring was carried out to determine background noise levels and noise criteria for five representative noise catchment areas (NCAs) (see **Figure 5**), including - NCA 1 – Swayers Gully east of Sawyers Gully Road; - NCA 2 – Western Loxford; - NCA 3 – Eastern Loxford; - NCA 4 – Gillieston North; and - NCA 5 – Sawyers Gully west of Sawyers Gully Road • Background noise in the NCAs is predominately influenced by the Hunter Expressway, environmental noise and noise from local roads. • The construction noise assessment identified: - Noise levels up to 6 dB(A) above the relevant noise criteria are predicted at residential receivers in NCA 2 and NCA 3 during site earthworks activities, underground service construction and site surfacing; - There are no predicted exceedances of noise criteria for the other construction activities; - Noise levels up to 9 dB(A) above the relevant noise criteria are predicted for a cumulative scenario taking into account construction noise impacts from SSD 6666 for a worst-case scenario where there are noisy works occurring from both developments in unison. Snowy Hydro has committed to mitigate cumulative noise impacts through the scheduling of construction activities to prevent multiple noise activities occurring at the same time; and - Construction traffic noise at some residential receivers is predicted to be above the Road Noise Policy daytime criteria of 60 dB(A) and night time criteria of 55 dB(A). However, the noise levels are dominated by background road traffic noise with the contribution of the project limited to 0.2 dB(A) which does not exceed the RNP's 2dB(A) incremental criteria. • No exceedances of operational noise criteria are predicted and the operation of the project would contribute to traffic noise levels by less than 0.1 dB(A).	

Issue	Department's Consideration	Recommended conditions
	• Snowy Hydro identified a range of mitigation measures to further reduce predicted noise impacts during construction. • Construction would be limited to standard hours (7 am and 6 pm Monday to Friday and between 8 am and 1 pm Saturdays and at no time on Sundays and public holidays), with the exception of low noise generating works and for deliveries or emergency works. • The proposed residential re-zoning (refer to **Section 3.5**) is located proximate to or further away from the project site compared to existing rural residential receivers. Noise impacts to potential future residences in this area would therefore be consistent with those described in the noise assessment for the project. • The Department and EPA consider that with the implementation of mitigation measures and the recommended conditions of consent that noise impacts can be adequately managed and mitigation.	
Heritage	• The project is largely located in a highly disturbed landscape associated with the former aluminium smelter. However, the northern section of the project including the electrical switchyard would be located in some areas that have not been disturbed or have been partially disturbed. • Snowy Hydro completed an Aboriginal Cultural Heritage Assessment Report (ACHAR) for the project. An ACHAR Addendum was provided in the Submissions Report providing further detail on management and mitigation measures requested by Heritage NSW. The assessment included consultation with Aboriginal stakeholders and archaeological survey in accordance with relevant guidelines. • The surface survey did not identify any sites, however there is potential for archaeological deposits at depth in potential alluvial deposits which may be disturbed during piling activities for the construction of foundations for the power station. • Snowy Hydro provided details of a provisional archaeological monitoring program and unexpected finds protocol in the ACHAR Addendum and committed to provide a detailed monitoring program and protocol in a Cultural Heritage Management Plan. The provisional monitoring program includes that if intact alluvial deposits are identified, hand excavations or mechanical excavations and sieving will be carried out subject to safety requirements. • The Department considers the recommended conditions of consent are appropriate to manage the potential for Aboriginal objects if they are discovered during earthworks. • Snowy Hydro completed a Historic Heritage Cultural Heritage Assessment for the project.	• Prepare and implement an Aboriginal Cultural Heritage Management Plan including an archaeological monitoring program, which includes a methodology for test and/or salvage excavations of intact alluvial deposits, and measures for the long-term management of Aboriginal objects if discovered during construction. • Prepare and implement an unexpected finds protocol.

