



Proposed Calala Battery Energy Storage System

LANDSCAPE CHARACTER and VISUAL IMPACT ASSESSMENT

2023

envisage

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PREPARED FOR: Equis Energy (Australia) Projects (Ngumi4) Pty Ltd as trustee for the Equis Energy (Australia) Ngumi 4 Asset Trust

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***We wish to acknowledge the Traditional Owners of country throughout Australia
and recognise their continuing connection to land, waters and community.
We pay our respects to them and their cultures; and to elders both past and present.***

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Cover image: Proposed site (foreground), Calala BESS

(Note: Please do not compress this document more than 330ppi to maintain sufficient quality to view images)

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Abbreviations

BESS	Battery Energy Storage System
DPE	NSW Department of Planning and Environment
DPI	NSW Department of Primary Industries
EIS	Environmental Impact Statement
EP&A Act	NSW Environmental Planning and Assessment Act
Equis Energy	The proponent: Equis Energy (Australia) Projects (NGUMI4) Pty Ltd
GPS	global positioning system
ha	hectare
km	kilometre
kV	kilovolt
LGA	Local Government Area
m	metre
mm	millimetre
MW	megawatt
MW/h	megawatt hours
O&M	operations and maintenance
SEARs	Secretary's Environmental Assessment Requirements
SSD	State significant development
LCVIA	Landscape character and visual impact assessment
VP(s)	Viewpoint(s)

1.1 Purpose of this report

This landscape character and visual impact assessment (LCVIA) assesses the likely visual impact of a proposed Battery Energy Storage System (BESS) at Calala, around six kilometres (km) south-east of Tamworth NSW (the Project). The Project includes:

- The construction and operation of a BESS with an estimated capacity of up to 300 megawatt (MW) / 1200 megawatt hours (MWh), and
- Associated infrastructure, including underground grid connection to the Tamworth 330 kilovolt (kV) substation.

The Project is State Significant Development (SSD). As such it requires an Environmental Impact Statement (EIS) and development consent from the Minister for Planning under Part 4 of the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act). The Project EIS has been prepared by Mecone, on behalf of the proponent, Equis Energy (Australia) Projects (NGUMI4) Pty Ltd (Equis Energy) as trustee for the Equis Energy (Australia) Ngumi 4 Asset Trust.

This LCVIA informs the EIS and addresses specific 'visual' matters referred to in the Secretary's Environmental Assessment Requirements (SEARs) issued by the Department of Planning and Environment (DPE, 30/01/2023).

The LCVIA aims to

- identify the likely visual effects of the Project on landscape character and on views
- estimate the magnitude of the effects
- assess the nature and significance of these effects and
- propose measures to avoid, reduce or compensate for those effects.

1.2 SEARs

The visual matters in the SEARs (SSD-52786213), and the sections of this report where these matters are addressed, are identified in [Table 1-1](#).

Table 1-1: Visual matters in SEARs and where these are addressed in this report

Visual matters	Where addressed in this report?
The EIS must address the following specific matters: Visual	▪ This report has been prepared to address visual matters. ▪ The methodology used for the assessment is outlined in SECTION 2.
– including a detailed assessment of the likely visual impacts	▪ The detailed assessment of likely impacts to landscape character is assessed in SECTION 4. ▪ The detailed assessment of likely visual impact (or the impact on views) is assessed in SECTION 5.
(including night lighting)	▪ Night lighting is described in SECTION 5.4 and addressed in SECTION 6.
of all components of the project (including transmission lines and any other ancillary infrastructure)	▪ A description of the Project components is provided in SECTION 3. ▪ The detailed assessment in SECTION 4 and SECTION 5 includes the visual impact of the Project components.
on surrounding residences, scenic or significant vistas, and road corridors in the public domain,	▪ Viewpoints, including residents, road corridors and scenic lookouts are identified and assessed in SECTION 5.
and on the Siding Spring Observatory in accordance with the <i>Dark Sky Planning Guideline</i> (2016).	▪ Night lightning and <i>the Dark Sky Planning Guideline</i> are addressed in SECTION 6. ▪ Lighting mitigation measures are provided in SECTION 7.

2.1 Guidelines

The applied methodology in this VIA has been tailored to this project and is based on principles presented in Transport for NSW's '*Guideline for Landscape Character and Visual Impact Assessment, Environmental Impact Assessment Practice Note EIA-NO4*'; 2020 and '*Guidelines for Landscape and Visual Impact Assessment*'; the United Kingdom's Landscape Institute and Institute of Environmental Management and Assessment, 2013.

