



Jacobs

Hunter Power Project
Landscape Character and Visual Impact Assessment

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Snowy Hydro Limited

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Hunter Power Project

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Document history and status

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Executive Summary

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

Jacobs have undertaken a combined quantitative and qualitative assessment of the potential landscape character and visual impacts that may be brought about by the Proposal.

The Proposal Site is located in Loxford, which is approximately three kilometres north of Kurri Kurri, on a brownfield site that was formerly occupied by the Kurri Kurri aluminium smelter which is owned by Hydro Aluminium Kurri Kurri Pty Ltd (Hydro Aluminium). The former Kurri Kurri aluminium smelter operated on the site from 1969 until 2012 and is undergoing progressive demolition and site rehabilitation. The existing Kurri Kurri aluminium smelter exhaust stacks and other elevated infrastructure formed a significant visual element on the skyline for approximately 50 years, until their demolition in 2019.

A separate rezoning proposal is before the Department of Planning, Industry & Environment (DPIE) that seeks to rezone the former Hydro Aluminium owned land into a mix of land uses, including an industrial precinct near the Proposal Site, and other uses including residential and recreational uses to the east and north east. This assessment discusses the likely impacts the Proposal may have on potential future residential areas.

The area within which the Proposal Site is situated is largely surrounded by forested areas, which largely limits external visibility to the surrounding local roads. Proposed elevated elements such as the Proposal's exhaust stacks have the potential to be partially visible above the surrounding treeline to areas within the viewshed and these elements are the focus of this assessment. The two proposed exhaust stacks for the Proposal would be approximately 36 m in height whereas stacks at the former Kurri Kurri aluminium smelter included one stack at 140 m and two at 70 m as well as a 55 m high water tower.

The Proposal's exhaust stacks will potentially be visible from a limited number of public viewpoints within the viewshed. These locations include areas within the township of Kurri Kurri, and from some locations along the surrounding local road network. These views will be largely screened or filtered by surrounding topography, vegetation and built form. Areas that are afforded visibility of the Proposal's exhaust stacks will likely have had previous visibility of the former Kurri Kurri aluminium smelter's stacks and water towers. The proposed elevated elements are fewer in number and height than that of the Kurri Kurri aluminium smelter. Where visible, the proposal elements will not be an out of character element and will not form dominating skyline features as the previous Kurri Kurri aluminium smelter infrastructure did.

The overall visual impact of the Proposal has been assessed as low-negligible. This is due to the fact that the Proposal is commensurate with the industrial landscape character of the wider site which has a low sensitivity to receiving similar infrastructure, and, is at a height that it will be largely screened or filtered from view from sensitive viewing locations including public and private viewsheds by the surrounding mature forest and localised topography. Locations that may be afforded full views of the Proposal are limited to the roads adjacent to the Proposal Site, which are used by few public road users, and are not used to access potentially sensitive land uses such as residential dwellings.

The impacts to Landscape Character are negligible, this is due to the Proposal being in keeping with the industrial landscape character of the surrounding area. Further, the Proposal is not likely to impact on the rural landscape character of areas within the Study Area, due to its low scale and low projected visibility from locations with key views of the rural landscape.

1. Introduction

1.1 Background

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

The Proposal involves the construction and operation of a power station and electrical switchyard, together with other associated supporting infrastructure. The Proposal would have a capacity of up to approximately 750 megawatts (MW) which would be generated via two heavy duty gas turbines. Although primarily a gas fired power station, the power station would also be capable of operating on diesel as required, if there were a constraint or unavailability in the natural gas system and there was a need to supply electricity to the National Electricity Market (NEM).

The Proposal would operate as a "peak load" generation facility supplying electricity at short notice when there is a requirement in the National Electricity Market. The major supporting infrastructure that is part of the Proposal would be a 132 kV electrical switchyard located within the Proposal Site. The Proposal would connect into existing 132 kV electricity transmission infrastructure located adjacent to the Proposal Site. A new gas lateral pipeline and gas receiving station will also be required and this would be developed by a third party and be the subject of a separate environmental assessment and planning approval. Other ancillary elements of the Proposal include:

- Storage tanks and other water management infrastructure;
- Fire water storage and firefighting equipment such as hydrants and pumps;
- Maintenance laydown areas;
- Stormwater basin;
- Diesel fuel storage tank(s) and truck unloading facilities;
- Site access roads and car parking; and
- Office/administration, amenities, workshop/storage areas.

Construction activities are anticipated to commence early 2022 and the Proposal is intended to be fully operational by the end of 2023. Further description of the Proposal is provided in Chapter 2 of the Environmental Impact Statement.

1.2 Secretary's Environmental Assessment Requirements (SEARs)

An environmental impact statement (EIS) for the Proposal has been prepared under Division 5.2 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). This Landscape Character and Visual Impact Assessment (LCVIA) has been prepared to support the EIS. The purpose of this report is to address the relevant sections of the Secretary's Environmental Assessment Requirements (SEARs) issued on 5 February 2021 (SSI 12590060). The report preparation has also taken cognisance of any applicable agency comments. Table 1.1 outlines the SEARs relevant to this assessment.

Table 1.1: SEARs relevant to this assessment

Secretary's requirement
Visual – including an assessment of the likely visual and landscape character impacts of the project on the amenity of the surrounding area and private residences in the vicinity of the project

1.3 Purpose of this report

This assessment will examine the existing conditions of the Kurri Kurri aluminium smelter site and viewshed of the Proposal and determine the potential for landscape character and visual impacts that may arise due to the Proposal.

This assessment is based upon desktop study and a field visit to publicly accessible locations in order to determine the likely visual impact of the Proposal.

2. Methodology and report structure

2.1 The viewshed

Defining the viewshed of the Proposal is based upon the key elevation or overall change in height that might be brought about by the key components of the Proposal. The viewshed is considered as the distance at which the visual changes brought about by the Proposal may no longer contribute to views in a meaningful way based on parameters of the human vision. The viewshed will determine the study area of the assessment. The rationale behind the definition of the viewshed is discussed in Section 5.

2.1.1 Zones of visual influence

Zones of visual influence (ZVI) seek to quantify the scale of the potential effects of a project over varying distances. This step is a useful measure to contemplate the potential for visual dominance of the Proposal in views based upon distance from the Proposal.

2.2 Planning and statutory context

This chapter will identify the relevant policies and provisions that apply to areas within the viewshed of the Proposal that are relevant to landscape sensitivity and visual impact.

2.3 Landscape character units and sensitivity

Landscape Character Units are based on the physical characteristics, land-use and planning provisions of the area within the Viewshed. Features that assist in defining the landscape units and a sensitivity rating include geology, vegetation, topography and drainage patterns, urban development and modification of the landscape. The use of the land and the underlying protections of an area that are afforded by the provisions within the planning scheme assist to determine the sensitivity of that area to visual change. This step recognises that the planning scheme identifies landscapes that are significant, rare or threatened and provides guidance on how these features may be preserved.

The sensitivity of a landscape unit considers the ability for a landscape to accommodate the level of change that is proposed by a project. Generally, the greater the extent of modifications in an area, or the prevalence of the landscape type and its use, the lower the sensitivity that landscape will be to visual change.

2.4 Seen area analysis

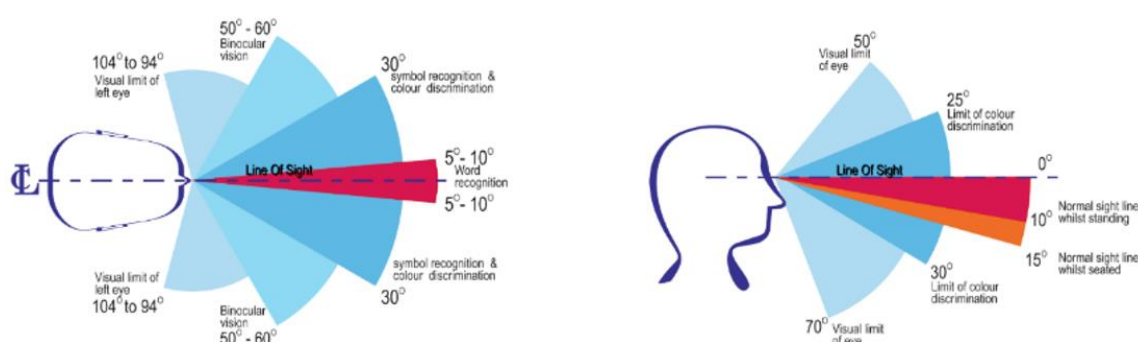
A Seen Area Analysis (SAA) utilizes Geographical Information Software (GIS) to map the areas of theoretical visibility of a proposal, as a whole or in part, utilising topographical data alone. The SAA is a conservative analysis tool as it does not take into account other factors that may affect visibility, such as intervening vegetation, built form or atmospheric conditions such as fog, low cloud or haze.

2.5 Photomontage

Photomontages are used within this report to show the anticipated change to the existing landscape created by the Proposal. Photomontages can assist in visual assessment by illustrating the scale and location of the proposed infrastructure in the landscape. One photomontage has been produced for the assessment. The methodology behind the technical production of photomontage imagery is described below.

2.5.1 Lens size and photos used within the photomontages

Photomontages typically show the changes in a 60° horizontal field of view. The 60° horizontal field of view represents the central cone of view in which symbol recognition and colour discrimination can occur. When defining vertical field of view, either 10° or 15° can represent the central field of view of human vision as shown below in Figure 2.1.



Source: Human Dimension and Interior Space, Julius Panero & Martin Zellnik, Witney Library of Design, 1979

Figure 2.1: Horizontal and Vertical field of view

Similar data can be found in the more recent publication entitled 'The Measure of Man and Woman, Revised Edition', Henry Dreyfuss Associates, John Wiley & Sons, 2012.

The 60° horizontal field of view is important if the photomontage images represent the change in the landscape. The A3 photomontage, which is appended to this report, includes a 60° horizontal field of view. One of the sheets within the photomontage set shows a wireframe view of the computer model to illustrate how the photomontages were derived. Vertical 'poles' within this wireframe are merely points on the landscape such as a group of trees, a corner of an existing building etc., which allow the computer model (prepared in 3D Studio Max) and the photograph to be accurately aligned. This ensures that the proposed power station is accurately located within the photograph and then the rest of the model is removed, and the power station is rendered into the image.

2.5.2 Photographs

A 70 mm lens on a Nikon D850 digital camera has a picture angle of 26.5° and a horizontal angle of view of approximately 21.3° (refer <https://imaging.nikon.com/lineup/dslr/basics/19/01.htm>).

Four photographs were overlapped 1/3 to create an image approximately the same as the central cone of view of human vision, i.e. 50-60° horizontal and 15° vertical. Figure 2.2 demonstrates this theory.

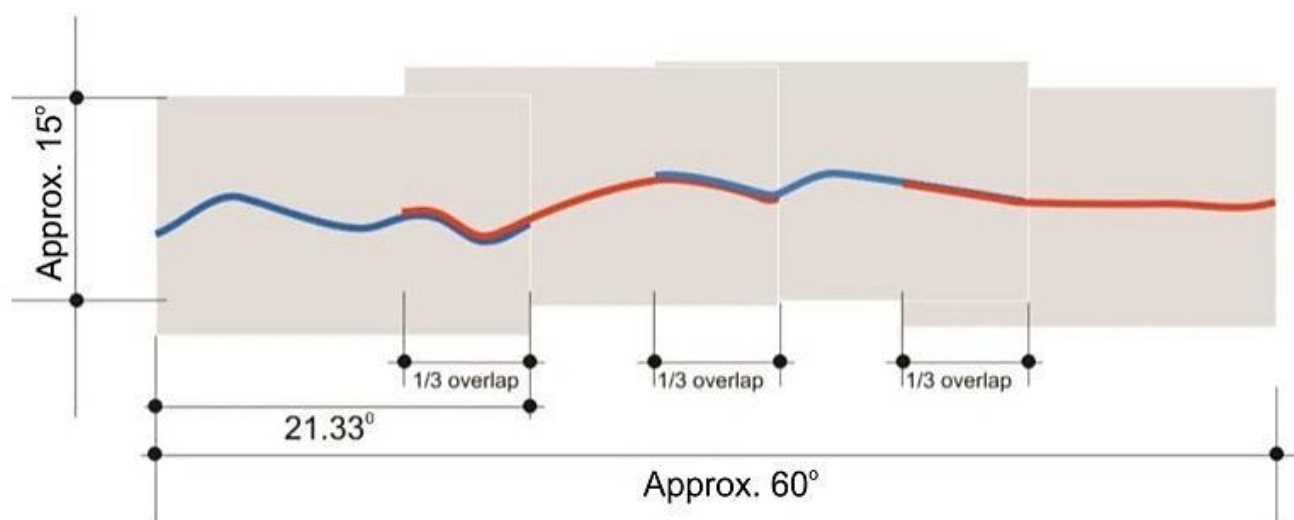


Figure 2.2: Photomontage photo layout

2.5.3 Computer modelling and the wireframe model

Cadastral data as well as the proposed development were modelled within a computer program (3D Studio Max). A virtual camera is set up in the model at the GPS coordinates for each of the photographs that are being used within the panorama.

The digital model or wireframe view is then overlaid on the photographic panorama. Known points within survey information such as topography, building locations or other infrastructure are registered into the base photographs (or other predetermined points). For technical accuracy, these points must align. This verifies the location and apparent height and scale of the Proposal development.

After the background reference points have been aligned, the wireframe is removed, leaving only the Proposal facilities, which are rendered, either to match the lighting conditions at the time the photographs were taken or, more typically, to increase their contrast against the background.

2.5.4 GPS coordinates

GPS coordinates were recorded from the viewpoint location and the locations from which the photographs were taken were marked on a digital map at the location of each photograph viewpoint.

2.5.5 Photomontages

One photomontage has been prepared from a publicly accessible viewpoint to illustrate the scale and nature of the Proposal. The photomontage is appended to this report (Refer Appendix A for A3 size photomontages with a 60° field of view).

It is recognised that the small photographs and the A3 photomontages included within this assessment are not indicative of the actual visual impact. For a greater sense of perceptual accuracy, it is recommended that the 60° images be printed and viewed on A0 sized sheets and held at arms' length at the original location. When viewed at A0 the photomontages are better representative of the level of visual alteration.

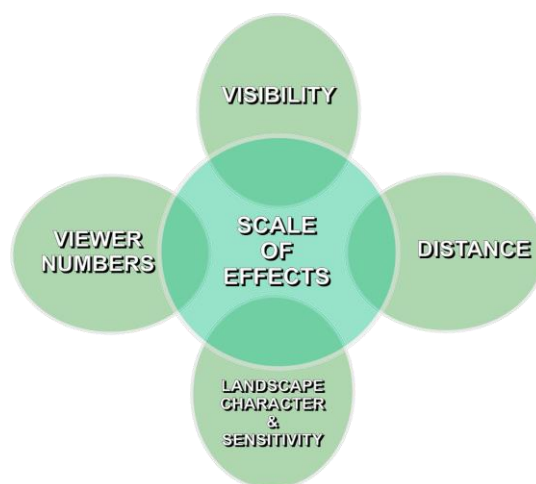
2.6 Viewpoint assessment

Assessing the potential visual impact of the Proposal from representative and key viewing locations within the public domain assists to consider the range of views and likely visual impact of the Proposal.

The assessment of visual impact from each location is based on four criteria which include visibility, distance, landscape character and viewer sensitivity and the number of viewers to arrive at an overall visual impact from each location. Time or likely duration and dwell at each location is also considered. Although considered, this is not easily quantified as it may vary from fleeting or transitory views to stationary views of varying duration depending on the individual, purpose of the stop and the setting. The scale of visual effect ranges from Negligible to High and recognises that a visual change may have no impact.

A more detailed description of the four criteria and their influence in determining the assessment of the overall visual impact from the public domain are set out below:

- **Visibility:** The visibility of the Proposal elements can be affected by other elements in the landscape, such as topography, vegetation, built form and infrastructure.
- **Distance:** Visibility and dominance of the Proposal will decrease with distance. The Zones of Visual Impact (ZVI) provides an indication of visual dominance and potential impact based on distance. This criterion is one of several to be considered when assessing the overall visual impact of the Proposal from any location.
- **Landscape Character and Sensitivity:** Landscape character of an area is based upon visual features such as topography, vegetation and the use of the land, the naturalness of the area and planning provisions. Typically, a modified landscape that is prevalent within the viewshed or the region, is less sensitive than one that is ostensibly natural or protected for its environmental, ecological or cultural values.
- **Viewer numbers:** The overall level of visual impact, which considers these four criteria, will decrease where there are fewer people able to view the Proposal. Conversely, the level of visual impact may also increase where the viewing location is a recognised vantage point or tourist route. Viewer numbers from these locations would be rated as 'high'.



The overall visual impact is the outcome of the above quantitative criteria that can be measured, balanced by a discussion of the qualitative aspects from each viewpoint.

The overall visual effect will range from nil to high. The definition for each scale is discussed below.

2.7 Scale of effects

The scale of effects determines the overall visual impact, or visual effect, from the assessed viewpoint. These range from nil to high visual impact, as described below:

2.7.1 Nil visual impact

Nil – The Proposal will be screened by topography, vegetation or buildings and structures.

2.7.2 Negligible visual impact

Negligible – minute level of effect that is barely discernible over ordinary day-to-day effects. The assessment of a 'negligible' level of visual impact is usually based on distance. That is, the Proposal is at such a distance that, when visible in good weather, it would be a minute element in the view within a modified landscape or will be predominantly screened by intervening topography, vegetation or buildings and structures.

2.7.3 Low visual impact

Low – visual impacts are those where the Proposal is noticeable but will not cause significant adverse impacts. The assessment of a "low" level of visual impact will be arrived at if the rating of any one or more of the four criteria, (visibility, distance, viewer numbers and landscape sensitivity), are assessed as low. Therefore, an additional piece of infrastructure in a landscape which is human-modified, and which already contains many examples of existing infrastructure may be rated as a low level of visual impact.

2.7.4 Medium/moderate visual impact

Medium/Moderate – visual impact may occur when several of the four assessment criteria are considered as higher than "low" or the visual effects are able to be mitigated / remedied from an initial rating of High. This will of course be moderated by the context of the existing view and the modifications within the landscape.

2.7.5 High visual impact

High or unacceptable adverse effect – extensive adverse effects that cannot be avoided, remedied or mitigated. The assessment of a "high or unacceptable adverse effect" from a publicly accessible viewpoint requires the assessment of all criteria to be high. For example, a highly sensitive landscape, viewed by many people, with the Proposal in close proximity and largely visible would lead to an assessment of an unacceptable adverse effect.

3. Site location and description

3.1 Proposal site and surrounding context

The Proposal Site is located in the small suburb of Loxford in the Hunter Valley region of New South Wales, approximately three km north of the town of Kurri Kurri, approximately 30 km west of Newcastle CBD and 125 km north of Sydney. The Proposal Site is located within the Cessnock City Council local government area (LGA).

The Proposal Site address is 73 Dickson Road, Loxford. Access to the Proposal Site is via Hart Road and is approximately one km north from the M15 Hunter Expressway. The Proposal location can be seen in Figure 3.1.