Issue	Department's Consideration	Recommended conditions
	• No registered historic heritage items were identified within a 1 km radius of the project site. The proposed works are located outside the curtilage of any listed heritage items and would have no direct (physical) impact or visual impact on any nearby listed heritage items. • The Department considers impacts to historic heritage items would be unlikely.	
Biodiversity	• The project is largely located on cleared land associated with the former aluminium smelter. • However, the northern section of the project including the electrical switchyard would be located in some areas that have not been disturbed or have been partially disturbed including a 1.09 ha area of regrowth and ground layer vegetation in a previously cleared area and a 0.40 ha area of intact native vegetation. • A BDAR was prepared for the project in accordance with the BC Act and Biodiversity Assessment Method with a BDAR Addendum prepared in response to issues raised by BCS. • Two Plant Community Types (PCTs) were identified at the project site including: - PCT 1737 – *Typha rushland* - PCT 1633 - *Parramatta Red Gum – Narrow-leaved Apple – Prickly-leaved Paperbark shrubby woodland in the Cessnock Kurri Kurri area*. • PCT 1633 aligns with the Threatened Ecological Community (TEC) 'Kurri Sand Swamp Woodland' (listed as Endangered under the BC Act). The overstorey of PCT 1633 is usually dominated by *Eucalyptus parramattensis subsp. decadens* (Earp's Gum), which is a species credit threatened species. • The Southern Myotis (*Myotis macropus*) was the only threatened fauna species positively identified at the project site. The Common Planigale was assumed present based on the presence of suitable habitat • The Regent Honeyeater and Swift Parrot were not identified from surveys at the project site, however both species are known to frequent the Kurri Kurri and Cessnock area (Birds Australia, 2013). The 'important area mapping' for the Regent Honeyeater overlays the project site. However, the habitat for within the project site is not be considered important, as it contains no key foraging species. • The project would result in impacts to threatened species associated with the clearing of the 0.4 ha of intact native vegetation including to Earp's Gum (37 plants) and habitat for the Southern Myotis, Regent Honeyeater and Common Planigale. • The disturbance of native vegetation on the site requires offsetting of 13 ecosystem credits and 106 species credit. The final credit requirement would be retired in accordance with the NSW Biodiversity	• Prepare and implement a Biodiversity Management Plan as part of the Environmental Management Strategy. • Retire the applicable biodiversity offset credits in accordance with the Biodiversity Offset Scheme.

Issue	Department's Consideration	Recommended conditions
	Offset Scheme which may include acquiring or retiring biodiversity credits, making payments in an offset fund or funding a biodiversity conservation action. • Snowy Hydro propose to mitigate impacts through the preparation of a Flora and Fauna Management Plan including: - Procedures for the demarcation and protection of retained vegetation, including all vegetation outside and adjacent to the construction footprint; - Measures to reduce disturbance to sensitive fauna; and - Procedures for the clearing of vegetation and the relocation of flora and fauna, including pre-clearing surveys and hollow-bearing tree identification. • The Department considers that project impacts have largely been avoided by site selection within a disturbed industrial site. The small amount of additional clearing of 0.4 ha if higher condition remnant vegetation is required for siting infrastructure associated with connection into existing electricity infrastructure. • With the recommended conditions, both BCS and the Department consider that the project is unlikely to result in a significant impact on the biodiversity values of the locality.	
Traffic	• The project would generate traffic movements during construction and operation, including heavy and oversize overmass (OSOM) vehicles. • The construction of the project would generate up to 400 light vehicle movements and 142 heavy vehicle movements per day during peak construction. • The operation of the project would generate traffic movements up to 24 light vehicle movements per day during normal operations, up to 12 heavy vehicle movements per day during diesel refilling (up to three times per year) and up to 80 light vehicle movements and 10 heavy vehicle movements per day during major works to the gas turbines (one six week period every 10 years). • The road network and primary construction and operational access route to the project site includes the M15 Hunter Expressway (state road) and Hart Road (local road), which connect via an interchange. Vehicles may also use Lang Street and Main Road to access the site via the Hunter Expressway. • Snowy Hydro completed a Traffic and Transport Assessment for the project. • The assessment identified that during construction:	• Prepare and implement a Construction Traffic Management Plan as part of the Environmental Management Strategy.