In addition, the Project location is within a 200 km radius of Siding Spring Observatory and falls within the Dark Sky Region of NSW, and therefore the *Dark Sky Planning Guideline, 2023*, is applicable and has been addressed in [SECTION 5.4](#) of this LCVIA.

2.2 Method

Two assessments are undertaken to improve design outcomes:

- A landscape character assessment - the assessment of impact on the aggregate of an area's built, natural, and cultural character or sense of place – which helps determine the overall impact of a Project on an area's character and sense of place, and
- A visual impact assessment - the assessment of impact on views - which helps define the day-to-day visual effects of a Project on people's views.

The method to measure impact is based on the combination of the sensitivity of the existing area (or view) to change, and the magnitude of the Project on that area (or view). These terms are defined as:

- sensitivity: refers to the qualities of an area, the number and type of receivers and how sensitive the existing character of the setting is to the proposed nature of change.
- magnitude: refers to the physical scale of a project, how distant it is and the contrast it presents to the existing condition.

The assessed level of sensitivity and magnitude is rated from 'High' to 'Negligible'. Unique aspects which lead to the assessed sensitivity and magnitude ratings, are described in the assessment. The combination of sensitivity and magnitude ratings, identifies the level of impact (refer Table 2-1).

Table 2-1: Landscape character and visual impact rating matrix

		Magnitude (of change)			
		High	Moderate	Low	Negligible
Sensitivity (to change)	High	High	High-moderate	Moderate	Negligible
	Moderate	High-moderate	Moderate	Moderate-low	Negligible
	Low	Moderate	Moderate-low	Low	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

Landscape character impact assessment

The following tasks are undertaken for the landscape character impact assessment:

1. analyse existing landscape character and its sensitivity
2. identify landscape character zones (if required)
3. determine the magnitude of impact

4. assess landscape character impact (based on the sensitivity of character and magnitude of the Project).

The landscape character assessment and results are provided in [SECTION 4](#).

Visual impact assessment

The following tasks are undertaken for the visual impact assessment:

1. identify the extent of visibility of the Project
2. identify existing viewpoints and their sensitivity to change
3. determine the magnitude of change from each viewpoint
4. assess visual impact (based on a composite of the sensitivity of the view and magnitude of the Project in that view).

The visual impact assessment and results are provided in [SECTION 5](#).

2.3 Field investigations

The site and surrounding area were inspected for this assessment 20-21 September 2022. Weather during the inspection was dry and sunny (good visibility). During the inspection, the impact to viewpoints was assessed from the nearest publicly accessible locations. Private property was not accessed.

A further inspection was undertaken 18 October 2023, to visit two private properties near the Project. The weather was dry and sunny with good visibility.

2.4 Images in this report

Photographs included in this report were taken using a 50mm lens on a full frame digital camera with global positioning system (GPS). The 50mm lens was used as it is generally accepted to be closest to the view perceived by a human eye. Unless otherwise noted, photographs in this report were taken by the author during the field inspection.

3

Project description

3.1 Location

The Project address is 57 Burgess Lane, Calala (Lot 17 DP 629969, also known as 474 Calala Lane), within Tamworth local government area (LGA). The total site area is approximately 36 hectares (ha). The footprint of the proposed BESS facility would cover a total area of 8.9 ha. The location of the development footprint is shown in [Figure 3-1](#).