A proposed future subdivision of land within the former Kurri Kurri aluminium smelter site, owned by Hydro Aluminium Kurri Kurri Pty Ltd (Hydro Aluminium) (see Section 3.2) would result in a new landuse classification for the Proposal Site. The Proposal Site is located in the area as shown in Figure 3.2. The Proposal Site and its surrounds are currently zoned RU2 Rural Landscape under the *Cessnock Local Environmental Plan 2011* (Cessnock LEP), with small pockets of surrounding land zoned E2 Environmental Conservation, as shown in Figure 3.3. A large proportion of the land surrounding the Proposal Site comprising the former Kurri Kurri aluminium smelter site is still owned by Hydro Aluminium.

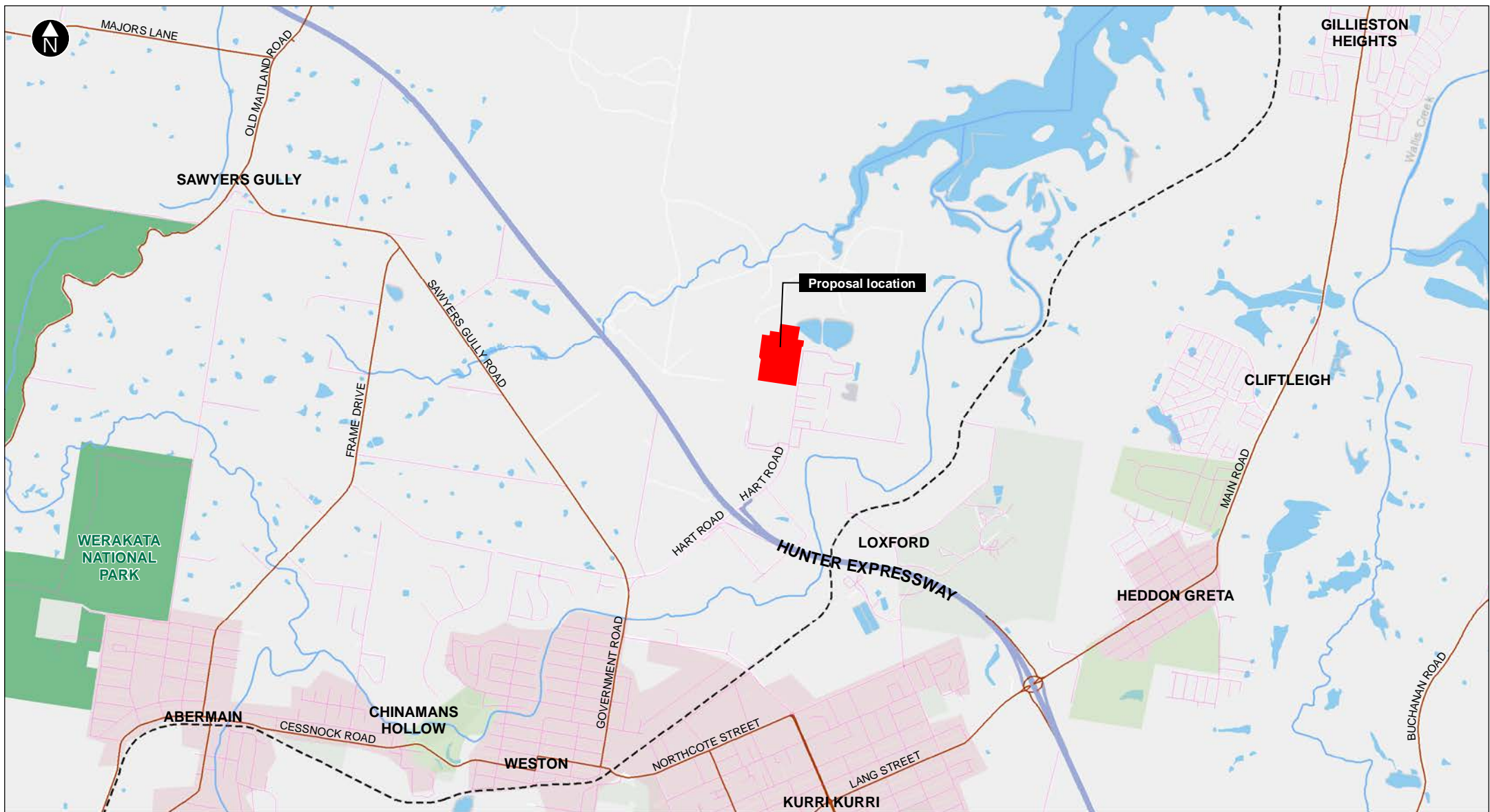
The Proposal Site forms a part of the former Kurri Kurri aluminium smelter site, which operated from 1969 to late 2012 and was closed in 2014. Since the closure of the Kurri Kurri aluminium smelter, extensive remediation works have taken place at the Kurri Kurri aluminium smelter site, including Stage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

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

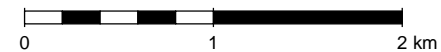
The closest residential zoned land is the suburban areas of Kurri Kurri, located approximately three km south and south-west of the Proposal Site. Further residential areas at Heddon Greta and Cliftleigh are situated approximately 2.5 km to the east. There are some sparse rural residential properties south and south-east of the Proposal Site, the nearest being located on Dawes Avenue, Loxford which is approximately 1.25 km south-east of the Proposal Site. The Kurri Kurri Speedway Club is on Dickson Road, Loxford and is approximately 800 to 850 m south-east of the Proposal Site.

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

The Proposal footprint encompasses the existing electrical switchyard of the former Kurri Kurri aluminium smelter. The existing electrical switchyard will be fully decommissioned and removed prior to the construction of the Proposal. The area further surrounding the Proposal Site are primarily flat, with natural drainage falling gradually towards the north-east towards Black Waterholes Creek. There are two large, shallow artificial ponds located north-east of the Proposal Site, which were constructed to capture stormwater runoff from the Kurri Kurri aluminium smelter site.



- | | | |
|--|--|--|
| Proposal location | Urban areas | Motorway |
| National Parks and Wildlife Services estate / reserve | Waterbodies | Main roads |
| Recreation areas | | Roads |
| | | Railway |



1:40,000 at A4
Coordinate System: GDA2020 MGA Zone 56

Data sources:
Jacobs
NSW Spatial Services

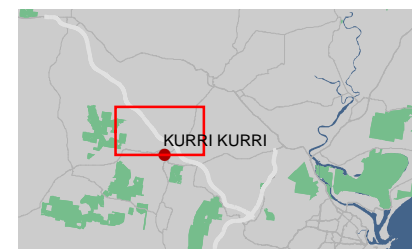


Figure 3-1 Proposal location (regional)



- Proposal Site
- Detention basin
- Existing electrical transmission easement

- Motorway
- Main roads
- Roads
- Railway
- Waterbodies

- ① Proposed Switchyard Area
- ② Proposed Plant Area
- ③ Proposed Buffer Area

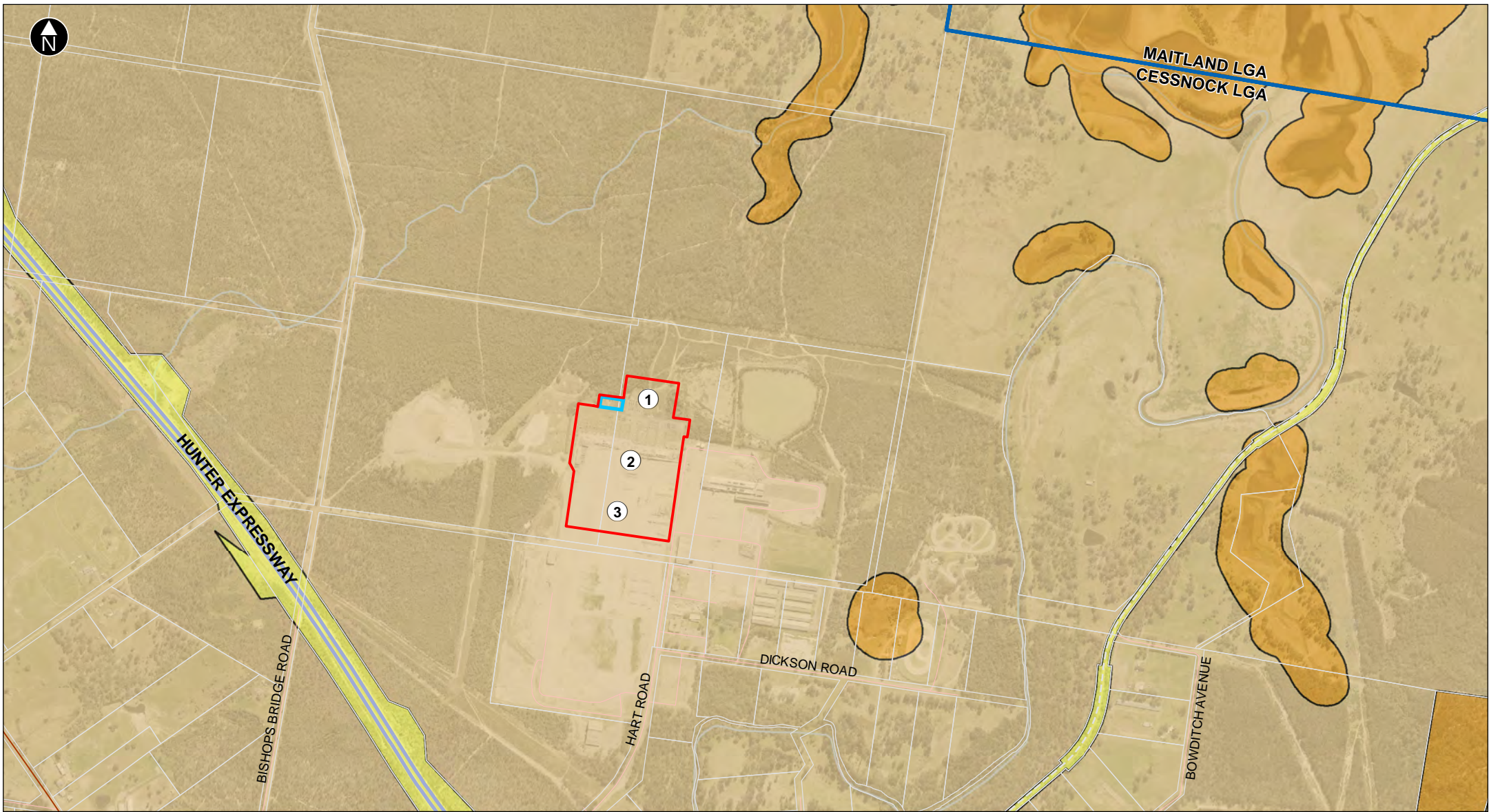
0 250 500 m

1:12,000 at A4
Coordinate System: GDA2020 MGA Zone 56

Data sources:
Jacobs
Metromap (Aerometrex) 2020
NSW Spatial Services



Figure 3-2 Proposal location (local)



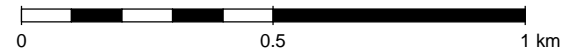
- | | |
|--|---|
| Proposal Site | — Motorway |
| Detention basin | — Main roads |
| Cadastre | — Roads |
| | --- Railway |
| Local Government Area | |

Land use zones

- E2 Environmental Conservation

- RU2 Rural Landscape
- SP2 Infrastructure

- ① Proposed Switchyard Area
- ② Proposed Plant Area
- ③ Proposed Buffer Area



1:15,000 at A4
Coordinate System: GDA2020 MGA Zone 56

Data sources:
Jacobs 2020
NearMap 2020
NSW Spatial Services

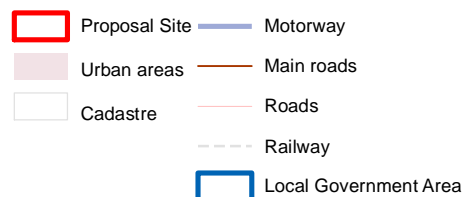
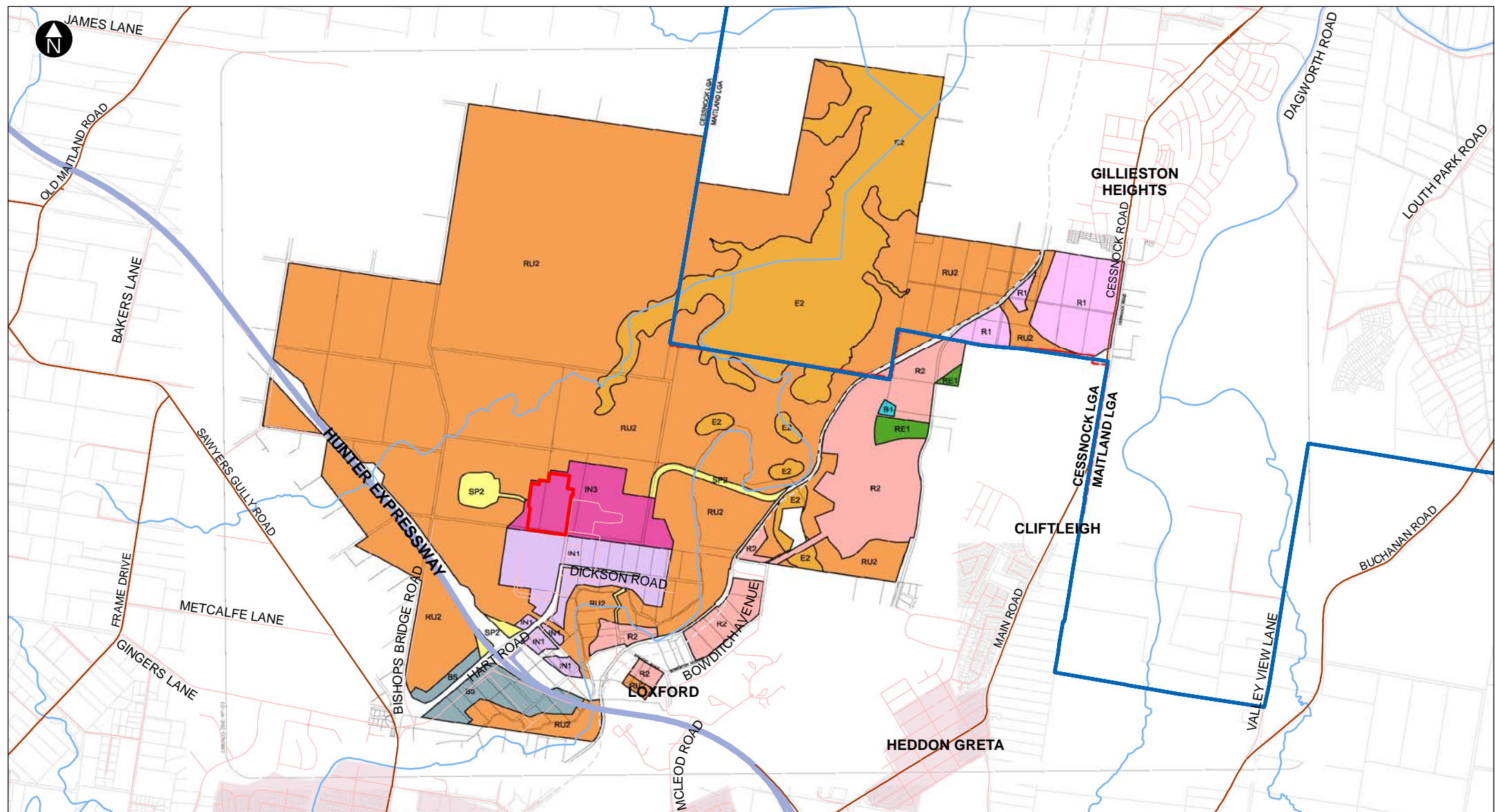


Figure 3-3 Current land use zones

3.2 ReGrowth Kurri Kurri rezoning and master plan

The rezoning, subdivision and industrial development of the Hydro Aluminium land is a major planning proposal by Regrowth Kurri Kurri to rezone approximately 329 hectares of land at and around the former Kurri Kurri aluminium smelter from Rural Landscape (RU2) to residential and public recreation, business, heavy and general industrial, infrastructure and environmental conservation (B1, B5, IN1, IN3, R2, RE1 and SP2 (in part)), to reduce the minimum lot size from 40 ha to 450 m² (in part) and to identify the site as an urban release area. The rezoning proposal affects land in both the Cessnock and Maitland local government areas. Under this plan, the Proposal Site would be designated Heavy Industrial. The concept master plan for the rezoning is shown in Figure 3.4. On 1 December 2020 the NSW Department of Planning, Industry and Environment issued a Gateway Determination enabling Cessnock City Council to place the Hydro Kurri Kurri Planning Proposal on public exhibition for a minimum of 28 days. Submissions closed on 1 February 2021.

The rezoning proposal is subject to further approval and physical works would be subject to lodgement and approval of separate development applications. Development applications for development of the land following rezoning and subdivision are not expected until 2023, by which time the Proposal is anticipated to be under construction and in operation by the end of 2023. There are not currently any development applications, nor any further detail around the type of future development that might occur adjacent to the Proposal Site. Therefore, potential cumulative impacts from the ReGrowth Kurri Kurri rezoning, subdivision and industrial development have not been assessed. It is assumed, however, in terms of the applicable land use zoning of the Proposal Site and the likely adjacent future land use context, that the rezoning proposal will be approved.



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

Source: McCloy Group, December 2020
 Note: Subject to Planning Approval and subject to change.
 This image has been georeferenced to this location.
 Jacobs does not warrant that this document is definitive nor free of error and does not accept liability for any loss caused or arising from reliance upon information provided herein.

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 GDA2020 MGA56



Figure 3-4 Hydro Kurri Kurri rezoning concept master plan

3.3 Regional context

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

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

The Proposal Site is surrounded on the north, east and west by extensive native vegetation, which appears to be regrowth.

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

3.4 Former site use and visual setting

The former Kurri Kurri aluminium smelter, particularly the elevated elements including the stacks, water towers and other tall components formed a significant visual element within the landscape setting of the area from 1969 to 2019. The tallest stack of the former Kurri Kurri aluminium smelter was approximately 140m in height. Two 70m stacks also existed at the former Kurri Kurri aluminium smelter site as well as a 55m tall water tower. The Proposal is not assessed against these former stack heights, however they provide context in the determination of landscape character and sensitivity of the Proposal Site and surrounding area, and, provide useful visual context in the determination of visibility of the proposed infrastructure, being similarly located, although significantly lower, to the former stacks. The site's former use and the visible infrastructure being commensurate with the proposed re-zoning application temper the expectations for the overall aluminium smelter site and future development.

As the majority of the Kurri Kurri aluminium smelter site is surrounded by a forested buffer zone, views of these elements from Kurri Kurri and other areas to the south, north and west was limited to those elevated elements that breached the tree canopy level. Residential dwellings to the south east and north east may have been afforded greater visibility of other aluminium smelter infrastructure where topography or breaks in vegetation allowed.

Visitors to the Kurri Kurri Speedway, adjacent to the former Kurri Kurri aluminium smelter site, would have experienced direct views of the aluminium smelter travelling via Hart Road and Dickson Road.

An enlarged view showing the smelter stacks in the landscape as viewed from Mitchell Avenue in Kurri Kurri is shown below in Figure 3.5.