Issue	Department's Consideration	Recommended conditions
	- the Hart Road interchange with the Hunter Expressway currently operates at a Level of Service A and crash rates in the area are low; - construction vehicle movements, including cumulative movements from SSD 6666, would not change the Level of Service at the Hart Road / Hunter Expressway interchange and would be minor compared to existing traffic volumes; - parking would be provided for all construction vehicles on the project site or adjacent properties as agreed with the relevant landowners; and - there are potential traffic safety impacts, which could be managed through the implementation of mitigation measures such as traffic control and safety protocols. • The assessment identified that during operational vehicle movements would have a minimal impact on the surrounding road network and parking would be provided for all vehicles on site. • Transport for NSW did not raise concern regarding the traffic impacts of the project. • The Department considers potential traffic impacts would be minor and could be appropriately managed through the implementation of standard traffic management measures.	
Water resources	• The site is located on the fringe of the floodplain of a tributary of Black Waterhole's Creek and the Hunter River regional floodplain. • Snowy Hydro completed a Surface Water Quality and Aquatic Ecology Assessment, Groundwater Assessment and Hydrology and Flooding assessment in accordance with relevant guidelines. Addendums to the Surface Water Quality and Aquatic Ecology Assessment and Groundwater Assessment were competed as part of the Submissions Report to respond to issues raised by BCS and Water Group. • The assessments identified that water quality surrounding the site is generally within relevant ANZECC criteria, with the exception of some elevated levels of total nitrogen, total phosphorus and some trace metals (chloride, aluminium, lead and zinc). • Potential impacts to water resources during the construction of the project include erosion and sedimentation from earthworks, impacts to water quality from stormwater runoff and contamination due to leaks or spills. During operation potential impacts would include impacts to water quality from stormwater runoff.	• Comply with water quality discharge limits set in an environment protection licence for the project. • Prepare and implement a Water Management Plan including a program to monitor potential surface water and groundwater impacts. • Develop fit-for-purpose construction erosion control measures and operational pollution control measures which do not require an open basin excavated below the water table where practicable.

Issue	Department's Consideration	Recommended conditions
	• Excavations would be unlikely to intercept groundwater except in the eastern section of the project site mainly related to the construction of the stormwater detention basin, with no significant inflow or dewatering likely. • The project site is located outside of the probable maximum flood Level and would not change flood behaviour at the site. The project would increase impervious surfaces at the site and so has the potential to increase peak stormwater flows. • A construction sediment basin would be converted to a water quality basin and stormwater detention basin during operations. The basin would capture runoff before discharge into Black Waterholes Creek and provide flood attenuation for up to a 1 in 100-year event. • BCS and Water Group raised concerns regarding impacts associated with the proposed stormwater detention basin in interception of groundwater. Snowy Hydro committed to address this issue during detailed design to avoid the need for a detention basin or to reduce its size. The Department has recommended a corresponding condition of consent. • The Department considers that potential impacts to water resources can be managed through the implementation of the mitigation measures identified by Snowy Hydro and the conditions of consent.	
Contamination	• As described in **Section 3.5**, the project site is subject to remediation works as part of SSD 6666. A range of contaminants have been identified at the project site in soil and groundwater associated with the operation of the former aluminium smelter. • Snowy Hydro has agreed to only take possession of the land comprising the project site and commence the construction of the project after a site audit statement has been prepared by an Environment Protection Authority (EPA) accredited site auditor. • An approved site audit statement registers the site as having acceptable low risk to human health and the environment and that any long-term management controls in place are suitable for ongoing protection. • The potential contamination impacts of the project are therefore limited to chemical and fuel spills during construction and operation, which can be managed through the implementation of standard mitigation measures.	• Submit a copy of the Site Audit Statement that covers the project site prior to construction.
Visual	• The Proposal would introduce a new facility in an industrial area which would be visible from a small number of existing viewpoints in the surrounding area.	• Minimise off-site visual impacts of the development including complying with