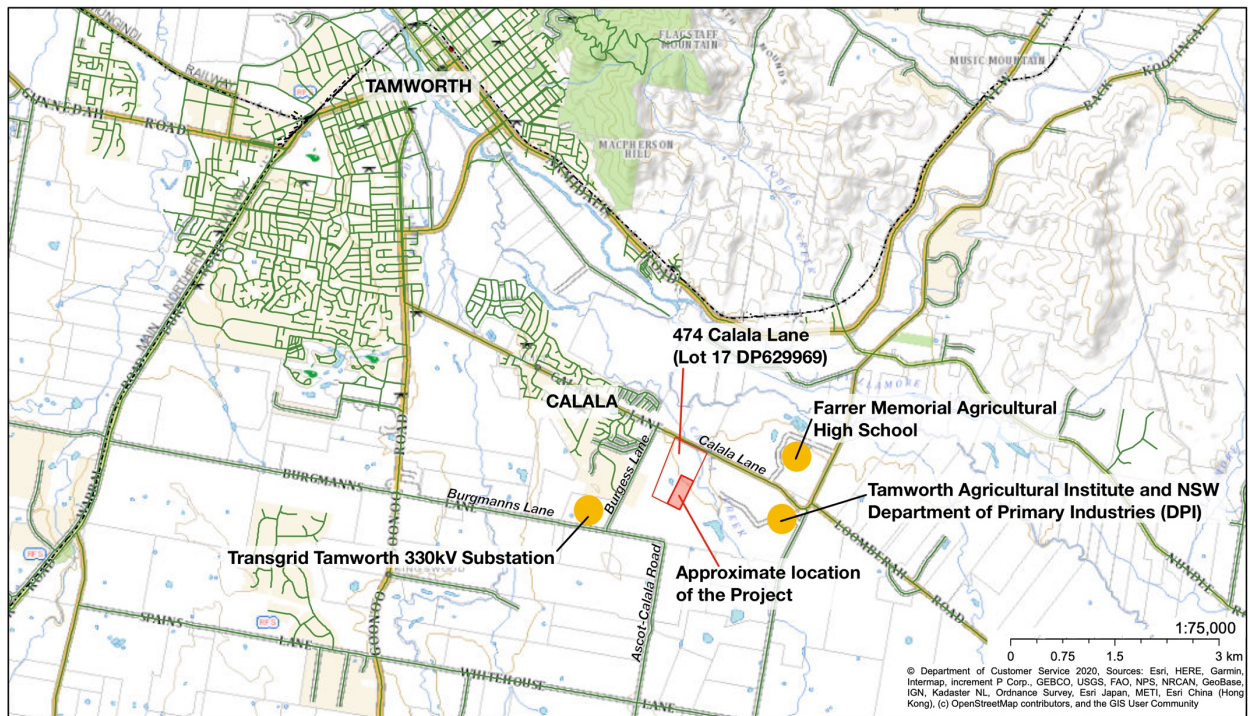


Figure 3-1: Location of development footprint

3.2 Project overview

The Project would involve the construction and operation of a large-scale BESS, that would have a capacity of up to 300 MW and provide up to 1200 MWh of battery storage capacity, or up to 4 hours of storage duration.

The Project would comprise the following:

- Large-scale BESS including battery enclosures, inverters, DC and AC combiner boxes, transformers and auxiliary components.
- 33/330 kV switchyard.
- Underground transmission line connection between the BESS and the nearby TransGrid Tamworth 330 kV substation.
- Ancillary elements including site access from Calala Lane, internal access roads and parking, control room and amenities, warehouse, stormwater and fire management infrastructure, utilities, signage, fencing, security systems, up to five metre (5 m) high noise attenuation wall and landscaping.

The proposed site plan is shown in [Figure 3-2](#). Photos of the site are shown in [Figure 3-3](#) to [Figure 3-6](#). (The location of each photograph is shown in [Figure 3-2](#)).

Calala BESS

300MW - 1200MWh

Site plan

Part of Lot: 17/DP629969

A-101

Legend

-  Calala BESS extent
-  Existing electricity substation
-  Proposed easement
-  Property (parcel)
-  Proposed transmission line
- Existing transmission line - Capacity (kV)**
 -  132
 -  330
- Proposed design**
 -  Fence
 -  Fence - High Voltage
 -  Gate
 -  Noise wall
 -  Underground cable (330 kV)
 -  Access track
 -  Auxiliary power
 -  Battery enclosure
 -  Control room
 -  Control room - TNSP
 -  Distribution kiosk (33 kV)
 -  Harmonic filter - future development
 -  High voltage connection asset
 -  Inverter station
 -  Laydown area
 -  Lightning mast
 -  Parking
 -  Switchroom
 -  Temporary office
 -  Warehouse
 -  Firewater tank
 -  Stormwater basin
 -  Transmission line alignment

Scale: 1:7,000 @ A3
Spatial Reference: GDA2020 MGA Zone 56

Notes: This plan is indicative for development approval only and subject to detailed design changes. It contains highly confidential and proprietary information that are of independent, economic value to Equis. This drawing and design shall not be reproduced, amended, disclosed or distributed to others without the express written consent of Equis.