Source: *Kurri Kurri Smelter Remediation and Demolition EIS - CH19 Visual*

Figure 3.5: Former Smelter in the landscape, viewed from Mitchell Avenue Kurri Kurri

The demolition of these elements in 2019 attracted considerable attention in the local community and media. Of interest was the community support and connection with the infrastructure at the Kurri Kurri aluminium smelter site and its history with the region.

In 2018, Hydro Aluminium commissioned a mural, designed in conjunction with the local community, to commemorate 43 years of the aluminium smelter operation. The mural exists on Hart Road to the south of the Kurri Kurri aluminium smelter site, which is used to access the Proposal Site from Kurri Kurri. The mural is shown below in Figure 3.6.



Source: Advance Cessnock: <https://advancecessnock.com.au/from-the-chambers-june-2018/>

Figure 3.6: Kurri Kurri Smelter Memorial Mural.

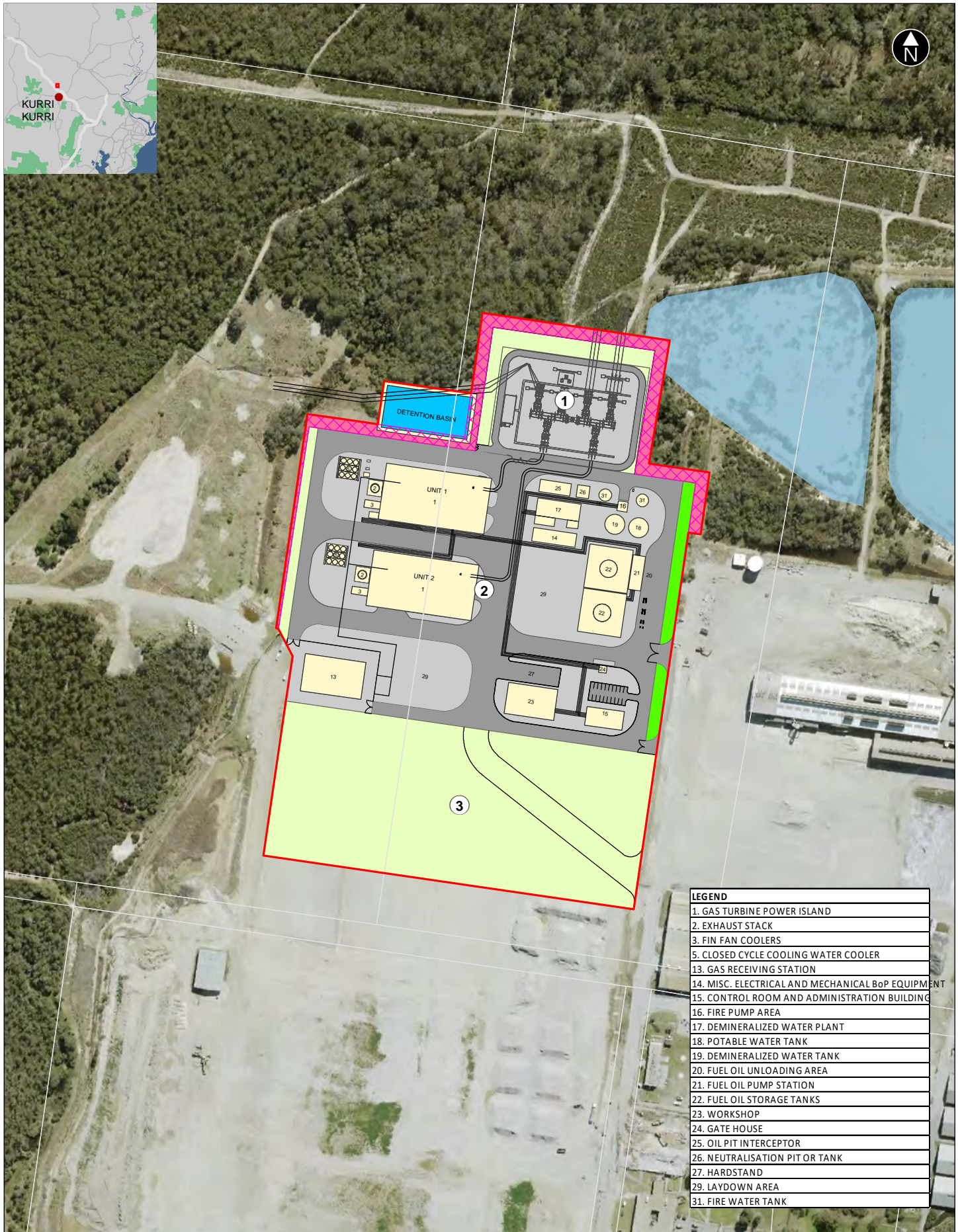
The mural depicts the former Kurri Kurri aluminium smelter within the distinct agricultural and floodplain landscape of the area north east of the Kurri Kurri aluminium smelter site. The aluminium smelter is shown as a significant built feature in the landscape, with the iconic stacks breaching the skyline above the Dividing Range in the background view.

4. Proposal description

4.1 Overview

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

The site layout and arrangement of infrastructure is shown below in Figure 4.1.



- Proposal Site
- Asset protection zone
- Detention basin
- Sealed roadway
- Crushed rock
- Landscaping
- Grass / Road base
- Existing waterbodies
- Existing cadastre
- ① Proposed Switchyard Area
- ② Proposed Plant Area
- ③ Proposed Buffer Area

Figure 4-1 Proposal Site Layout

The Proposal is proposed to comprise of two heavy-duty Open Cycle Gas Turbines (OCGT).

An example of a similar OCGT power station is shown below in Figure 4.2. This example, at Mortlake in Victoria, is the only F-Class OCGT power station currently in Australia.

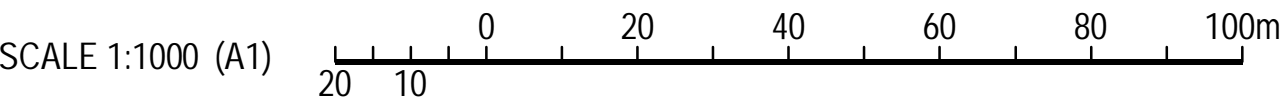
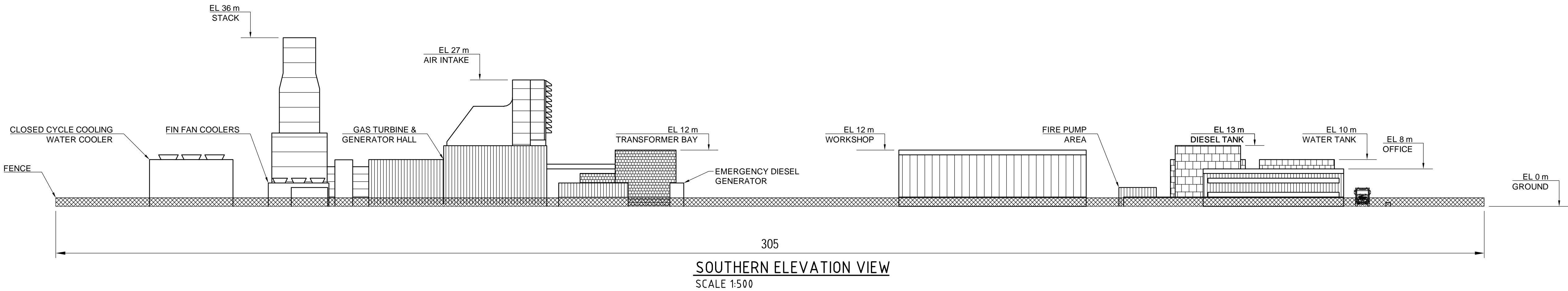
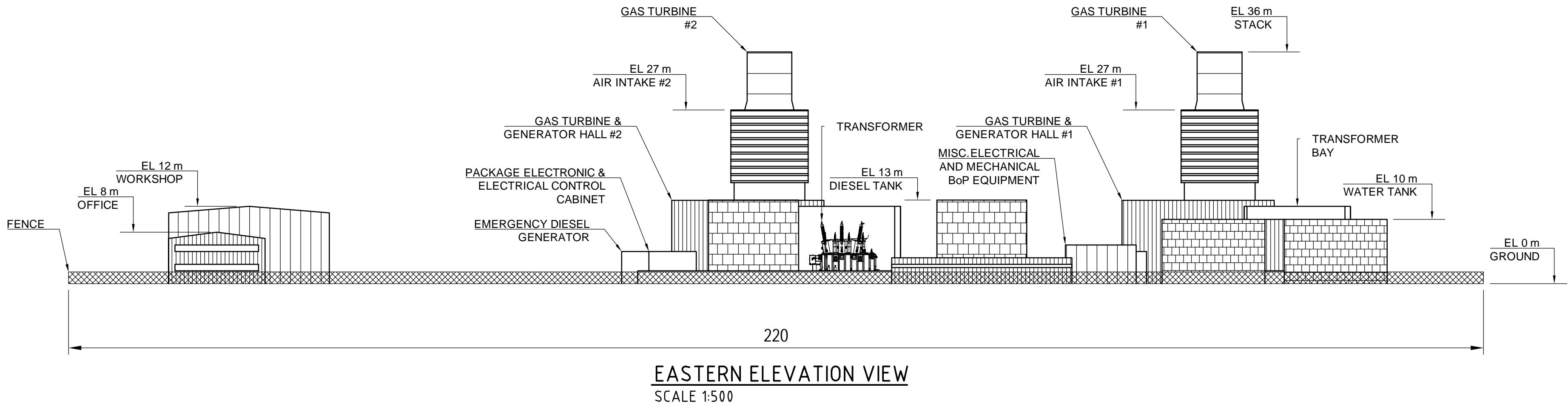


Figure 4.2: Example OCGT Power Station, Mortlake Victoria. Source: Jacobs

Indicative elevations that show the layout, appearance and heights of the Proposal's infrastructure are shown below in Figure 4.3 below.

NOTES:

- 1. ALL DIMENSIONS AND ELEVATIONS ARE IN METERS & ARE APPROXIMATE ONLY.
- 2. THE PURPOSE OF THIS DRAWING IS TO PROVIDE AN INDICATIVE ELEVATION OF THE SITE FOR AESTHETICS PURPOSES.



CONCEPT

REV	DATE	APP'D	REVISION	DRAWING NUMBER	REFERENCE DRAWING TITLE
A	XX.02.21		ISSUED FOR INFORMATION		

Jacobs

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CLIENT SNOWY HYDRO				TITLE KURRI KURRI POWER STATION CONCEPT ELEVATION OCGT F-CLASS LAYOUT		
PROJECT KURRI KURRI POWER STATION STUDY						
DRAWN R. INCAMPO	DRAWING CHECK	REVIEWED	APPROVED	SCALE 1:500 DRAWING No IS354500-0000-MC-DRG-0002 REV A		
DESIGNED R. INCAMPO	DESIGN REVIEW A. MARSHALL	DATE	DATE			

The preferred gas turbine technology for the Proposal is an industrial frame heavy duty 'F Class' gas turbine. The Proposal would have a nominal total electrical output of up to approximately 750 MW, but this will be dependent on the eventual gas turbine selected. The choice of the eventual gas turbine will be based on a range of environmental, engineering and economic factors that will be considered as the Proposal design advances.

The major supporting infrastructure required, which is part of the Proposal, will be a new 132 kV electrical switchyard. Potable water, wastewater and storm water connections and communication infrastructure to the Proposal Site will also be required for the operation of the Proposal. Temporary power and other services will also be required during the construction phase of the Proposal.

The main elements of the Proposal are as follows:

- Industrial frame gas turbines in Open Cycle configuration as described above, with a stack height of approximately 36 m;
- 132 kV electrical switchyard;
- Water storage tanks and other water management infrastructure;
- Fire water storage tanks and firefighting equipment such as hydrants and pumps;
- Maintenance laydown areas;
- Diesel fuel storage tank(s) and truck unloading facilities;
- Site access roads and car parking; and
- Office/administration, amenities, workshop/storage areas.

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

4.2 Ancillary facilities

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

- A natural gas receiving station including gas metering, pressure regulation, heating stations, pigging facilities (to clean and inspect the gas pipeline) and potential provision for flaring. This would be developed by a third party and be the subject of a separate environmental assessment and planning approval.
- Generator step-up transformers, Generator circuit breakers and electrical switchyard infrastructure including either underground cable or overhead line support structures;
- Water storage tanks (potable and demineralised), pumps, demineralised water plant, etc;
- Demineralised water plant;
- Diesel fuel storage tank(s) and forwarding pumps;
- Diesel tanker truck unloading facilities;
- Trade waste (water) collection and treatment facilities;
- Emergency diesel generator(s) with associated internal fuel storage;
- Closed circuit cooling systems for small on-site heat exchangers;
- Compressed air system;
- Firefighting system including two fire water storage tanks, pumps, hydrants, etc;
- Stormwater basin, pits and drainage system;
- Control room;
- Office and amenities facilities;

- Local electrical switch/control rooms;
- Workshop and warehouse;
- Communication systems;
- Occupational health and safety systems including an emergency warning and evacuation system;
- Concrete foundations, bitumen roadways, concrete pads in liquid fuel unloading station and gas turbine unit maintenance areas;
- Concrete bunded areas with drains for liquid fuel tanks, liquid chemicals store, oil filled transformers and other facilities where such liquids could leak;
- Security fence, security lighting, stack aviation warning lights (if required) and surveillance system;
- Landscaped areas and staff parking areas; and
- A level construction and laydown area.

Security and other outdoor lighting that is part of the Proposal will be designed and operated in accordance with the relevant Australian Standards to ensure potential offsite amenity impacts are mitigated.

4.3 Electrical switchyard

The proposed location of the new 132 kV electrical switchyard within the Proposal Site is shown in Figure 4.1. The specific orientation of the switchyard would be confirmed during the detailed design process however is expected to be similar to that shown in Figure 4.1. The electrical switchyard forms part of the Proposal and will be assessed in the EIS.

A typical switchyard is shown below in Figure 4.4.



Figure 4.4: Typical switchyard

4.4 Landscaping buffer

A 10 m landscaping buffer is proposed along parts of the eastern perimeter of the Proposal Site. This is also shown in Figure 4.1 The proposed landscaping will comprise areas of low shrubs and ground covers with trees and taller shrubs.

4.5 Water

The Proposal will connect into an existing Hunter Water potable water supply pipeline in proximity of the Proposal Site. Water storage tanks will also be provided within the Proposal Site to assist with the Proposal's peak water demands. This will include two dedicated fire water storage tanks.

Potable water will be used for evaporative cooling of air into the gas turbines and other water demands such as fire water (a rare occurrence if needing to fill up the storage tanks), gas turbine compressor washing, amenities and for the supply to the demineralised water plant.

A demineralised water plant within the Proposal Site will service the Proposal's demineralised water demands. Demineralised water is required to further assist with cooling of the ambient air to improve the gas turbine performance during high temperature conditions and/or when additional power augmentation is required, and for water injection when operating the power station on diesel fuel to assist with managing NOx emissions.

4.6 Vehicular access

No new dedicated roads are required to be constructed as a result of the Proposal. Primary access will be from the Hunter Expressway and Hart Road. New internal roads will be constructed within the Proposal Site.

Heavy Vehicle access during construction will be via the Hunter Expressway onto Hart Road leading into the Proposal Site. Construction parking will be provided within the Proposal Site.

4.7 Construction activities and construction staging

Key construction activities for the Proposal include, but not limited to:

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

Pre-construction activities including design, field surveys, environmental studies and consents, approval of associated management plans and community and stakeholder engagement will also be completed. Construction is anticipated to commence in approximately January 2022, with operation planned to commence between August 2023 and December 2023.

4.8 Proposal summary: relevance to this assessment

The major components of the Proposal relevant for the consideration of landscape character and visual impacts are elevated infrastructure, including the:

- Gas turbine exhaust stacks and associated air intake structures
- Water and fuel tanks

These elements have the capacity to be visible above the vegetation surrounding the Proposal Site. The tallest built element of the Proposal are the gas turbine exhaust stacks, with a height of up to approximately 36 m, which will be used to determine the viewshed of the Proposal. The water and fuel tanks will be up to approximately 10-13 m in height depending on the final storage demands and detailed design.

5. Viewshed

This section establishes a rational basis on which to determine the extent of the viewshed or study area for the assessment of the visual impact of the Proposal. Zones of Visual Influence will also be established to consider the scale of the Proposal in views from various distances removed from the Proposal Site boundary.

The viewshed defines the area or distance from the Proposal where the key features may be a recognisable element within a view. This distance is established based on the height of the key Proposal features determined in Section 4 and the parameters of the human vision which are described below.

Typically, the extent of the viewshed is calculated based on the overall height of the tallest project component rather than its width. This is because the taller the object, generally the greater the distance that the object would be more noticeable from. The width of the project area is contemplated by the horizontal offset of the viewshed and zones of visual influence from the project features.

It may be possible to see the Proposal from areas beyond the viewshed, however the Proposal would be a barely noticeable element in the view and would therefore not bring about an appreciable change in the view.

The parameters of human vision include the vertical and horizontal fields of views as shown in Figure 5.1. These figures are based on data from 'Human Dimension and Interior Space', Julius Panero & Martin Zellnik, Witney Library of Design, 1979. Similar data can be found in the more recent publication entitled 'The Measure of Man and Woman, Revised Edition', Henry Dreyfuss Associates, John Wiley & Sons, 2012.

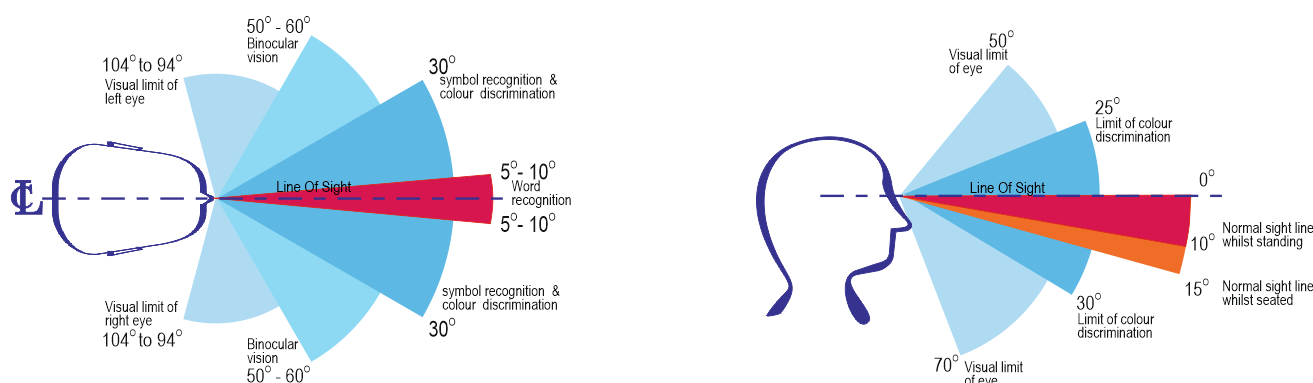


Figure 5.1: Vertical and horizontal parameters of human vision

For this Proposal, the viewshed will be based upon the height of the tallest infrastructure component. The theoretical extent of the viewshed can be considered to extend to a distance at which the tallest component of the Proposal would take up less than five per cent of the vertical field of view. Typically, the field of view of a person is 10°, whereby five per cent of the vertical field of view is approximately equal to 0.5°.