Issue	Department's Consideration	Recommended conditions
	• Landscape screening would be provided along the easter perimeter of the project site to screen views from the road network and future potential industrial land uses. • The Department considers the visual impact would be low due to the existing industrial landscape character and sensitivity and limited visibility and distance from accessible viewpoints.	applicable Australian Standards for outdoor lighting and glare reflection. • Blend visual appearance of infrastructure with surrounding landscape as reasonably and feasibly as possible.
Waste	• Construction would generate waste from vegetation clearing, earthworks and the operation of plant and equipment. Snowy Hydro propose to manage waste in accordance with a Construction Waste Management Plan. • Waste from operation of the power station would include general waste from offices, amenities, and the maintenance, repair or upgrade of equipment. • Wastewater generated by the operation of the project would include municipal sewage, demineralised wastewater, water discharged from turbine evaporative coolers and from oily water separators. • Municipal sewage would be discharged to the sewer network. Other liquid waste streams would be discharged in accordance with Hunter Water trade waste requirements. • Treatment/disposal options would include treatment in a neutralising tank and discharge to sewer or collection by a liquid waste truck for offsite disposal. • The Department considers the proposed waste management strategies are acceptable as they would appropriately reduce waste being transferred to landfill, promote recycling and manage construction and operation impacts.	• Comply with the requirements of the Hunter Water Corporation and the EPA in regard to waste management, classification and disposal. • Prepare and implement a Waste Management Plan as a sub plan of the Environmental Management Strategy.
Social and economic	• Potential social impacts identified for the project include: - impacts to human health including air and noise emissions, road traffic, safety and visual amenity; - increased employment opportunities (250 jobs during peak construction and 10 jobs for operation); and - short term use of local amenities during construction (accommodation and recreational facilities). • The social impacts associated with these aspects have been integrated into the Department's overall assessment including recommended conditions to avoid and mitigate impacts.	• Refer to recommended conditions above for air quality, noise, visual and traffic impacts.

Issue	Department's Consideration	Recommended conditions
	• The project is located within and in proximity to large regional centres where there is substantial capacity to accommodate the construction workforce. • The project would also result in both direct and indirect jobs and economic benefits to the region including a capital cost of $610 million and ongoing tax contributions from employees of the project. • The project would provide benefits to NSW in contributing to energy security and contributing to the net reduction of greenhouse gas emissions from the energy sector.	
Planning agreement	• Council requested development contributions be levied in accordance with its *Cessnock Section 7.12 Levy Contributions Plan 2017*, which requires a levy of 1% of the capital investment of projects where Council is the determining authority and the capital investment value is over $200,000. The project is CSSI and therefore the contributions plan does not directly apply. • Snowy Hydro and Council entered into negotiations for a planning agreement. • Snowy Hydro and Council were not able to reach a resolution regarding the contribution under the planning agreement. Snowy Hydro made an offer to contribute $880,000 to project(s) that have a community benefit and demonstrated link to the development. • Given the small operational workforce associated with the project, the Department does not consider there would be a significant impact on Council infrastructure or services as a result of the development that would warrant a contribution of 1% of the capital investment value. • The Department notes that planning agreements or contributions are not typical for CSSI projects, however as this is not a public infrastructure development, under the EP&A Act contributions can be considered. • The Department has recommended a condition that Snowy Hydro and Council execute the planning agreement offer within 6 months of commencing the development, if the terms cannot be agreed then Snowy Hydro be required to make a development contribution to Council of $880,000 consistent with Snowy Hydro's final offer under a planning agreement.	• Enter into a planning agreement with Council to provide a contribution of $880,000 to projects that have a community benefit and targeted to community.

7 Evaluation

The project was declared to be Critical State Significant Infrastructure by the Minister for Planning and Public Spaces as it was essential to NSW as it would strengthen energy security in NSW.

The project would contribute to energy reliability and security in the NEM as it transitions away from coal-fired power station power generation over the next 10-15 years, commencing with the closure of Liddell Power Station by 2023. The project would provide firming capacity to intermittent renewable energy and is recognised as a committed project in the recent 2021 *Electricity Statement of Opportunity* to contribute to overall system reliability in the NEM.

The selection of the project site location on a highly disturbed brownfield site has minimised potential impacts due to direct disturbance including to biodiversity and Aboriginal and non-Aboriginal heritage. The project site is located within an historic industrial setting surrounded by large areas of remnant vegetation and larger rural lots and commercial/ industrial operations, providing a buffer to minimise noise, air quality and visual impacts to residential receivers.

There is a current planning proposal over the broader Kurri Kurri smelter and buffer land which would rezone the site to heavy industrial while still retaining a significant buffer to proposed low density residential zoning. The Department considers that the proposed construction and operation of the power station at this location would be consistent with current and proposed land use, with sufficient buffer to sensitive receivers in relation to minimising amenity impacts.

Overall, the Department considers that the project has been designed in a way that avoids and minimises social and environmental impacts as far as practicable. The Department has carefully considered the residual potential impacts of the development on the environment, in consultation with key government agencies.