For this Proposal, the viewshed will be based upon the gas turbine exhaust stacks, with a height of up to approximately 36 m. For the purpose of conducting a conservative assessment, and to account for any potential design changes that may occur in subsequent detailed design stages, the height of the 36 m exhaust stacks will be rounded up to 40 m for the purpose of establishing the viewshed extent and zones of visual influence distances.

The distance at which 40 m stacks in the landscape would take up five per cent (0.5°) of the vertical field of view is 4.6 km. The viewshed of the Proposal will therefore consider the area within 4.6 km of the Proposal.

5.1 Zones of Visual Influence

Zones of Visual Influence (ZVI) assist to assess the overall visual impact of the Proposal based on distance. The calculations used to determine the viewshed can also be used to define visual impact based on distance. It must be recognised that zones of visual influence are one of several criteria for assessing visual impacts.

For example, when a view location is closer to the Proposal, the Proposal would take up a greater percentage of the vertical field of view.

Table 5.1 sets out the theoretical extent of the study area and Zones of Visual Influence based upon a 40 m high gas turbine exhaust stack.

Table 5.1: Zones of Visual Influence

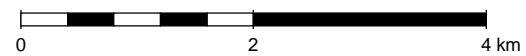
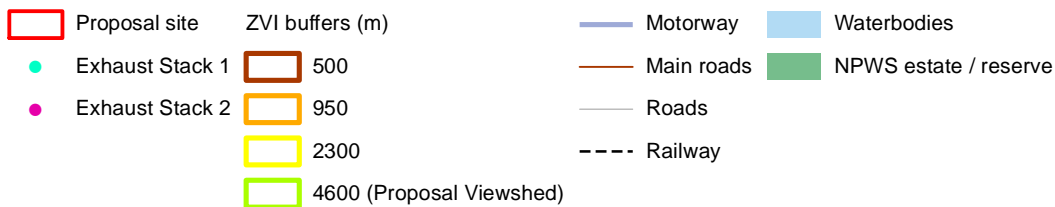
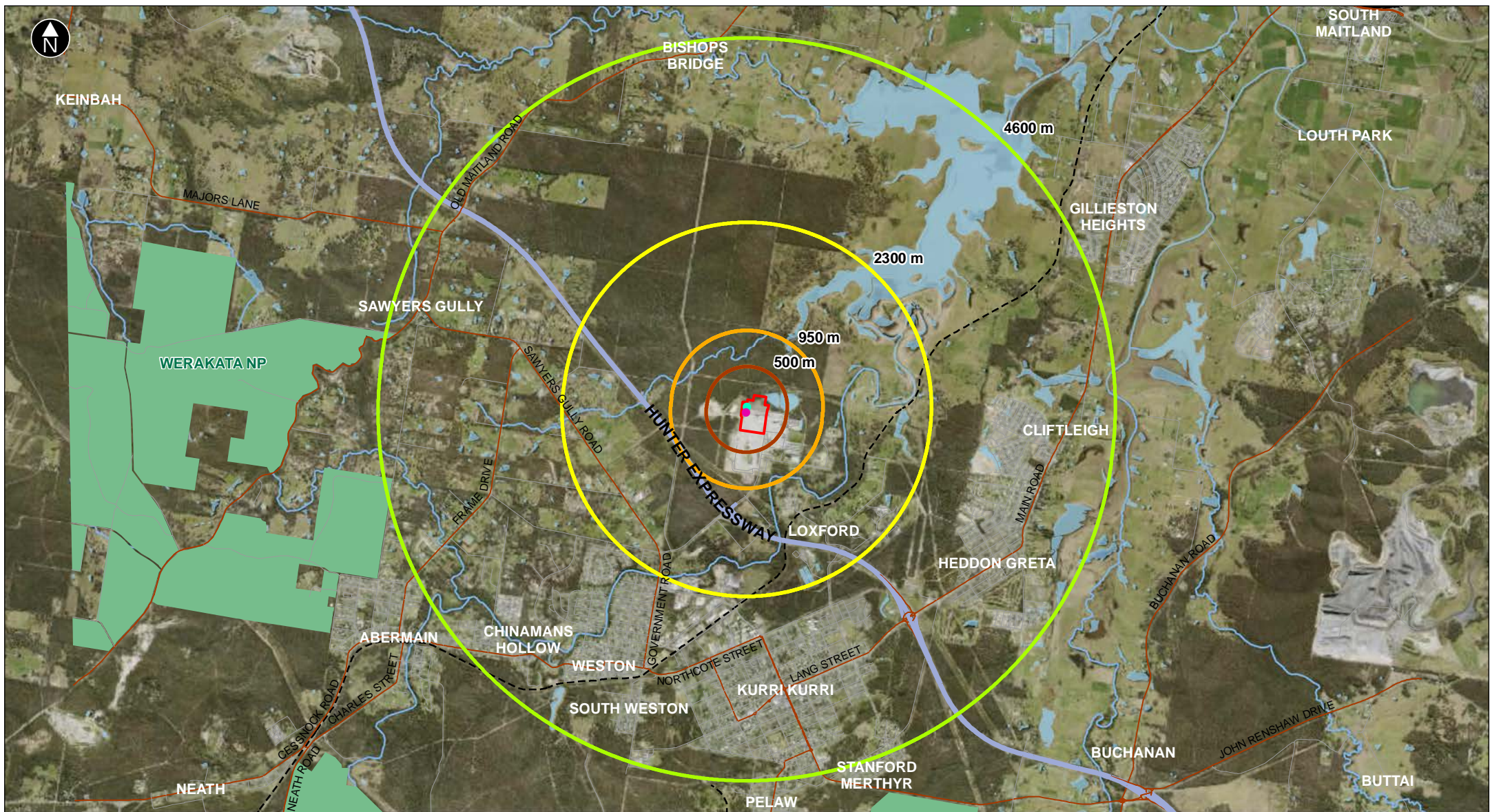
Vertical angle of view	Zones of Visual Influence	Distance from the gas turbine exhaust stack
<0.5	Visually insignificant – Extent of the Proposal viewshed A very small element in the viewshed, which is difficult to discern and will be invisible in some lighting or weather circumstances.	>4.6 km
0.5-1.0	Noticeable, but will not dominate the landscape The degree of visual intrusion will depend on the landscape sensitivity and the sensitivity of the viewer; however, the Proposal will not dominate the landscape.	2.3 km - 4.6 km
1.0-2.5	Noticeable and can dominate the landscape The degree of visual intrusion will depend on the landscape sensitivity and the sensitivity of the viewer.	950 m - 2.3 km
2.5-5.0	Highly visible and will usually dominate the landscape The degree of visual intrusion will depend on the Proposal visibility in views from the landscape and factors such as foreground screening.	500 m – 950 m
>5.0	Will always be visually dominant in the landscape Dominates the landscape in which it is sited.	<500 m

It is recognised that the Proposal visibility will not dramatically alter when a viewer moves from 940 m to 960 m from the Proposal Site, and therefore these zones are a guide only.

The areas that will be most affected visually by the Proposal are those within 500 m of the gas turbine exhaust stacks.

Figure 5.2 shows the extent of the Proposal viewshed or visual study area in green, with the zones of visual influence in yellow, orange and red.

The zones of visual influence do not determine visual impact. Rather they assist the consideration of the visual scale and prominence of proposed infrastructure over varying distances as one of the criteria considered when determining the overall visual impact of the Proposal.



1:65,000 at A4
Coordinate System: GDA2020 MGA Zone 56

Data sources:
Jacobs 2020
Metromap (Aerometrex) 2020
NSW Spatial Services

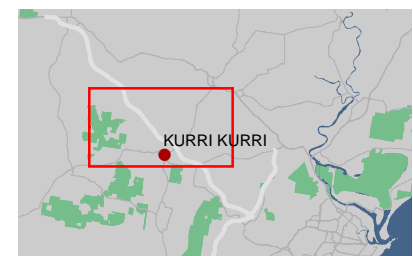


Figure 5-2 Proposal Viewshed and Zones of Visual Influence

6. Planning and statutory setting

This section describes the relevant planning policies, strategic documents and other frameworks that are of relevance to an LVIA of the Proposal.

6.1 Local planning policy framework

The Proposal Site is situated within the Cessnock Local Government Area (LGA). The broader visual study area also encompasses the Maitland LGA, which exists to the north east of the Proposal Site.

6.1.1 Cessnock Local Environmental Plan 2011

The Cessnock Local Environmental Plan 2011 (LEP) sets out standards and permissions that apply to land use and development within the Cessnock LGA.

6.1.1.1 Existing land use zoning: Proposal Site

As discussed in Section 3.1, the Proposal Site is currently zone RU2 – Rural Landscape. The objectives of this zone include:

- *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*
- *To maintain the rural landscape character of the land.*
- *To provide for a range of compatible land uses, including extensive agriculture.*
- *To enable other forms of development that are associated with rural activity and require an isolated location or support tourism and recreation.*
- *To ensure that the type and intensity of development is appropriate in relation to the rural capability and suitability of the land, the preservation of the agricultural, mineral and extractive production potential of the land, the rural environment (including scenic resources) and the costs of providing services and amenities.*
- *To maintain and enhance the scenic character of the land.*
- *To ensure that development does not create unreasonable or uneconomic demands for the provision or extension of services.*
- *To minimise the visual impact of vegetation clearing in order to be consistent with the rural character of the locality.*
- *To minimise disturbance to the landscape from development through clearing, earthworks, access roads and construction of buildings.*
- *To ensure development does not intrude into the skyline when viewed from a road or other public place.*

It is recognised that this current zoning and the objectives of RU2 is at odds with the former use of the existing Kurri Kurri aluminium smelter site.

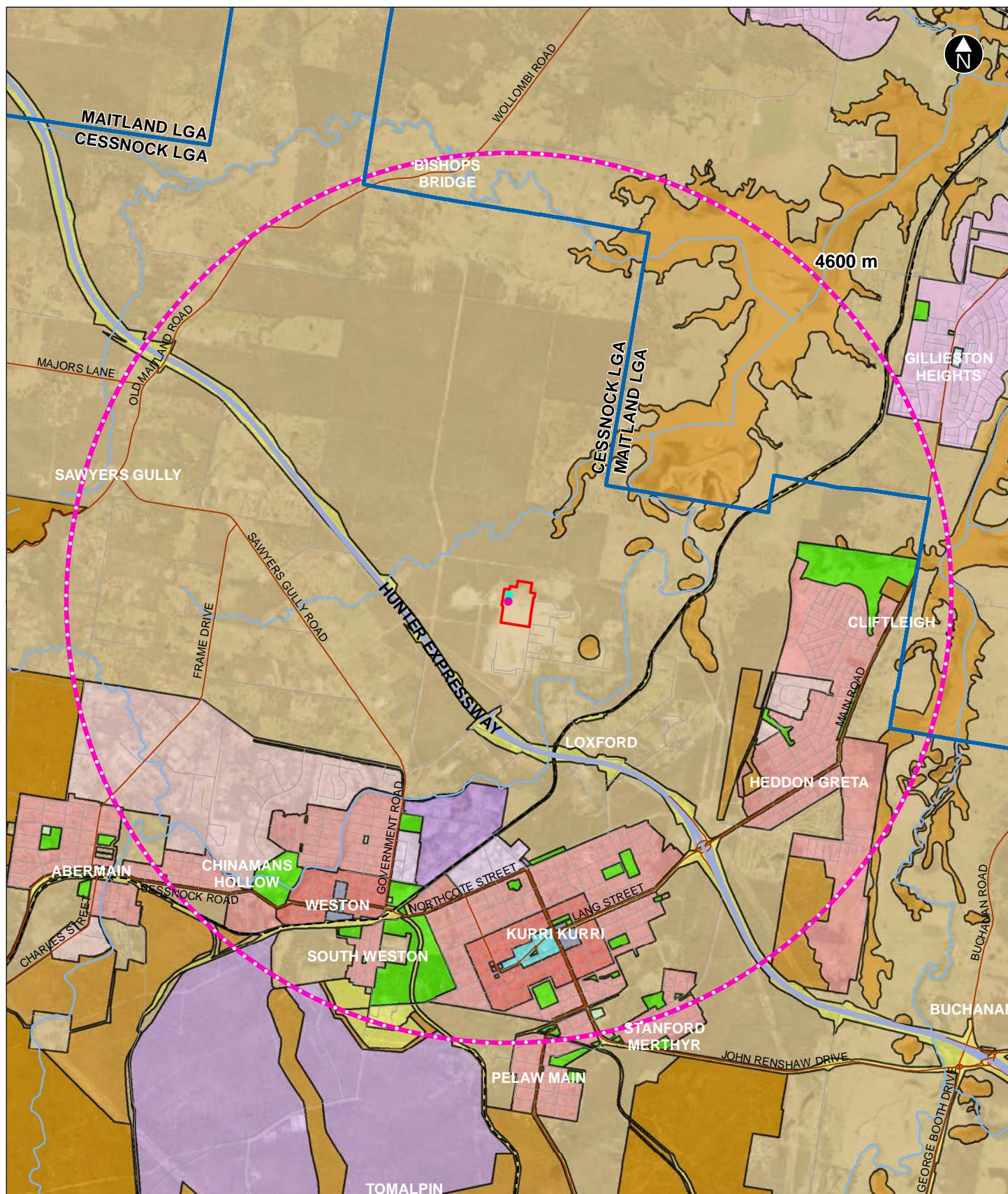
A gas fired power station is not an identified prohibited use within RU2.

As mentioned in Section 3.2, a rezoning plan is currently before the DPIE to rezone the Proposal Site along with the surrounding areas. If this plan proceeds, the Proposal Site would be zoned Heavy Industrial and would be located within a future industrial precinct.

6.1.1.2 Existing Land Use Zoning: Viewshed

An understanding of the land use zoning within the Proposal viewshed highlights locations that may include land uses or activities sensitive to the imposition of the Proposal within the landscape.

The land use zoning within the viewshed are shown below in Figure 6.1 and listed in Table 6.1 below.



- | | | |
|---|--|--|
| <ul style="list-style-type: none"> Proposal site ● Exhaust Stack 1 ● Exhaust Stack 2 Proposal Viewshed — Motorway — Main roads — Roads - - - Railway | Land use zones <ul style="list-style-type: none"> B1 Neighbourhood Centre B2 Local Centre B4 Mixed Use E1 National Parks and Nature Reserves E2 Environmental Conservation E3 Environmental Management IN1 General Industrial IN2 Light Industrial IN3 Heavy Industrial R1 General Residential R2 Low Density Residential R3 Medium Density Residential | <ul style="list-style-type: none"> R5 Large Lot Residential RE1 Public Recreation RE2 Private Recreation RU1 Primary Production RU2 Rural Landscape RU3 Forestry SP2 Infrastructure |
|---|--|--|

0 1 2 km
1:55,000 at A4
GDA2020 MGA Zone 56

Data sources:
Jacobs 2020
Metromap (Aerometrex) 2020
NSW Spatial Services



Figure 6-1 Land Use Zoning within the viewedshed

Table 6.1: Land Use Zoning within the viewshed

Class	Zone	LGA	Summary / Relevant Objectives
Residential	R1 – General Residential	Maitland	<p>This zoning typically applies to residential areas within townships. Objectives include:</p> <ul style="list-style-type: none"> To provide for the housing needs of the community. To provide for a variety of housing types and densities.
	R2 – Low Density Residential	Cessnock	<p>This zoning typically applies to residential areas within township fringes. Objectives include:</p> <ul style="list-style-type: none"> To provide for the housing needs of the community within a low density residential environment. To enable other land uses that provide facilities or services to meet the day to day needs of residents.
	R3 – Medium Density Residential	Cessnock	<p>This zoning typically applies to residential areas within township fringes.</p> <ul style="list-style-type: none"> To provide for the housing needs of the community within a medium density residential environment. To provide a variety of housing types within a medium density residential environment. To enable other land uses that provide facilities or services to meet the day to day needs of residents.
	R5 – Large Lot Residential	Cessnock	<p>This zoning typically applies to residential areas outside townships. Objectives include:</p> <ul style="list-style-type: none"> To provide residential housing in a rural setting while preserving, and minimising impacts on, environmentally sensitive locations and scenic quality. To ensure that large residential lots do not hinder the proper and orderly development of urban areas in the future. To ensure that development in the area does not unreasonably increase the demand for public services or public facilities. To minimise conflict between land uses within this zone and land uses within adjoining zones.
Recreation	RE1 – Public Recreation	Cessnock / Maitland	<p>This zoning applies to public recreation sites. Objectives include:</p> <ul style="list-style-type: none"> To enable land to be used for public open space or recreational purposes. To provide a range of recreational settings and activities and compatible land uses. To protect and enhance the natural environment for recreational purposes.

Class	Zone	LGA	Summary / Relevant Objectives
	RE2 – Private Recreation	Cessnock / Maitland	<p>This zoning applies to private recreation sites. Objectives include:</p> <ul style="list-style-type: none"> <i>To enable land to be used for private open space or recreational purposes.</i> <i>To provide a range of recreational settings and activities and compatible land uses.</i> <i>To protect and enhance the natural environment for recreational purpose</i>
Environmental	E1 – Environmental Conservation	Cessnock	<p>This zoning applies to National Parks and other land reserved under the National Parks and Wildlife Act 1974. Objectives include:</p> <ul style="list-style-type: none"> <i>To enable the management and appropriate use of land that is reserved under the National Parks and Wildlife Act 1974 or that is acquired under Part 11 of that Act.</i> <i>To enable uses authorised under the National Parks and Wildlife Act 1974.</i> <i>To identify land that is to be reserved under the National Parks and Wildlife Act 1974 and to protect the environmental significance of that land.</i>
	E2 – Environmental Conservation	Cessnock / Maitland	<p>This zoning applies to other areas of environmental, cultural or aesthetic significance. Objectives include:</p> <ul style="list-style-type: none"> <i>To protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values.</i> <i>To prevent development that could destroy, damage or otherwise have an adverse effect on those values.</i>
Rural	RU2 – Rural Landscape	Cessnock / Maitland	<p>This zoning typically applies to land set aside for primary production. Key relevant objectives include:</p> <ul style="list-style-type: none"> <i>To maintain the rural landscape character of the land.</i> <i>To ensure that the type and intensity of development is appropriate in relation to the rural capability and suitability of the land, the preservation of the agricultural, mineral and extractive production potential of the land, the rural environment (including scenic resources) and the costs of providing services and amenities.</i> <i>To maintain and enhance the scenic character of the land.</i> <i>To minimise the visual impact of vegetation clearing in order to be consistent with the rural character of the locality.</i> <i>To minimise disturbance to the landscape from development through clearing, earthworks, access roads and construction of buildings</i> <i>To ensure development does not intrude into the skyline when viewed from a road or other public place.</i>

Class	Zone	LGA	Summary / Relevant Objectives
	RU3 – Forestry	Cessnock / Maitland	<p>This zoning applies to land set aside for forestry uses. Objectives include:</p> <ul style="list-style-type: none"> To enable development for forestry purposes. To enable other development that is compatible with forestry land uses.
Infrastructure	SP2 – Infrastructure	Cessnock / Maitland	<p>This zoning applies to roads and other related uses. Objectives include:</p> <ul style="list-style-type: none"> To provide for infrastructure and related uses.
Industrial	IN1 – General Industrial	Cessnock	<p>This zoning applies to industrial areas. Objectives include:</p> <ul style="list-style-type: none"> To provide a wide range of industrial and warehouse land uses. To minimise any adverse effect of industry on other land uses. To support and protect industrial land for industrial uses. To encourage sustainable major industrial development and major employment generating development.
	IN2 – Light Industrial	Cessnock	<p>This zoning applies to light industrial areas. Objectives include:</p> <ul style="list-style-type: none"> To provide a wide range of light industrial, warehouse and related land uses. To minimise any adverse effect of industry on other land uses. To support and protect industrial land for industrial uses
	IN3 – Heavy Industrial	Cessnock	<p>This zoning applies to industrial uses that need to be separated from other land uses. Objectives include:</p> <ul style="list-style-type: none"> To provide suitable areas for those industries that need to be separated from other land uses. To minimise any adverse effect of heavy industry on other land uses. To support and protect industrial land for industrial uses.
Business	B1 – Neighbourhood Centre	Cessnock	<p>This zoning is found in the central business area of townships. Objectives include:</p> <ul style="list-style-type: none"> To provide a range of small-scale retail, business and community uses that serve the needs of people who live or work in the surrounding neighbourhood.
	B2 – Local Centre	Cessnock	<p>This zoning is found in the central business area of townships. Objectives include:</p> <ul style="list-style-type: none"> To provide a range of retail, business, entertainment and community uses that serve the needs of people who live in, work in and visit the local area.

Class	Zone	LGA	Summary / Relevant Objectives
	B4 – Mixed Use	Cessnock	<p>This zoning applies to areas that contain a range of compatible land uses. Objectives include:</p> <ul style="list-style-type: none"> To integrate suitable business, office, residential, retail and other development in accessible locations so as to maximise public transport patronage and encourage walking and cycling.

6.1.2 Scenic Protection Land

Scenic Protection Land is an overlay applied to areas to be protected from visual impacts. No Scenic Protection Land areas are within the Proposal viewshed.

6.2 Strategic documents

6.2.1 Cessnock Local Strategic Planning Statement 2036

The Cessnock Local Strategic Planning Statement 2036 (LSPS) guides planning decisions made by Cessnock City Council, and sets a 20 year land use planning direction for the Cessnock LGA. The relevant sections of the LSPS are described below:

Planning Priority 3 is the character and vitality of our town centres and villages is protected and enhanced. This priority seeks to ensure that future development is sensitive to the existing local character. Action 14 states that Council will prepare a Local Character Study and Local Character Statement for residential land in relevant city locations.

Planning Priority 8 is our rural land is protected from incompatible development. This priority seeks to protect agricultural and productive land from inappropriate development or encroachment. The LSPS proposes five 'rural lands precincts', which are based upon areas of similar landscape elements, land-use and topographical characteristics. These are shown below in Figure 6.2.

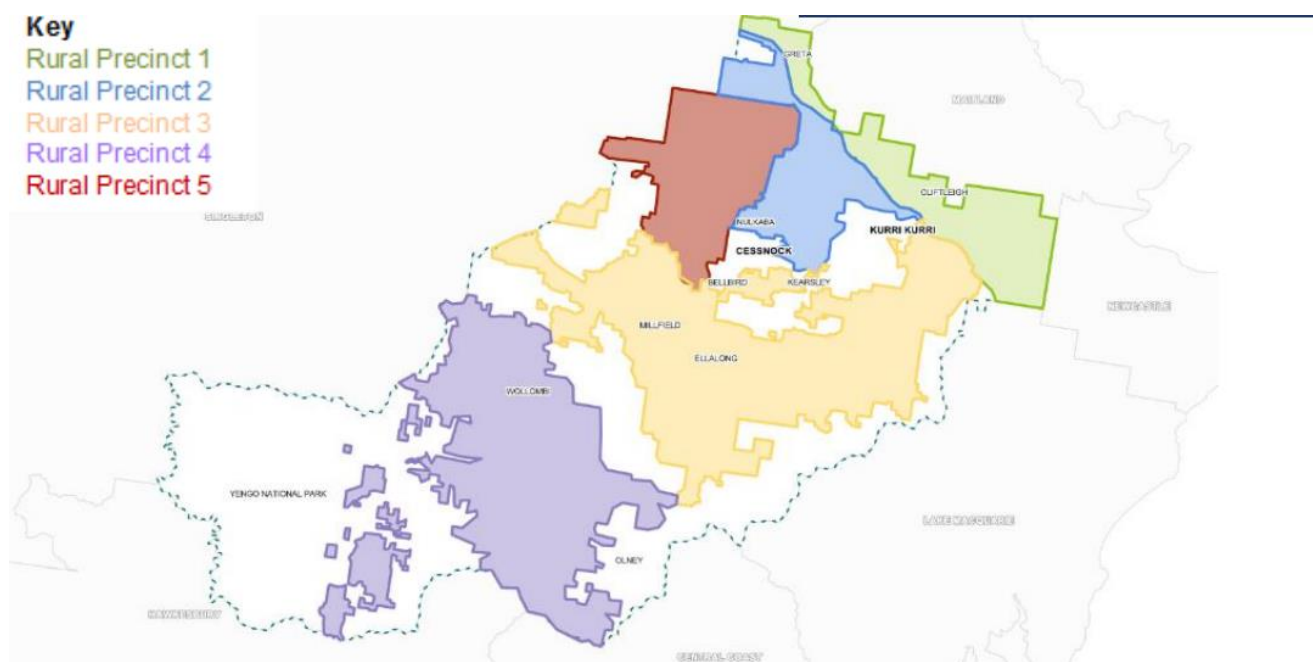


Figure 6.2: Cessnock Strategic Planning Statement: Proposed Rural Lands Precincts

The Proposal Site is located within Rural Precinct 1. While the land is currently zoned RU2, it is recognised that the Proposal Site was the location of an operational industrial use (aluminium smelter) for several decades and it is unlikely that future use of the Kurri Kurri aluminium smelter site for agricultural purposes would be permitted due to this previous use.

Relevant planning principles of this priority include:

- **Principle 1:** Fragmentation of rural land is discouraged, whereas the use and consolidation of existing undersized lots is encouraged.
- **Principle 2:** Effective buffers are maintained to protect rural lands from further encroachment by non-agricultural development.
- **Principle 6:** The impacts of higher risk, non-agricultural land-uses are appropriately managed to mitigate impacts on the rural, environmental and scenic values of the LGA.

Planning Priority 13 is *Our industrial land is developed in an orderly manner and meets future development needs*. This priority seeks to support the development of industrial land where appropriate. Action 30 of the LSPS is referenced, which seeks to progress the Hydro Planning Proposal (Regrowth Kurri Kurri) with the inclusion of employment land to encourage a range of appropriate industries and specialised retail premises.

Planning Priority 14 is *Our industrial land fosters economic growth, business diversity, and employment opportunities*. This priority reiterates that specialised retail precincts for bulky goods should be encouraged at the Regrowth Kurri Kurri development site. Planning Principle 4 of this priority states that *Industries that implement sustainable forms of energy generation and supply will be encouraged*.

Planning Priority 17 is *Our lands of environmental value are protected and enhanced*. This priority recognises that many areas of high environmental value exist within the LGA, but may not be reflected in the current zoning. Relevant planning principles of this priority include:

- **Principle 1:** Natural assets and lands of environmental value are identified and protected.
- **Principle 2:** Areas of high biodiversity are identified and conserved.
- **Principle 3:** Development at the interface of our state forests and national parks has minimal environmental impact.
- **Principle 4:** Areas of high environmental value are protected from encroachment by incompatible land-uses
- **Principle 8:** Developments that are likely to result in a Serious and Irreversible Impact (SAIL) on biodiversity values will not be supported.

Planning Priority 22 is *Our rural landscape is retained and enhanced*. This priority states that:

Cessnock's landscape is characterised by scenic ranges, internationally significant national parks and vineyards, and extensive areas of rural landscape. These rural areas, mountain ranges and environmental lands are distinctive features and integral to the identity of the area.

Relevant planning principles of this priority include:

- **Principle 1:** Scenic view corridors of the region are protected and enhanced.
- **Principle 2:** The rural character and amenity of the land is preserved and enhanced.
- **Principle 6:** The interface between urban areas and rural land or environmental land is managed to minimise visual impacts.
- **Principle 7:** Visually significant views, topography and tree-lined local road corridors are preserved.

6.2.2 Maitland Local Strategic Planning Statement 2040+

The Maitland Local Strategic Planning Statement 2040+ (MLSP) provides the strategic direction for land use planning within the Maitland LGA. Although the Proposal Site is not within the Maitland LGA, the viewshed extends across landscapes within the Maitland LGA that may include areas of scenic value.

Planning Priority 11 is *Protect our city's rural lands, natural assets and rural landscape*. This priority states that Maitland's rural landscape has strong cultural, historical, recreational and aesthetic connections for the local community. The priority references the Maitland Rural Land's Strategy 2005 (MRLS). The MRLS describes Maitland's rural landscape and scenic values as:

'... relatively diverse and sometimes described as unique. The early settlers began clearing the land of its vegetation and this together with European farming practices has developed the rural landscape of the area. Whilst land clearing and traditional farming practices have created various degrees of ecological and related environmental damage, these actions have developed Maitland's European heritage character.

Tourism and population growth can be directly attributed to the importance that people place on these landscape and scenic attributes.'

The MRLS states that:

'rural settlement planning should ensure that inappropriate development is not permitted in visually prominent rural areas (e.g. highly visible dwellings on ridgelines). Any new development should be designed with a view to maintaining and enhancing existing vegetation both for visual amenity...'

6.2.3 Strategic documents summary

The Cessnock Local Strategic Planning Statement and Maitland Local Strategic Planning Statement planning priorities seek to protect a range of landscapes from inappropriate development, that in particular may impact on local landscape character of rural landscapes, townships and villages, as well as infringe upon valued scenic amenity. The potential for the Proposal to impact on these values will be discussed and assessed in the viewpoint assessment chapter.

6.3 Hunter 2000

Hunter 2000: Conservation of lands and buildings of natural, historical, scenic or recreational value in the Hunter Region is a report prepared by the National Trust of Australia (NSW) (the Trust) (1972) following a request from the State Planning Authority of NSW for the Trust's views on planning for nature conservation, scenic preservation, historic buildings and recreation in the Hunter Region. Kurri Kurri and surrounding areas are included within the scope of this study.

Hunter 2000 identified a range of landscapes or buildings of significance that the Trust determined should be protected by future planning interventions, such as changes in land use zoning or designation of certain sites as parks or reserves.

All proposed scenic locations exist outside of the Proposal viewshed distance, as shown below in Figure 6.3, and will not be affected by the Proposal.

7. Landscape character and sensitivity

Landscape character units are based on areas with similar visual characteristics in terms of topography and features, such as creeks and drainage lines, soil, vegetation and land use. The following sections describe the underlying patterns of these elements to derive the landscape character units within the viewshed.

7.1 Land use

Predominant land uses within the viewshed include:

- Townships;
- Industrial areas;
- Major and local road networks;
- Railways;
- Public recreation;
- Rural Residential living;
- National and State Parks, State Forests, Nature Conservation Reserves and other reserves;
- Utility corridors and easements;
- Wetlands and floodplains; and
- Mining and quarrying.

7.2 Topography

Local topography, waterways and aerial imagery of vegetation of the Proposal viewshed is shown below in Figure 7.1.

The topography of the Proposal Site is relatively flat, as the site had been cleared and levelled for its past use hosting the former Kurri Kurri aluminium smelter. Relatively, the township of Kurri Kurri sits marginally higher in elevation. The town centre sits approximately 40 m higher than the Proposal site. The main street of the Kurri Kurri township follows a localised ridgeline, allowing elevated views in some locations.

A number of topographical features frame the horizon of the surrounding area, including sections of the Great Dividing Range to the north, west and south of the Proposal Site. Views to these features may be permitted due to the large areas of clear, low floodplains to the north of the Proposal Site.

The Hunter Expressway sits within a localised cutting in sections to the south and south east of the Proposal Site, which has the potential to restrict viewing corridors beyond the road reserve.

To the north, converging waterways within a shallow valley form a large mosaic of floodplain and swamp lands.



- Proposal site
- Waterbodies
- Motorway
- Exhaust stack
- Proposal Viewshed
- Main roads
- Roads
- Railway
- 5m contours

0 1 2 km

1:55,000 at A4

GDA2020 MGA Zone 56

Data sources:

Jacobs 2020

Metromap (Aerometrex) 2020

NSW Spatial Services

Figure 7-1 Topography, waterways and vegetation of subject site and surrounds

7.3 Drainage and waterways

There are a number of creeks, waterways, wetlands, dams and swamps in the local area. Several creeks near the Proposal Site run into Testers Hollow, a flat valley that forms the floodplain landscape to the north east of the Proposal Site.

7.4 Vegetation

Vegetation within the viewshed of the Proposal Site is found predominately within forested areas of national and state parks and other reserves, as well as within other public open space and recreation areas, roadsides and private land and gardens. A significant section of vegetation exists directly adjacent to the Proposal Site to the north, west and south. This vegetation is identified by E2 Environmental Conservation zoning, and has been previously managed as a buffer zone for the former Kurri Kurri aluminium smelter.

Historical and current land use has shaped the existing extent of vegetation cover. Some areas have been cleared of pre-colonisation vegetation for various settlement and development purposes, including for townships, agriculture, transmission corridors, roads and mining. This has resulted in areas of patchy or fragmented vegetation communities.

Roadside vegetation along major roads such as the Hunter Expressway consist of predominately native trees, including eucalyptus and casuarina species. The Proposal Site itself is largely surrounded by native vegetation within forested areas. This vegetation aids to screen or filter views toward the Proposal Site from most locations. Filtered views toward the Proposal Site are permitted through breaks in vegetation from locations including residential areas to the south-east and limited sections of the Hunter Expressway.

The stacks and other towers associated with the former Kurri Kurri aluminium smelter were once an element that appeared above the vegetation surrounding the site, forming a noticeable element in views of the horizon. This indicates that proposed elevated elements of the Proposal may also breach the surrounding treeline to become visible to some locations.

7.5 National Parks, State Parks, Forests and Reserves

Edges of the Werakata National Park are within the Proposal viewshed. Several other forests, national and state parks exist nearby regionally, but are located outside of the 4.6 km viewshed.

7.6 Landscape Character Units and sensitivity

Seven landscape character units have been identified within the viewshed of the Proposal. These have been assessed based on land use, topography and vegetation. These landscape character units can be defined as the following:

7.6.1 Landscape Character Unit 1 – Townships and suburbs

Townships are characterised by a concentration of urban settlement, generally characterised by a central business area, general residential areas, parks and industrial precincts. These areas tend to be cleared of native vegetation and host a concentration of built form and infrastructure. Kurri Kurri in particular also contains many instances of murals throughout the township, including a mural remembering the former Kurri Kurri aluminium smelter. These murals contribute to the character of the town and would be valued by locals and tourists alike.

Suburbs have been increasingly developing former agricultural land between Kurri Kurri and Maitland. The Regrowth Kurri Kurri proposal would see further residential development between Loxford and Gillieston Heights.

Areas of particular sensitivity within townships include residential areas and sites of recreation such as parks and reserves.

Townships and suburbs within the viewshed of the Proposal include Kurri Kurri, Loxford, Heddon Greta, Weston, Abermain, Cliftleigh and Gillieston Heights.

Photos indicative of the features of this landscape are shown below in Figure 7.2.



Figure 7.2: Townships Character Images

7.6.2 Landscape Character Unit 2a – Rural Living (Forested flats and gullies)

Rural living areas are characterised by clusters or isolated residential dwellings within the rural landscape. These are areas where the primary land use is residential living, rather than agricultural areas which also have accompanying dwellings.

These localities contain dwellings within a relatively patchy forested setting. Large areas of native vegetation have been cleared on some blocks, while others are predominately forested, creating a patchwork mosaic of mostly native vegetation. Some non-native vegetation appears particularly within private gardens.

Built form within this landscape includes houses, sheds and occasional agricultural structures such as greenhouses.



Figure 7.3: Rural Living: Forested Flats and Gullies Character Images

7.6.3 Landscape Character Unit 2b – Rural Living (hills and rises)

This landscape character unit is found around Bishops Bridge. Scattered residential dwellings exist on the upper sections of the valley, generally within cleared lots, surrounded by forested areas. Some roads are afforded elevated views across the valley floor, taking in views of the floodplain and the distant ranges to the east and south east.

Figure 7.4 below shows the indicative character of this landscape unit.



Figure 7.4: Rural Living: Hills and Rises Character Images

7.6.4 Landscape Character Unit 3 – Lakes, Wetlands and Waterways

This landscape character unit applies to the many water bodies and waterways, including ephemeral floodplains that exist in the area. These networks of creeks, rivers and wetlands exist in an interconnected mosaic across the viewshed and contribute significantly to the local landscape character. These landscapes are valued for their scenic, recreational and biodiversity values. These landscapes regularly undergo seasonal variation with rainfall, which has led to many recorded instances of flooding.



Figure 7.5: Floodplain Landscape at Testers Hollow, not currently in flood.

7.6.5 Landscape Character Unit 4 – Forested Areas

Large forested areas are noted for conservation uses exist around the Proposal Site, and within the western and southern edges of the viewshed. Many of these areas include relatively dense vegetation, unlike the patchy vegetated mosaic of much of the Sawyers Gully landscape. This density of forested areas is an immersive experience for road users and other visitors to the area. Due to the density of this vegetation, views are often confined to the road corridor.

Figure 7.6 below shows an example of this landscape.



Figure 7.6: Forested Areas: Character Image

7.6.6 Landscape Character Unit 5 – Cleared Farmland

Cleared farmland landscapes contain fewer dwellings than the rural living landscape units and are primarily used for agricultural purposes. There are few instances of this landscape type within the Proposal viewshed as suburb development has encroached on agricultural land use, and floodplain areas, such as Testers Hollow, encroaches onto this landscape during times of flooding.

Vegetation within this landscape includes some scattered trees and shelterbelt plantings. This landscape regularly undergoes seasonal changes, and includes some built features such as sheds, fences and farm machinery.

Figure 7.7 below shows an example of this landscape.



Figure 7.7: Cleared Farmland: Character Image

7.6.7 Landscape Character Unit 6 – Industrial and Utility

Kurri Kurri and surrounding towns are located within an area known as the South Maitland Coalfields. The coal mining industry operated in the area largely from the 1880s until the 1960s and was instrumental in the creation and wealth of towns and cities in the area. Donaldson open cut coal mine operated until 2013, and is located south of Maitland, and approximately seven km from the Proposal Site. The scars of open-cut coal mines and other operating mine and quarries are largely hidden from public roads, but are visible to people visiting by plane. The mines in the area exist outside of the Proposal viewshed, however related elements, including rail freight lines, cleared easements, transmission infrastructure and aluminium related industry are present.