The Department considers the key impacts of the project are greenhouse gas emissions and air quality. However, the Department has considered a range of other issues in its assessment including but not limited to hazards and risks, contaminated land, noise impacts during construction, biodiversity and heritage impacts, management of waste streams, including broader social and economic aspects associated with the project. The Department considers that these impacts can be appropriately mitigated and/or offset in accordance with NSW government statutory requirements, guidelines and policy requirements.

In regard to greenhouse gas emissions, the project would generate a peak of around 0.41 million tonnes (Mt) of CO_2 equivalent ($CO_{2\text{-}e}$) of Scope 1 and Scope 2 emissions a year, based on the operation of the power station at its proposed maximum capacity of up to 12% of the year. However, it is predicted it would operate on average 2% over a year, which would significantly reduce the predicted emissions. Peak operations would contribute 0.3% of NSW emissions (based on the latest available 2019 emissions inventory) and 0.05% based on a 2% average capacity factor.

The Department notes that the NSW Government has recently announced through the *Net Zero Plan Stage 1: 2020-2030 Implementation Update* (2021), a target of reducing NSW's emissions by between 47-52% compared to 2005 levels by 2030. Importantly, the plan identifies that the reductions would be achieved through current policy settings. The Department considers that the project would not significantly increase greenhouse gas emissions in NSW or constrain the ability to achieve the target

of a 50% reduction in emissions by 2030. Further, the hydrogen capabilities of the project present the opportunity to further reduce the emissions of the project, where clean hydrogen is used in the fuel mix.

In regard to air quality, the Department considers that air quality impacts would represent a minor incremental increase in ambient concentrations of key air pollutants at sensitive receivers around the site. The EPA advised that it was satisfied that it could regulate the site under an environment protection licence subject to strict conditions, including setting limits on annual operating time using gas and diesel, consistent with commitments in the EIS, stack discharge limits consistent with regulatory requirements and best practice, and validation testing and ongoing monitoring.

Additionally, the project would deliver economic benefits to the Hunter Region and NSW as a whole by generating $610 million of capital investment, creating up to 250 construction jobs at the peak of construction and up to 10 operational jobs over the life of the project.

The Department considers the project is consistent with the relevant NSW and Commonwealth strategic policy framework regarding climate change and energy security.

The Department has concluded that the residual impacts can be adequately minimised, managed, or offset, to an acceptable standard, subject to a comprehensive framework of recommended conditions of approval.

Based on its evaluation, the Department has carefully weighed up the impacts of the project against the benefits. On balance, the Department considers that the benefits of the Hunter Power Project outweigh its costs, and the project is in the public interest and approvable, subject to strict conditions.

8 Recommendation

It is recommended that the Minister for Planning and Public Spaces:

- **considers** the findings and recommendations of this report;
- **accepts and adopts** all of the findings and recommendations in this report as the reasons for making the decision to grant approval to the application;
- **agrees** with the key reasons for approval listed in the notice of decision;
- **grants approval** for the application in respect of the Hunter Power Project (SSI 12590060), subject to the conditions in the attached project approval; and
- **signs** the attached project approval including the recommended conditions of approval (see **Appendix D**).

Prepared by:

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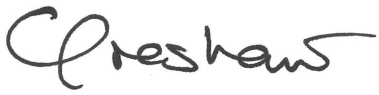
Mandana Mazaheri
Team Leader

Recommended by:

10/11/2021

Stephen O'Donoghue
Director
Resource Assessments



10/11/2021

Clay Preshaw
Executive Director
Energy, Resources and Industry

9 Determination

The recommendation is **Adopted/ ~~Not adopted~~** by:

The Hon. Rob Stokes MP
Minister for Planning and Public Spaces

Appendices

Appendix A – List of Key Documents

A1 – Environmental Impact Statement (EIS): Refer to folder "EIS" on the Department's website at

https://www.planningportal.nsw.gov.au/major-projects/project/40951

A2 – Submissions and Agency Advice: Refer to folder "Submissions" on the Department's website at

https://www.planningportal.nsw.gov.au/major-projects/project/40951

A3 - Submissions Report: Refer to folder "Response to Submissions" on the Department's website at

https://www.planningportal.nsw.gov.au/major-projects/project/40951

A4 – Additional Information: Refer to folder "Additional Information" on the Department's website at

https://www.planningportal.nsw.gov.au/major-projects/project/40951

Appendix B – Consideration of the Objects of the Act

Table B1| Consideration of the Project Against the relevant Objects of the EP&A Act