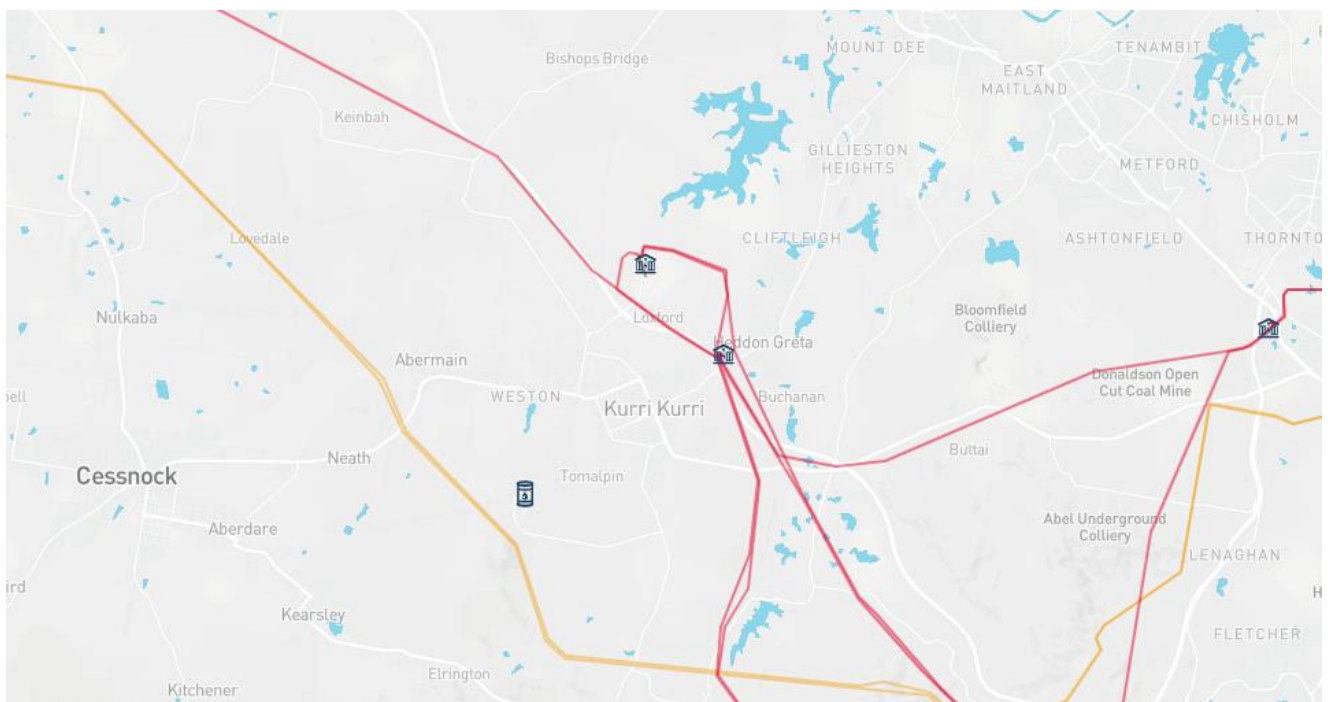
Other industrial precincts are generally located within clusters on the outskirts of towns. A new industrial precinct near Loxford is proposed in the Regrowth Kurri Kurri proposal, within and adjacent to the Proposal Site.

An example of these industrial areas is shown below in Figure 7.8.



Figure 7.8: Industrial and Utility: Character Image

Electricity transmission infrastructure, including high voltage transmission lines and utility-scale substations, are common across the viewshed. These features are largely hidden from view by screening vegetation found either side of easements, but are visible for moments as they cross public road networks. A map of the transmission network surrounding Kurri Kurri is shown below in Figure 7.9.



(Source: Aemo Map, <https://www.aemo.com.au/aemo/apps/visualisations/map.html>)

Figure 7.9: AEMO Electricity transmission and generation infrastructure around Kurri Kurri.

An example of the views toward utility infrastructure from the public realm is shown below in Figure 7.10.



Figure 7.10: 132 kV Transmission lines and Kurri Substation viewed near Main Road BP Service Station

7.7 Sensitivity

Landscape sensitivity is in part a measure of the ability of a landscape to absorb visual change based on attributes of a particular landscape. The sensitivity of the previously described landscape units will depend upon a number of attributes, such as:

- **Location.** The sensitivity of a potential viewer varies according to location. For example, visitors to a National Park where the landscape appears untouched or pristine will be more sensitive to the imposition of new or artificial elements within that landscape. The same viewer travelling along a rural highway, which contains existing examples of modifications and artificial elements, will be less sensitive to the presence of new elements. Modifications or artificial elements are not confined to vertical structures or built form, they also include removal of native vegetation; and visibility of roads, tracks, fences and other rural infrastructure, all of which decrease the sensitivity of a landscape to further change.
- **The rarity of a particular landscape.** Landscapes that are considered rare or threatened are valued more highly by viewers.
- **The scenic qualities of a particular landscape.** Landscapes that are considered scenic are also those that are considered sensitive. They often contain dramatic topographical changes, the presence of water, coastlines, and other comparable features. The presence of modifications or artificial elements (including built form, roads, tracks, fences, and farm sheds), as well as farming practices including land clearing, cropping and burning can decrease the sensitivity of a landscape's scenic qualities.

The landscape within the viewshed includes many constructed elements including dwellings, structures and sheds, transmission infrastructure within cleared easements and other interventions.

The former imposition of the Kurri Kurri aluminium smelter stacks within the landscape and skyline views over approximately 50 years reduces the surrounding landscape's sensitivity to the introduction of similar, although smaller, infrastructure in the same location. The Proposal's infrastructure is of a character that is familiar to the landscape and surrounding population, in a location that is largely screened from view from public locations. This does not guarantee that the views will necessarily be received positively by local viewers. However, the sensitivity of this landscape is relatively less than similar landscapes that have not contained prominent, elevated structures.

The landscape sensitivity of a Farmland Landscape Unit that has been highly modified is considered low-moderate. It is common across a large area of New South Wales, but has become encroached upon in the Proposal viewshed by urbanisation. This landscape undergoes visually apparent change both on a regular basis and progressively over time. Rural activities such as grazing, tractors and other farming changes associated with farming and agriculture are constant reminders of human influence on the landscape. However, rural landscape

character is recognised and protected within the LEP and local strategic documents as a valued scenic landscape. These cleared landscapes in some locations allow long-range views across the landscape to floodplains and distant mountains. The presence of industrial elements may be perceived as a high visual impact due to the presence of large-scale structures on a rural landscape to these viewers, notwithstanding that the landscape is already modified by human activity.

The landscape sensitivity of the Forested Areas Landscape Unit is considered medium to high, as although it too is relatively common in the area, it appears more pristine or natural than the Farmland landscape units. The dense nature of the vegetation in these areas buffers somewhat against views to afar features, depending on viewer location.

The Rural Living and Townships Landscape Units are considered to have a moderate-high sensitivity to further visual change. This is due in part to the higher number of residents and therefore people who may view the alteration, the extent of visual modifications already brought about by the establishment of those areas and the presence of similar infrastructure. Views from these areas to the surrounding landscape are usually screened or filtered by buildings, and vegetation. Table 7.1 sets out the sensitivity of the various landscape units within the viewshed of the Proposal.

Table 7.1: Landscape Character Units and Sensitivity

Landscape Character Unit	Sensitivity
Landscape Character Unit 1 – Townships	Moderate: Land clearing, built form and other visual elements reduce the visual sensitivity of these areas.
Landscape Character Unit 2a – Rural Living (forested flats and gullies)	Moderate: The presence of residential dwellings increases the likelihood for sensitive viewers in this landscape. This landscape is also somewhat modified, by clearing of vegetation in lots, and agricultural, horticultural and equestrian elements.
Landscape Character Unit 2b – Rural Living (hills and rises)	Moderate: The presence of residential dwellings increases the likelihood for sensitive viewers in this landscape. This landscape is also somewhat modified, by clearing of vegetation in lots and paddocks. Some locations afford elevated views across the valley floor to natural features, such as floodplains and distant mountains, as well as built features, such as suburbs.
Landscape Character Unit 3 – Lakes, Wetlands and Waterways	High: The local floodplains are a unique and dynamic element within the landscape. Floodplains clear of vegetation allow long range views across water to the broader landscape.
Landscape Character Unit 5 – Cleared Farmland	Low-Moderate: These areas have been modified by way of clearing for primary industries. They contain fewer dwellings, and therefore fewer sensitive viewers than rural living landscapes. The rural landscape character is a valued scenic landscape in local planning documents.
Landscape Character Unit 6 – Industrial and Utility	Low: These areas contain infrastructure and landscape modifications that lessen the sensitivity of the landscape to further change.

The landscape character units and sensitivity ratings will form the basis of the visual impact of views from publicly accessible locations.

Landscape sensitivity from individual residential properties will always be assessed as “high” as for a resident, their home will always be a highly sensitive location and disturbances to a resident’s views must always be considered to have the highest degree of sensitivity.

8. Seen Area Analysis

GIS can map theoretical project visibility based on topography and does not take into account potential intervening vegetation, existing structures or minor topographic changes that may filter or screen views of the Proposal. For this reason, GIS analysis is a conservative visibility map and is useful to determine locations from which to assess the potential visual impacts of the Proposal.

A Seen Area Analysis (SAA) identifies locations where the Proposal may be visible from the areas surrounding the Proposal Site. Visibility of the Proposal depends on the landscape character and features, such as intervening topography and vegetation that may filter or screen views toward the Proposal.

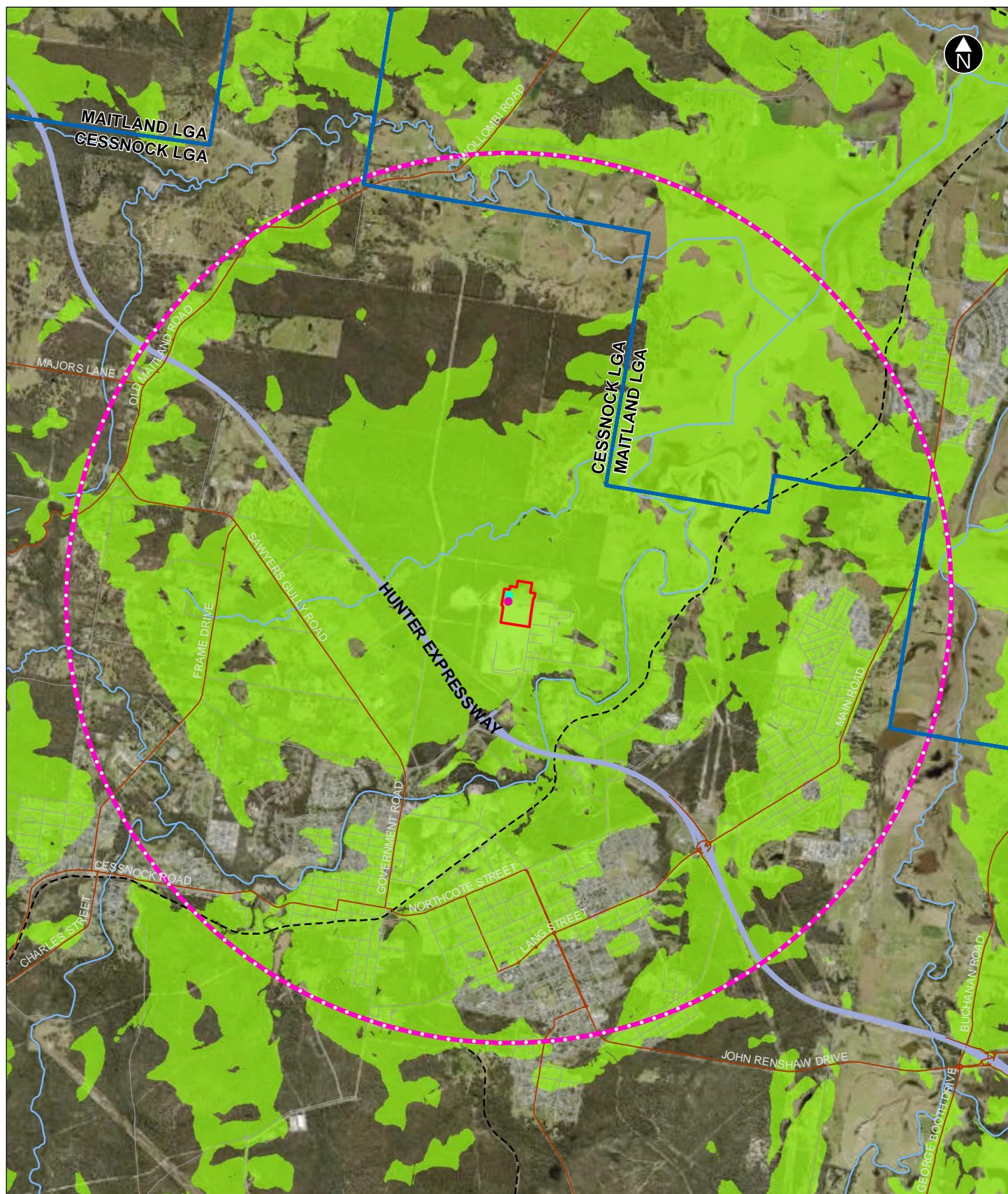
The SAA of the Proposal has been modelled using the tallest components of the Proposal, which are the approximate 36 m tall gas turbine exhaust stacks. For the purpose of this assessment, the modelled height has been raised to 40 m to account for any potential localised changes in topography when the site is remediated, and potential changes to the design. Areas modelled for potential visibility have been offset an additional 1.8 m to represent the height of an average standing person in the landscape.

The SAA and broad areas of theoretical Proposal visibility are shown below in Figure 8.1. The SAA shows that, due to surrounding topography, and the location of the Proposal's exhaust stacks being within a localised depression, theoretical visibility of the exhaust stacks is afforded to several locations.

These locations include areas within the Kurri Kurri township, areas within Sawyers Gully, areas within Gillieston Heights, Heddon Greta and other areas within the rural landscape.

Within Kurri Kurri, the main street (Lang Street) of the town centre is aligned along a ridgeline. It can be seen that this ridgeline restricts visibility further south across the township.

Actual visibility from these areas will depend on other landscape features such as vegetation, or intervening built form, that may influence the visibility from these areas. These matters are discussed in the Viewpoint Assessment chapter.



- Proposal site
- Motorway
- Exhaust Stack 1
- Exhaust Stack 2
- Main roads
- Roads
- Railway
- Proposal Viewshed
- Visible

0 1 2 km

1:55,000 at A4
GDA2020 MGA Zone 56



Data sources:
Jacobs 2020
Metromap (Aerometrex) 2020
NSW Spatial Services

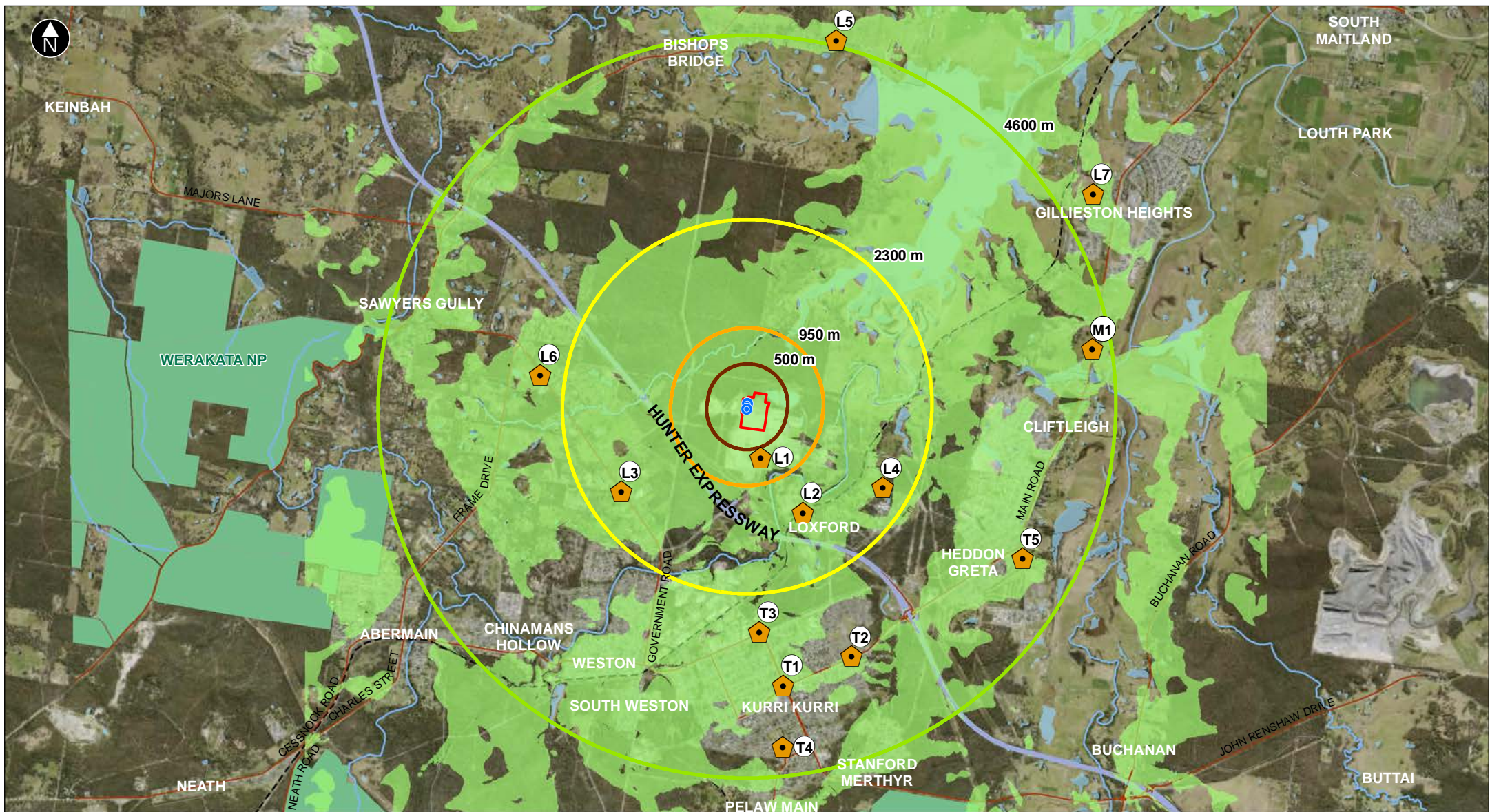
Figure 8-1 Seen Area Analysis

9. Viewpoint assessment

This section will assess the potential visual impact from a range of key locations within the public realm. Viewpoints are selected from a range of locations such as roads, townships, residential areas or other potential vantage points, where the public is likely to view the Proposal.

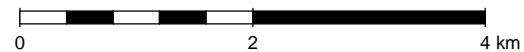
Thirteen viewpoints have been selected from locations that are accessible by the general public and from where the Proposal is potentially visible.

Viewpoints are shown below in Figure 9.1, and listed below in Table 9.1.



- | | |
|---|---|
| Proposal site | ZVI buffers (m) |
| ● Viewpoints | 500 |
| ● Exhaust stacks | 950 |
| | 2300 |
| | 4600 (Proposal Viewshed) |

- | | |
|---|--|
| — Motorway | ■ Waterbodies |
| — Main roads | ■ NPWS estate / reserve |
| — Roads | ■ Visible areas |
| --- Railway | |



1:65,000 at A4
Coordinate System: GDA2020 MGA Zone 56

Data sources:
Jacobs 2020
Metromap (Aerometrex) 2020
NSW Spatial Services



Figure 9-1 Viewpoints Map

Table 9.1: Viewpoints

VP	Category of viewer	Approx. distance to Proposal elements	Sensitivity
M1 – Cessnock Road	Road Users – High	4.1 km SE	Moderate
L1 – Hart Road	Road Users – Low	300 m N	Low
L2 – McLeod Road	Road Users / Rural Residential – Low	1.0 km NE	Low-Moderate
L3 – Metcalfe Lane / Sawyers Road	Road Users / Rural Residential – Moderate	1.6 km NE	Moderate
L4 – Bowditch Avenue	Road Users / Rural Residential – Low	1.6 km NW	Low-Moderate
L5 – Ravensfield Lane	Road Users / Rural Residential – Low	4.6 km S	Low-Moderate
L6 – Sawyers Gully Road	Road Users / Rural Residential – Low	2.5 km E	Moderate
L7 – Cartwright Street	Township Edge / Road users – Low	4.8 km SW	Moderate
Townships and localities			
T1 – Mitchell Avenue / Lang Street	Township Centre / Main Road – Moderate-High	2.5 km N	Moderate
T2 – Lang Street / Heddon Street	Township-Residential – Moderate	3 km N	Moderate
T3 – Mitchell Avenue / Northcote Street	Main Road – Moderate-High	2.5 km N	Low-Moderate
T4 – Centre Oval	Recreational	3.8 km N	Moderate
T5 – Bill Squires Park	Recreational	3.6 km NW	Moderate

9.1 Major Roads viewpoints

Major Roads include the Hunter Expressway, highways and main connecting roads within the viewshed. A viewpoint from the Hunter Expressway was not captured due to safety reasons. The majority of the Hunter Expressway within the viewshed is confined by forested areas, and often sits within a localised cutting or between noise walls, which restricts views outside of the road corridor.

The Seen Area Analysis demonstrates that theoretical visibility of the Proposal from the Hunter Expressway may be afforded to sections within proximity to the Proposal to the west and south.

One section is near the McLeod Drive overpass. At this location, the Hunter Expressway is contained within noise walls between the highway and the Proposal. These noise walls are not modelled within the SAA, and would intervene in actual visibility of the Proposal's exhaust stacks from this location.

The second section is to the west and south of the Proposal Site. There may be opportunities for south-bound travellers to the west of the Proposal Site to partially view the proposed exhaust stacks above the forested areas surrounding the Proposal Site. These views would be short in length due to the expressway travelling speed and would also include the existing transmission lines that run parallel to the expressway in this area.

9.1.1 Viewpoint M1 – Cessnock Road

This viewpoint is located along Cessnock Road, just north of the bridge across the Testers Hollow floodplain.

The Proposal Site is approximately 4.1 km to the west-south west of this viewpoint.

Figure 9.2 shows the view looking south west toward the Proposal. Figure 9.3 shows views looking south east across the floodplain toward Mount Sugarloaf.



Figure 9.2: VP M1 – Cessnock Road looking south west toward the Proposal Site



Figure 9.3: VP M1 – Cessnock Road looking south east toward Mount Sugarloaf

Cessnock Road is a main connecting road from Newcastle and Maitland to Kurri Kurri and other suburbs to the south. Cessnock Road crosses Testers Hollow, a floodplain that offers broad, dynamic views depending on the filled state of the floodplain. The ephemeral nature of this landscape provides for a variety of views across the seasons when travelling between suburbs to the north and south of Testers Hollow.

New residential suburb development is encroaching into this landscape, from Gillieston Heights to the north, and Cliftleigh to the south. This encroachment increases the rarity of this landscape, but decreases the sensitivity to further change, as built elements such as transmission towers and new suburbs are common and accepted.

The landscape character of this area is predominately characterised by the floodplain and cleared farmland, which sits within a shallow valley. The clearing of vegetation within the valley allows for some long-range views to mountain ranges, particularly Mount Sugarloaf to the south east. These are the more dominant and picturesque views at this location, which draws the viewer away from more developed landscapes to the south east.

Views toward the Proposal Site from Cessnock Road are partially filtered through bands of vegetation within the floodplain and paddocks in the foreground, and the topography of the landscape to the south east. When crossing the bridge to the south, roadside vegetation and the new residential development at Cliftleigh intervenes in views toward the Proposal, largely screening most views to the west. Views are instead drawn to the east, which includes vistas across the floodplains, and the mountainous horizon.

The Proposal's exhaust stacks may be partially visible in this landscape when breaks in vegetation and topography allows. These views will largely be filtered or screened from the majority of Cessnock Road. Due to distance to the Proposal, this visibility is further lessened.

This impact at this location in Negligible-Nil.

VP M1 – Cessnock Road		
Distance to Proposal	4.1 km south west	Noticeable, but will not dominate the landscape
Landscape Unit	Landscape Unit 3 / 5	Moderate sensitivity
Viewer Numbers	Arterial Road	High viewer numbers
OVERALL VISUAL IMPACT	NEGLECTIBLE-NIL	

9.2 Local roads viewpoints

The local road network allows for views of the landscape when road users are transiting through the area. These roads generally expect lower traffic volumes than major roads such as main streets, highways and the expressway.

The following viewpoints have been selected from across the local road network.

9.2.1 Viewpoint L1 – Hart Road

This viewpoint is located near the end of Hart Road, Loxford, near to the Proposal Site. A photomontage has been prepared from this viewpoint. The full size photomontage images are included in the Appendix A.

At this viewpoint, the recently demolished Kurri Kurri aluminium smelter site exists directly adjacent to the west. The aluminium smelter site has been largely cleared of any infrastructure, except for the switchyard to the north of the site, which is to be demolished, and the Hydro Aluminium offices at the end of Hart Road.

The landscape character at this location is predominately industrial and utility, due to the expansive brownfield aluminium smelter site and the presence of high voltage transmission lines which surround the western and northern perimeter and join a large transmission corridor to the south.

The Proposal Site is located approximately 500 m north of this viewpoint.

Figure 9.4 below shows the view looking north toward the Proposal Site.



Figure 9.4: VP L1 – Hart Road looking north toward the Proposal Site

Hart Road to the south is largely surrounded by forested areas. The Kurri Kurri aluminium smelter site is largely filtered from view until entering the clearing near the site. This area is within the proposed rezoning plan to become an industrial precinct.

Hart Road joins Dickson Road, which is the connecting road for those visiting the Kurri Kurri Speedway, which is located approximately 650 m to the east. Otherwise, there are currently no other businesses or points of interest that require public access to this area, until it is eventually redeveloped. Visitors to the Kurri Kurri Speedway in previous years would have transited past the former Kurri Kurri aluminium smelter site.

The photomontage showing the Proposal from this viewpoint is shown below in Figure 9.5.



Figure 9.5: Viewpoint L1 – Photomontage

The photomontage prepared from this viewpoint shows that the Proposal's exhaust stacks and air intake units are visible over the security fencing in this view.

At this viewpoint, the Proposal would likely be clearly visible. Recognising that this area may become occupied with warehouses and other light industry, built form may screen some views to the Proposal. At this distance, the Proposal's exhaust stacks would form a dominant element in an industrial landscape, which would not be out of character with the former or future use of this landscape.

The Proposal includes landscape screening along the eastern perimeter, which would soften views toward the Proposal from Hart Road and future access roads to be constructed.

There are no sensitive receptors, such as dwellings or public open space in this area.

Recognising that the former and future proposed (Regrowth Kurri Kurri) landscape character of this area is predominately industrial in nature, and the viewer numbers are relatively low, the Proposal will not bring about an unacceptable visual impact or change to the landscape character at this location despite being a dominant element in the landscape.

The visual impact at this location would be Negligible-Low.

VP L1 – Hart Road		
Distance to Proposal	500 m north	Highly visible and will usually dominate the landscape
Landscape Unit	Landscape Unit 6	Low sensitivity
Viewer Numbers	Local Road	Low viewer numbers
OVERALL VISUAL IMPACT	NEGLECTIBLE – LOW	

9.2.2 Viewpoint L2 – McLeod Road

This viewpoint is located at the level crossing at McLeod Road, Loxford.

The Proposal Site is located approximately 1.25 km to the north west.

Figure 9.6 below shows the view looking north east toward the Proposal Site.



Figure 9.6: VP L2 – McLeod Road looking north west toward the Proposal Site

This landscape is characterised as rural living (forested flats and gullies). Industrial elements, including the freight rail line and a high voltage transmission line (parallel to McLeod Road, 140 m south) are also present. The former Kurri Kurri aluminium smelter stacks and water towers would have been visible above the treeline in the background of this view. These elements lessen the sensitivity of the landscape to receiving similar infrastructure somewhat.

Currently, the area contains scattered residential dwellings in a relatively forested setting.

This area is part of the proposed rezoning of the Hydro Aluminium land, which would include the industrial precinct to the north west, and may include residential areas to the east and north of this viewpoint. The

introduction of more residential land use into this area will heighten the viewer numbers and sensitivity, albeit within a landscape that already contains hints of industrial and utility uses.

Vegetation in this area exists in a patchwork forested setting. Vegetation has been cleared in some areas for housing, rear setbacks and the nearby transmission corridor.

A forested gully exists between the viewpoint and the Proposal and is not part of the proposed rezoning footprint. The retention of this forested area will assist in filtering and screening views toward the Proposal.

At this distance, there is the potential for elevated elements such as the Proposal's exhaust stacks to be a visible and dominant above the treeline in the background of this view. These views would be similar in appearance to the visibility of former water towers on the Kurri Kurri aluminium smelter site. The rest of the Proposal will likely be screened or filtered by the forested gully.

In the current setting, the visual impact at this location would be low. This recognises the current low viewer numbers, existing and former presence of industrial and utility infrastructure through the area which would have been static elements for current residents until 2019, and only partial potential visibility of the Proposal's exhaust stacks.

Recognising the area may become a more densely populated residential suburb, the future setting may experience a moderate visual impact. This recognises a greater number of residential viewers, which heightens the sensitivity of the area, which is balanced by an increase in built form and likely vegetation clearing as a result, which will change the forested, rural-living character of the area to one that is more suburban. This assessment also recognises that that future residential development in this location would occur with the knowledge of the former and proposed industrial nature of the Proposal Site and surrounding area. As such, the Proposal would not be considered imposed upon or unexpected in these areas, and new residential occupants would be aware of its presence.

VP L2 – McLeod Road		
Distance to Proposal	1 km north west	Noticeable and dominate the landscape
Landscape Unit	Landscape Unit 2a	Moderate sensitivity
Viewer Numbers	Local Road	Low viewer numbers
OVERALL VISUAL IMPACT	LOW-MODERATE	

9.2.3 Viewpoint L3 – Metcalfe Lane / Sawyers Gully Road

This viewpoint is located at the intersection of Metcalfe Lane and Sawyers Gully Road in the Sawyers Gully locality.

The Proposal Site is located approximately 1.75 km to the north east.

Figure 9.7 below shows the view looking north east toward the Proposal Site.



Figure 9.7: VP L3 – Metcalfe Lane / Sawyers Gully Road looking north east toward the Proposal Site

This landscape is characterised as a mix of rural living and cleared, low-intensity agricultural land use. This landscape has been relatively cleared, and contains residential dwellings on large, cleared blocks with small paddocks. Other built form in this landscape includes large sheds, greenhouse structures and equestrian related elements including trotting tracks. A large, lattice steel telecommunication tower exists in views between this viewpoint and the Proposal Site.

Residential dwellings along Sawyers Gully Road would previously have been afforded views of the Kurri Kurri aluminium smelter infrastructure above the treeline in background views when looking toward the east, which reduces the landscape sensitivity to the introduction of similar infrastructure.

Views to the Proposal would be across the modified farming landscape, and largely filtered by the forested areas to the south of the Proposal. The Proposal's exhaust stacks may be partially visible above this treeline. At this distance, the exhaust stacks would be a noticeable and potentially dominant element in the landscape.

The impact for road users at this location would be Low.

The impact for residential viewers in this area is Moderate.

VP L3 – Metcalfe Lane / Sawyers Gully Road		
Distance to Proposal	1.6 km north east	Noticeable, and can dominate the landscape
Landscape Unit	Landscape Unit 2a	Moderate sensitivity
Viewer Numbers	Local Road	Moderate viewer numbers
OVERALL VISUAL IMPACT	LOW-MODERATE	

9.2.4 Viewpoint L4 – Bowditch Avenue

This viewpoint is located along Bowditch Avenue.

The Proposal Site is approximately 1.6 km to the north west of this viewpoint.

Figure 9.8 below shows the view looking north west toward the Proposal Site.



Figure 9.8: VP L4 – Bowditch Avenue looking north west toward the Proposal Site

This location is somewhat elevated as the road travels along a localised rise. This area is currently characterised by the cleared farmland and forested areas, but is near the area of the proposed rezoning and future development masterplan, which may see this character change and viewer numbers rise.

Kurri Kurri Tafe exists to the east of this viewpoint and is largely surrounded by forested areas.

Vegetation in the road verges, paddocks and conservation areas restricts views in this area. Visible built form in this area is largely limited and includes several residential dwellings and agricultural sheds. These built features do not dominate the landscape. A freight rail line exists in the background of this view but is largely screened from view by vegetation.

Looking north west toward the Proposal Site, vegetation and topography largely filter or screen views toward the Proposal Site. The Proposal's exhaust stacks may be partially visible above this treeline, but will likely be screened entirely.

Due to the degree of natural features screening or filtering views toward the Proposal Site, the overall visual impact at this location will be Low-Moderate, recognising that future development may increase viewer numbers and increase built form and development in the area. Similar to discussions above at VP L2 (McLeod Road), new residential development in this area would occur with the knowledge that the proposed industrial uses are present and would not be imposing upon or unexpected in this context.

The visual impact at this location is assessed as Low.

VP L4 – Bowditch Avenue		
Distance to Proposal	1.6 km north west	Noticeable, and can dominate the landscape
Landscape Unit	Landscape Unit 4/5	Low-Moderate sensitivity
Viewer Numbers	Local Road	Low viewer numbers
OVERALL VISUAL IMPACT	LOW	

9.2.5 Viewpoint L5 – Ravensfield Lane

This viewpoint is located along Ravensfield Lane.

The nearest Proposal boundary is approximately 4.6 km to the south. This viewpoint is at the edge of the Proposal viewshed.

Figure 9.9 below shows the view looking south toward the Proposal Site.



Figure 9.9: VP L5 – Ravensfield Lane looking south toward the Proposal

This landscape is characterised as cleared farmland, with isolated rural living (hills and rises) areas along Ravensfield Lane where residential dwellings exist.

As Ravensfield Lane terminates shortly to the east, viewer numbers are likely restricted to people living nearby and their visitors. The presence of these residential dwellings raises the sensitivity of this location.

Vegetation within this landscape has largely been cleared for agricultural purposes, in contrast with surrounding forested areas. Vegetation exists within forested areas to the north of this viewpoint, and to the south, within the large forested areas surrounding the Proposal Site in the background. Patches or corridors of vegetation exist along the vegetated creek corridor in the valley and in private lots, particularly along fence lines.

The topography descends from this location to the south as the valley forms, allowing for somewhat elevated views across the valley toward the Proposal Site. These views take in water features such as farm dams, the meandering creekline, and the ephemeral floodplains. Long-range views to the state forests and national park to the south are also visible on the horizon.

The southern side of the valley includes forested areas that intervene in views toward the Proposal Site. The nearer of these forested areas exists upon a rise which assists in elevating the existing vegetation to screen or filter views toward the Proposal Site from this location.

At this distance, the Proposal's exhaust stacks, if visible above the forested areas north of the Proposal Site, would likely form a minute element in views. At a distance of 4.6 km, this viewpoint represents the edge of the Proposal viewshed.

The visual impact at this location is negligible.

VP L5 – Ravensfield Lane		
Distance to Proposal	4.6 km south	Noticeable, but will not dominate the landscape
Landscape Unit	Landscape Unit 2b/5	Low-Moderate sensitivity
Viewer Numbers	Local Road	Low viewer numbers
OVERALL VISUAL IMPACT	NEGLECTIBLE	

9.2.6 Viewpoint L6 – Sawyers Gully Road

This viewpoint is located along Sawyers Gully Road where the road exits a stretch of enclosed vegetation.

The Proposal Site is located approximately 2.5 km to the east.

Figure 9.10 shows the view looking east toward the Proposal Site.



Figure 9.10: VP L6 – Sawyers Gully Road looking east toward the Proposal Site

This landscape is characterised as rural living (forested flats and gullies). Residential dwellings and small farm properties exist in a relatively patchwork forested setting.

Vegetation exists in large patches and corridors along property boundaries and roadsides.

Journey's along this road are largely within a vegetated corridor, which restricts views to the direction of travel.

At this location, the Proposal would sit behind roadside vegetation in this view, and would not be visible. Road users may catch glimpses of the Proposal's exhaust stacks as they travel toward Kurri Kurri (refer to VP L1), but these views are scarce due to vegetation.

The visual impact at this location is Negligible.

VP L6 – Sawyers Gully Road		
Distance to Proposal	2.5 km east	Noticeable, will not dominate the landscape
Landscape Unit	Landscape Unit 2a	Moderate sensitivity
Viewer Numbers	Local Road	Low viewer numbers
OVERALL VISUAL IMPACT	NEGLECTIBLE	

9.2.7 Viewpoint L7 – Cartwright Street

This viewpoint is located along Cartwright Street, at the edge of residential development in Gillieston Heights.

The nearest Proposal boundary is approximately 4.8 km to the south west. This viewpoint is just outside the edge of the Proposal viewshed, but is included due to the potential overlooking nature of the area.

Figure 9.11 below shows the view looking south west toward the Proposal Site.



Figure 9.11: VP L7 – Cartwright Street looking south west toward the Proposal Site

At this location, the landscape character is a mix of the edge of suburban residential development to the east (Gillieston Heights), which overlooks some farmland and in some locations the floodplain valley. The presence of residential dwellings heightens the sensitivity at this location.

The topography at this location is relatively raised, as the street reaches a crest. This crest allows some views to distant landscape features, filtered through vegetation.

Vegetation at this location is found within private gardens, the paddocks to the south and west contain emerging shrubs. The vegetation in the foreground largely filters or screens views toward the Proposal Site, but glimpses toward the Proposal Site may be permitted at some locations.

Due to the elevated nature of some residential dwellings along this road, they may allow views above the surrounding foreground vegetation toward the Proposal Site. Views to the Proposal will further be filtered or screened by the forested areas that surround the Proposal Site. The Proposal's exhaust stacks may be visible in these views, above the surrounding vegetation. Although potentially partially visible, the Proposal will be at such a distance that it would be visually insignificant.

The visual impact at this location will be Low.

VP L7 – Cartwright Street		
Distance to Proposal	4.8 km south west	Visually Insignificant.
Landscape Unit	Landscape Unit 1	Moderate sensitivity
Viewer Numbers	Local Road	Low viewer numbers
OVERALL VISUAL IMPACT	LOW	

9.3 Township viewpoints

9.3.1 Viewpoint T1 – Mitchell Avenue / Lang Street

This viewpoint is located at the roundabout at Lang Street and Mitchell Avenue, within the main street of Kurri Kurri.