Issue	Consideration
• (a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources;	• The project would provide ongoing socio-economic benefits to the people of NSW through contributing to energy reliability and ongoing employment opportunities during construction and operations. • Consideration has also been given to the environmental features at the project site with appropriate conditioning of the project to avoid, minimise and offset impacts.
• (b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment;	• The Department considers that the project can be carried out in a manner that is consistent with the principles of ecologically sustainable development. The Department's assessment has sought to integrate all significant environmental, social and economic considerations. Consideration of the key principles and programs of ecologically sustainable development is detailed below. ***Precautionary Principle*** • The Department has assessed the project's threat of serious or irreversible environmental damage and considers that there is sufficient scientific certainty regarding environmental impacts and residual risks to enable determination of the application. • The EIS contains a number of specialist environmental impact assessments and a number of design, construction and operation measures to mitigate, remediate or offset potential impacts. • The Department considers that the recommended conditions can provide an appropriate level of protection to environmental values in the region. ***Inter-generational equity*** • The Department recognises that the NSW energy market is in a state of transition from one dominated by coal-fired power stations to a renewable energy mix. Whilst this transition is being fuelled by investment in renewable energy zones and increased battery storage systems, gas-fired power stations are still required to play a crucial role in firming the State's electricity supply. • The Department recognises that climate change and reducing greenhouse gas emissions are key considerations for inter-generational equity and consider that the project contributes to reducing potential climate impacts compared with coal-fired power stations, whilst also securing a reliable energy supply to the State.

Issue	Consideration
	Conservation of biological diversity and ecological integrity • The projects potential impacts on biodiversity were considered as part of the Department's assessment of the project. As described in **Section 6.4**, the Department considers that direct and indirect impacts on biodiversity a can be minimised through proposed mitigation measures and offsets. ***Improved valuation, pricing and incentive*** • This ecologically sustainable development principle emphasises the internalisation of environmental costs in the pricing of assets and services. • The Department's assessment has sought to apply the 'polluter pays principle', insofar as Snowy Hydro would be required to offset or remediate potential environmental impacts. As such, the Department has conditioned that biodiversity impacts be offset, operational wastewater is required to be removed offsite to a licensed facility and that the project would operate under an Environment Protection Licence issued by the EPA.
• (c) to promote the orderly and economic use and development of land;	• The project is located in a rural landscape zoned area in the Cessnock LEP and the development is permitted with consent in the RU2 zone. The project is located on land formerly used for industrial purposes. The project would be consistent with the proposed re-zoning of the site as heavy industrial land.
• (e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats;	• The Department considers that the project has been designed to minimise environmental and biodiversity impacts as much as practicable through locating the power station in areas previously cleared or impacted by existing industrial land use in the area. • Although some clearing of native vegetation would be required, the Department considers that the proposed offset would maintain biodiversity values in the long-term and that potential impacts to threatened species and habitats can be managed and/or mitigated through appropriate conditions of approval that require strict management measures and biodiversity offsets.
• (f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage);	• The Department has assessed the project's impacts on cultural heritage (see **Section 6.4**) and considers that potential impacts to Aboriginal heritage items can be appropriately minimised through the proposed management measures and the Department's recommended conditions for discovery of unexpected items. The project would not impact non-Aboriginal heritage items.
• (g) to promote good design and amenity of the built environment;	• The Department considers that the project would be located in an land formerly used for industrial purposes and would suit the existing and proposed built environment in the locality. Nonetheless, the proposed mitigation measures and conditions would minimise off-site noise and visual impacts of the development and aim to blend the visual appearance of

Issue	Consideration
	infrastructure with surrounding landscape as reasonably and feasibly as possible.
• (h) to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants;	• The project application included a comprehensive hazard assessment completed in accordance with the requirements of SEPP 33 and reviewed in consultation with the Department's Hazards team. • Proposed mitigation measures to minimise risks from construction and operation of a gas-fired power station, fire safety and bushfire risks would provide acceptable levels of protection for the health and safety of occupants of the power station, project site and surrounding residents. • The Department has also conditioned further requirements including finalisation of hazard assessments, emergency planning and construction and demolition conditions to ensure structural adequacy of the buildings and safe demolition at the end of project life.
• (i) to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State; and	• The Department notified and consulted with Cessnock Council and NSW government authorities (including further discussion of key issues with the EPA, Water Group and BCS) throughout the assessment of the project and carefully considered all responses in its assessment. • The Department has also consulted with the Commonwealth Department of Agriculture, Water and Environment throughout the assessment due to the assessment process under the EPBC Act.
• (j) to provide increased opportunity for community participation in environmental planning and assessment.	• The Department publicly exhibited the project application and EIS and made all relevant documents publicly available on its website (see **Section 5**). All public submissions have been considered by Snowy Hydro and the Department during the assessment process.