This viewpoint is located approximately 3.2 km south of the nearest Proposal Site boundary.

Figure 9.12 shows the view looking north toward the Proposal Site.



Figure 9.12: VP T1 – Mitchell Avenue / Lang Street looking north toward the Proposal Site

Mitchell Avenue is a major thoroughfare through town and is the connecting road from Kurri Kurri to Cessnock. A main shopping strip is located adjacent to this viewpoint along Lang Street. This viewpoint would expect a moderate to high level of viewer numbers.

At this location, two of Kurri Kurri's murals are seen on the exterior of buildings either side of Mitchell Avenue. The street is atop a crest, which allows some views to distant landscape features. These views are largely restricted by surrounding built form and vegetation.

The Proposal would be located behind the vegetation visible in the foreground of this view. Glimpses of the Proposal's exhaust stacks may be visible as road users travel south along Mitchell Avenue toward Cessnock. These views would be largely limited by the built form and vegetation within the surrounding streets.

Considering distance alone, the Proposal's exhaust stacks may be a noticeable but not dominant element in the landscape. As it will be largely filtered or screened by elements in the landscape, they are unlikely to form an appreciable element.

The overall visual impact at this location would be Low.

VP T1 – Mitchell Avenue / Lang Street		
Distance to Proposal	3.2 km north	Noticeable, but will not dominate the landscape
Landscape Unit	Landscape Unit 1	Moderate sensitivity
Viewer Numbers	Main Road – Town Centre	Moderate-High viewer numbers
OVERALL VISUAL IMPACT	LOW	

9.3.2 Viewpoint T2 – Lang Street / Heddon Street

This viewpoint is located near the intersection of Lang Street and Heddon Street.

This viewpoint is located approximately three km south of the nearest Proposal Site boundary.

Figure 9.13 shows the view looking north toward the Proposal.



Figure 9.13: VP T2 – Lang Street / Heddon Street looking north toward the Proposal

This viewpoint at Heddon Street was chosen as it is orientated toward the Proposal Site when travelling north, and this location is slightly elevated. Lang Road is a main road, but is orientated perpendicular to the Proposal Site and is unlikely to afford visibility to road users.

The Proposal would be located behind the vegetation visible in the background of this view.

This landscape is characterised as a township setting. It contains many houses, and some elevated structures such as powerlines and antennae. Public recreation sites, including Birrale Park oval, playground and a creekline exist to the north. These elements heighten the sensitivity of the area.

Vegetation in the area is largely limited to within private lots, and in background views toward the forested areas to the north.

At this distance, the Proposal's exhaust stacks may be partially visible above the treeline in the background of this view. They may be a noticeable element, but will not be dominant in the landscape.

Due to distance and intervening vegetation and built form, the Proposal's exhaust stacks would only be visible from a limited number of locations in this area, and would only be partially visible.

The visual impact at this location would be low.

VP T2 – Lang Street / Heddon Street		
Distance to Proposal	3 km north	Noticeable, but will not dominate the landscape
Landscape Unit	Landscape Unit 1	Moderate sensitivity
Viewer Numbers	Main road / local road	Moderate viewer numbers
OVERALL VISUAL IMPACT	LOW	

9.3.3 Viewpoint T3 – Mitchell Avenue / Northcote Street

This viewpoint is located at the roundabout at Mitchell Avenue and Northcote Street. At this location, the B68 Highway diverts left from Mitchell Avenue to Northcote Street towards Cessnock.

This viewpoint is located approximately 2.5 km south of the nearest Proposal Site boundary.

Figure 9.14 below shows the view looking north toward the Proposal Site.



Figure 9.14: VP T3 – Mitchell Avenue / Northcote Street looking north toward the Proposal Site

This viewpoint is located along a main thoroughfare through town and would expect moderate-high viewer numbers.

Views to the north from this location are orientated toward the Proposal Site. These views include the industrial area of Kurri Kurri, which sits in front of a background of vegetation that extends toward the Hunter Expressway and the Proposal Site. Foreground views include several elevated built features, including two types of transmission poles.

To the south is the edge of residential areas in Kurri Kurri. The presence of residential dwellings heightens the sensitivity of the area, which is balanced by the views toward industrial and utility elements.

The landscape character of this viewpoint is a mix of township and industrial landscape elements.

At this location, the Proposal Site is located behind the hardware warehouse in the foreground of this view, and the vegetation behind this in the background. The Proposal's exhaust stacks may be partially visible above these features.

In the context of this landscape, the Proposal's exhaust stacks would not be out of character with the relatively built-up, industrial setting.

In this context, the visual impact of the proposal would be low.

VP T3 – Mitchell Avenue / Northcote Street		
Distance to Proposal	2.5km north	Noticeable, but will not dominate the landscape
Landscape Unit	Landscape Unit 1 / 6	Low-Moderate sensitivity
Viewer Numbers	Main road	Moderate-High viewer numbers
OVERALL VISUAL IMPACT	LOW	

9.3.4 Viewpoint T4 – Centre Oval

This viewpoint is located along the southern boundary of the Centre Oval, near Coronation Street in Kurri Kurri.

This viewpoint is located approximately 3.8 km south of the nearest Proposal Site boundary.

Figure 9.15 below shows the view looking north across the oval toward the Proposal Site.



Figure 9.15: VP T4 – Centre Oval looking north toward the Proposal Site

This landscape is characterised as a township, within a predominately residential area. The Centre Oval and other nearby recreational areas heighten the sensitivity of the area as it will be valued for its amenity benefit to the community.

Vegetation in the area exists predominantly around the boundary of the Oval, and in private gardens.

At this location, the Proposal Site would be located to the north behind vegetation, built form and topography. The main street of Kurri Kurri, Lang Street, is situated on a rise that intervenes in views toward the Proposal from this viewpoint.

Due to these intervening features, there will be no visibility of the Proposal from this location. The visual impact will be Nil.

VP T4 – Centre Oval		
Distance to Proposal	3.8 km north	Noticeable, but will not dominate the landscape
Landscape Unit	Landscape Unit 1	Moderate sensitivity
Viewer Numbers	Local Road / Recreation Reserve	Moderate viewer numbers
OVERALL VISUAL IMPACT	NIL	

9.3.5 Viewpoint T5 – Bill Squires Park

This viewpoint is located at Bill Squires Park in Heddon Greta.

This viewpoint is located approximately 3.6 km south east of the nearest Proposal Site boundary.

Figure 9.16 below shows the view looking north west toward the Proposal Site.



Figure 9.16: VP T5 – Bill Squires Park looking north west toward the Proposal Site

This location is characterised as a township landscape and sits on the eastern edge of the suburb of Heddon Greta. Residential development to the west is predominately low-density detached dwellings, and to the east a strip of semi-rural living dwellings exist along the floodplain, set on large blocks with views across the floodplain to the ranges to the east.

The presence of residential dwellings and public open space heightens the sensitivity of this area.

At this location, the Proposal Site would be situated behind the houses and vegetation in the foreground of this view. Visibility of the Proposal is unlikely from this park but may be visible in glimpses from limited locations along the road network in Heddon Greta. If visible, the Proposal will be at a distance that it will not form a dominant element in views and will be largely screened or filtered by intervening vegetation and built form.

The visual impact of this location will be Nil-Negligible.

VP T5 – Bill Squires Park		
Distance to Proposal	3.6 km north west	Noticeable, but will not dominate the landscape
Landscape Unit	Landscape Unit 1	Moderate sensitivity
Viewer Numbers	Local Road / Recreation Reserve	Moderate viewer numbers
OVERALL VISUAL IMPACT	NIL-NEGLIGIBLE	

9.4 Construction impacts

Construction activities and staging have been described above at Section 4.7.

Visual impacts during the construction phase will largely be limited to areas that have direct visibility of the Proposal Site, which has been determined by field studies to be limited to a short section of Hart Road and Dickson Road, adjacent to the Proposal Site. Construction activities that require elevated machinery such as cranes may be visible to locations beyond these surrounding roads.

Construction activities will be temporary.

The visual impact of construction activities is expected to be low-negligible.

9.5 Viewpoints summary

Table 9.2 below summarises the assessed viewpoints, and a discussion of the key observations and assessment is provided thereafter.

Table 9.2: Viewpoint Assessment Summary

VP	Category of viewer	Approx. distance to Proposal elements	Sensitivity	Overall visual impact
Major Roads				
M1 – Cessnock Road	Road Users - High	4.1 km SE	Moderate	Nil – Negligible
Local Roads				
L1 – Hart Road	Road Users – Low	300 m N	Low	Negligible – Low
L2 – McLeod Road	Road Users / Rural Residential – Low	1.0 km NE	Low-Moderate	Low – Moderate
L3 – Metcalfe Lane / Sawyers Road	Road Users / Rural Residential – Moderate	1.6 km NE	Moderate	Low – Moderate
L4 – Bowditch Avenue	Road Users / Rural Residential – Low	1.6 km NW	Low-Moderate	Low
L5 – Ravensfield Lane	Road Users / Rural Residential – Low	4.6 km S	Low-Moderate	Negligible
L6 – Sawyers Gully Road	Road Users / Rural Residential – Low	2.5 km E	Moderate	Negligible
L7 – Cartwright Street	Township Edge / Road users – Low	4.8 km SW	Moderate	Low
Townships and localities				
T1 – Mitchell Avenue / Lang Street	Township Centre / Main Road – Moderate – High	2.5 km N	Moderate	Low
T2 – Lang Street / Heddon Street	Township – Residential – Moderate	3 km N	Moderate	Low
T3 – Mitchell Avenue / Northcote Street	Main Road – Moderate-High	2.5 km N	Low-Moderate	Low
T4 – Centre Oval	Recreational	3.8 km N	Moderate	Nil
T5 – Bill Squires Park	Recreational	3.6 km NW	Moderate	Nil – Negligible

The landscape character of the Proposal Site and immediate surrounds is characterised by the former Kurri Kurri aluminium smelter site. This site is industrial in character, which is reinforced by the numerous high-voltage transmission lines and easements that bisect the area. These transmission towers are relatively low and tend not to be revealed in views until travelling through a transmission corridor. Elevated elements that included several exhaust stacks and water towers were present in views toward the site for approximately fifty years, until their demolition in 2019. Areas that had visibility of these features may be afforded visibility of the Proposal, but the height of the Proposal's exhaust stacks is considerably lower.

The landscape character of areas within the viewshed include a range of landscapes, as listed in Section 7.6 addressing landscape character units. The landscape character of rural landscapes, townships and villages are noted in local strategic documents to be protected from inappropriate development that may encroach on these landscapes. While the Proposal Site is zoned for rural uses, this is at odds with the landscape character of the surrounding area which is determined by the industrial nature of former land uses. The Proposal will be largely screened or filtered from view from public locations where views across rural or other landscapes are permitted. The Proposal is not likely to impact on the rural landscape character of the study area.

The high cover of established vegetation surrounding the Proposal Site and surrounding areas confines most views to the road corridor for road users. Views to features in the landscape often occur in moments and glimpses when travelling through a clearing, then disappear when re-entering a forested area.

Due to the vegetation surrounding the Proposal Site, and vegetation, topography and built form in the broader viewshed, potential visibility of the Proposal is limited to few locations.

Direct views of most elements of the Proposal will be limited to Hart Road, Dickson Road and any other new adjoining roads to be constructed as part of the proposed industrial precinct. These views would receive some additional screening or filtering of views from the Proposal's perimeter landscape screening on the eastern boundary, but views to tall elements would be unavoidable. These views would be within the setting of the existing brownfield site, and the proposed industrial precinct, and would not be inappropriate or unexpected in this context.

Topography and established vegetation to the east would assist in screening and filtering views to the proposed residential developments (Regrowth Kurri Kurri) as seen from Bowditch Avenue and McLeod Road. These residential developments would occur with the knowledge of the industrial character of the nearby landscape, including the several existing transmission corridors in the area, and the proposed industrial precinct near the Proposal Site. In this context, the Proposal would not be unexpected or out of character for the surrounding landscape or these emerging residential developments.

Visibility of the Proposal from existing residential dwellings is limited due in part to distance, screening afforded by existing vegetation in the surrounding landscape and zoning of the land tempering the setting and contemplated development that might be expected or considered in views towards the Proposal.

Residential dwellings in proximity to the Proposal Site within Loxford are within a forested area that screens and filters views toward the Proposal. The forested buffer areas surrounding the Proposal Site, and localised vegetation and built form largely filter or screen views from residential areas within Kurri Kurri, and the rural residential areas within Sawyers Gully. Developed residential areas to the east, including Heddon Greta and Cliftleigh will have limited to no visibility due to built form and vegetation in the area, as well as the vegetated rise to the east of the Proposal Site. These areas are also at a distance that if the Proposal's exhaust stacks are visible amongst these landscape features, it will be a noticeable, but not dominant element within views. Few elevated residential dwellings in Gillieston Heights may overlook the Proposal Site, but are outside the viewshed and at a distance that the Proposal will not form a noticeable element in the landscape. Existing residential dwellings that have the potential to take in the Proposal would have included the former Kurri Kurri aluminium smelter, which was a long established industrial use. Views from these dwellings would have altered, however through the inclusion of a lower level development and absence of prominent exhaust stacks.

As the Proposal is a similar land use, and of a significantly lower scale, significant amenity impacts are not expected for residential dwellings in proximity to the Proposal Site. Potential lighting impacts from the Proposal would be similar or consistent with the former use at the site. There is the potential that these may be improved through the application of current Australian Standards for night lighting as well as the lower overall height of structures at the Proposal Site. The impact of night lighting is considered to be negligible due to the existing and proposed vegetation that surrounds the Proposal Site to the east. There is the potential for elevated lighting impacts when atmospheric conditions such as fog at night scatter light.

Some locations within the township of Kurri Kurri and surrounding suburbs may be afforded views to the upper portion of the Proposal's exhaust stacks. In these instances, these views would likely be from locations that had visibility of the former Kurri Kurri aluminium smelter's stacks and water towers. While the tallest former stacks (at 140 m and 70 m) were visible from many locations, the Proposal's 36 m stacks will sit much lower in the landscape, and behind the surrounding vegetation. If stack aviation lighting is required, this will create additional visibility of the Proposal's exhaust stacks.

The overall visual impact is assessed as low-negligible.

10. Mitigation options

The Proposal includes the provision of a 10 m perimeter landscaping buffer along the eastern perimeter of the Proposal Site. Landscape screening is an accepted and appropriate design feature to filter or screen views for potentially sensitive viewing locations. This landscaping would be appropriate for filtering or screening views of the lower elements of the Proposal from the local road network surrounding the Proposal Site. These elements include the security fencing, security lighting, buildings, switchyard and, partially, the power station.

Elevated elements such as the Proposal's exhaust stacks, water tanks and fuel tanks will be partially screened or filtered from view by the existing mature trees surrounding the Proposal Site. The viewpoint assessment has determined that existing vegetation, topography and built form within the viewshed will be effective at screening or filtering most views toward the Proposal Site across the broader viewshed.

If aviation lighting is required on the Proposal's exhaust stacks, it is proposed that it be directional. Offsite impacts due to light spill from security lighting may be minimised by adhering to Australian Standards (*AS/NZ 4282:2019 Control of the obtrusive effects of outdoor lighting*), implementing measures such as baffling, downward direction of lighting and sensor-triggering lighting to minimise lighting duration. The viewpoint assessment has determined that existing vegetation around the Proposal Site will largely assist in the mitigation of off-site lighting impacts to residential dwellings. The proposed perimeter landscaping will also assist the mitigation of light spill to residential dwellings to the east within Loxford.

Mitigation measures may also be implemented by way of designing of surfaces and finishes for the power station and associated infrastructure to reduce visual bulk and contrast of large surfaces and elements and allow them to blend into the context of the surrounding area. This may include incorporating contemporary finishes, similar to those seen in existing examples of OCGT power stations (see Figure 4.2). These may include articulation in long elevations or large facades, alternating colours, or use the of contrasting materials.

11. Summary and conclusions

The Proposal is a new gas-fired power station, located approximately three km north of Kurri Kurri, NSW.

A rezoning proposal is separately under consideration which seeks to redevelop the land formerly owned by Hydro Aluminium, which includes, among other uses, an industrial and employment precinct adjacent to the Proposal Site, and new residential and recreational areas to the east and north east. The Proposal Site would be rezoned from Rural Use (RU2) to Heavy Industrial, which is commensurate with the Proposed development.

The former Kurri Kurri aluminium smelter site and proposed industrial estate is surrounded by mature forested areas, which formed a buffer zone for the former aluminium smelter. This vegetation would be retained and will screen nearby views towards the Proposal.

The Proposal's elevated infrastructure will include two exhaust stacks up to approximately 36 m and water and fuel tanks of approximately 10 m height.

The Seen Area Analysis determined theoretical visibility is afforded to several areas, including townships, rural living areas and parts of the road network. Topographic elements including local ridgelines and rises restricts visibility from some areas. This theoretical visibility analysis does not take into account intervening vegetation or built form between the viewer and the Proposal.

Construction activities will only be visible from limited sections of Hart Road and Dickson Road due to the surrounding vegetation. Visual impacts of these activities would be temporary, short in duration and limited to low viewer numbers.

Opportunities for viewing the Proposal are limited to a few locations that are elevated, and not obscured by built form or vegetation. These locations include those that were afforded visibility of some former aluminium smelter infrastructure. These locations are at such a distance that, although the Proposal may be visible, it would not be a visually dominant feature in views and would form part of the context of the contemplated visual setting which would include other similar developments within the industrial estate.

Existing residential dwellings and future proposed residential developments would be in areas that are largely screened or filtered by existing vegetation and localised topography in the landscape. There may be views of elevated structures above the surrounding treeline in some locations, however these would be limited.

Some perimeter landscape screening will be appropriate for localised mitigation of views from the surrounding road network toward lower elements of the Proposal Site. Existing vegetation is sufficient to filter or screen views further afield in the Proposal viewshed.

Aviation lighting, if required by CASA, will increase visibility of the Proposal's exhaust stacks, but may be mitigated through directional lighting.

The overall visual impact of the Proposal is considered to be Low to Negligible. This is due to the existing landscape character and sensitivity surrounding the Proposal Site and limited visibility of the Proposal from sensitive viewing locations. In addition, the Proposal is consistent with the industrial character of the current Kurri Kurri aluminium smelter site and the proposed future rezoning and industrial development of the adjacent land.

Appendix A. Photomontage



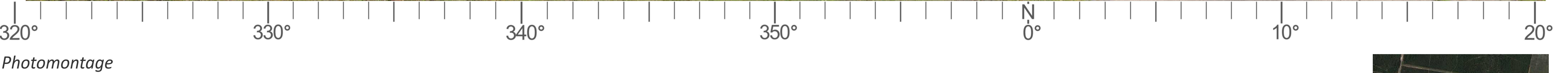
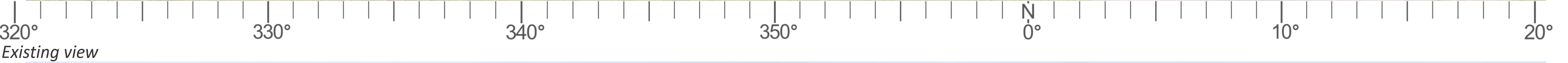
Existing view



Photomontage



Viewpoint Map





Existing view



Wireframe view