Appendix C – Consideration of Community Views

Table C1 below includes a summary of how the key issues raised by the community were taken into consideration.

Table C1 | Consideration of Community Views

Issue	Consideration
• The project would result in greenhouse gas emissions and contribute to climate change	The project would provide firming supply and synchronous generation which is increasingly important in the transition to a low carbon emissions energy sector and as coal fired power stations are retired. The Department considers the project would play an important role in this transition by facilitating additional intermittent renewable energy supply into the NEM, noting it has been estimated that the project would be capable of facilitating

Issue	Consideration
	the entry of approximately 1,650 MW of new renewable capacity for Snowy Hydro. As a peaking power station firming intermittent renewables, the project would only operate when it is needed to maintain reliability in the NEM and provide firming capacity. Supply would otherwise be provided by other generation, which is increasingly from renewables. No new coal fired power stations are proposed in New South Wales. The future exit of Liddell Power Station and the replacement of its capacity by the project and other new generation (which is increasingly from renewables) represents a net reduction of emissions in the energy sector which will continue as other coal-fired power stations are retired.
• The project is not needed for energy security in the National Energy Market and the project would increase electricity prices	The Department considers the project would: • contribute to closing the previously forecast reliability gap in 2023-2024 following the retirement of Liddell Power Station identified by the Australian Energy Market Operator (AEMO); • mitigate electricity supply scarcity for the Hunter, Sydney and Wollongong regions associated with the retirement of Vales Point Power Station in 2029; • mitigate reliability risks associated with the potential early exit of coal-fired power stations ahead of planned closure timeframes; • provide an ongoing source of synchronous energy to contribute to system security; and • contribute to avoiding electricity price increases following the closure of Liddell Power Station for the scenario described in the Report of the Liddell Taskforce.
• New renewable energy projects are a preferred alternative to the project	Given the objective of the project to provide dispatchable generation, potential alternatives to the project primarily include pumped hydro and battery storage, as noted in community submissions. Solar and wind, while being increasingly viable generations sources from a commercial perspective and important contributors to the NEM moving forward, do not provide dispatchable generation and are therefore not feasible alternatives. Pumped hydro provides comparable reliability outcomes compared to open cycle gas. However, pumped hydro projects are constrained by geography and have high cost and development lead times. A pumped hydro project could not be delivered in time to address the shortfall associated with the retirement of Liddell Power Station in 2022-23. Batteries can provide firming capabilities for the NEM, however the current cost of medium and long-term storage limits batteries to shallow storage and use for intra-day levelling (ie storing surplus energy in low demand periods in the middle of the day and dispatching in higher demand periods in the evening). Batteries are limited by storage capacity and time taken to

Issue	Consideration
	recharge, unlike open-cycle gas which can provide flexible and longer duration firming capacity on-demand. The strategic policy framework confirms that the future of the NEM a diverse mix of renewable energy resources supported by firming generation. The Department considers the project would play a complementary role with other dispatchable and non-dispatchable renewable energy sources in the NEM and that the project would provide the firming capacity to unlock new additional renewable generation.
• Concern regarding the funding of the project by the Commonwealth Government	The Department is required to consider the merits of the project in accordance with the relevant Commonwealth and NSW legislation, policy and guidelines. The Department considers that the justification for the Commonwealth funding arrangements are not within the scope of its assessment Notwithstanding, the concern was often raised in the context greenhouse gas impacts, the justification for the project in the NEM and potential impacts to electricity prices. The Department's consideration of these issues is provided above.

Appendix D – Recommended Instrument of Approval

Refer to folder "Determination" on the Department's website at

https://www.planningportal.nsw.gov.au/major-projects/project/40951