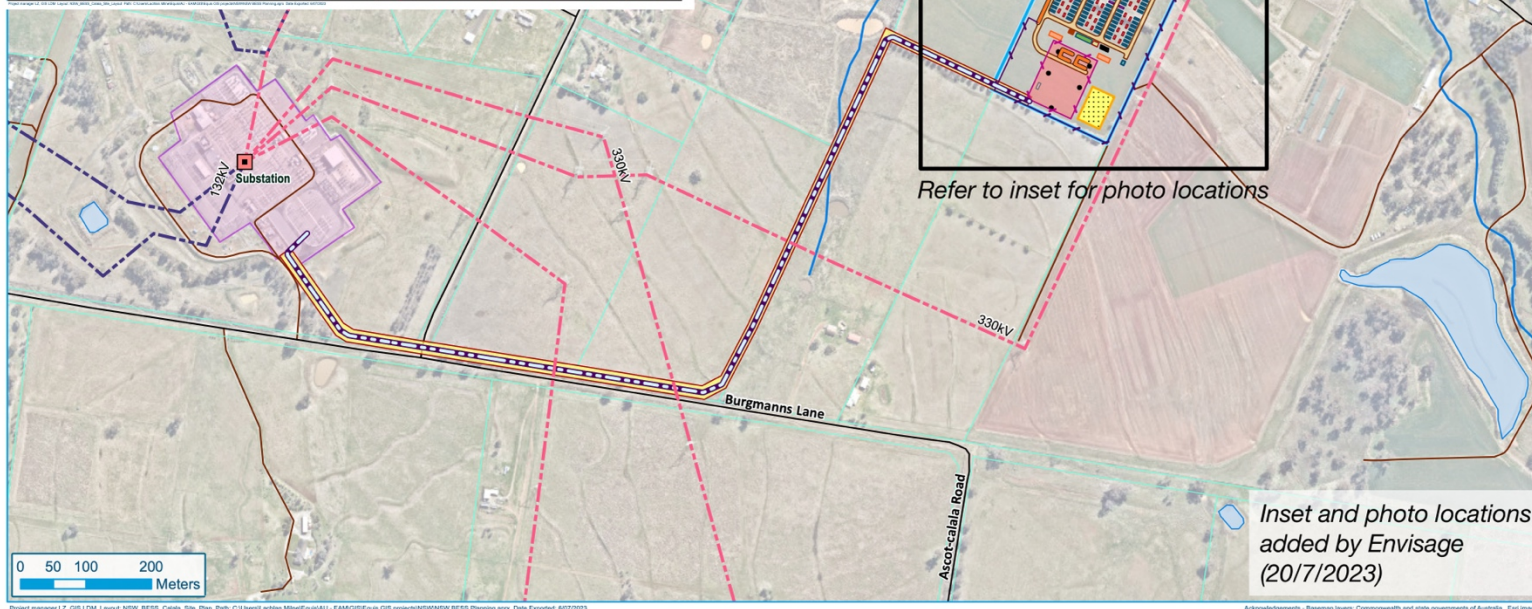
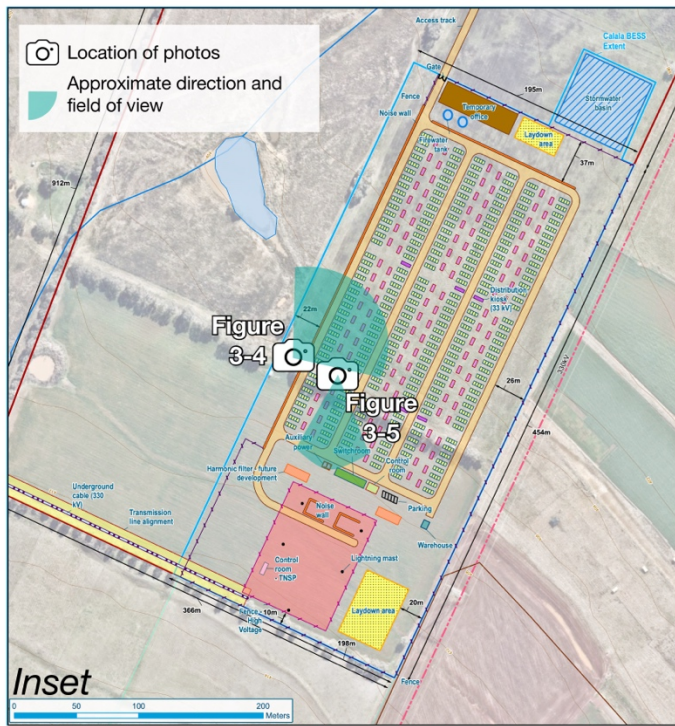


Figure 3-2: Site plan (including photograph locations for views of the existing site)



Figure 3-3: Photograph looking east toward Project site, mostly hidden behind trees



Figure 3-4: Photo-panorama of existing site looking north-east toward approximate location of BESS



Figure 3-5: Photograph of existing site looking south toward approximate location of switchyard



Figure 3-6: Photograph of existing site access looking south from Calala Lane (Project site mostly hidden behind trees)

3.3 Project features

The approximate size of the main visual features of the Project are summarised in [Table 3-1](#) and described below.

Table 3-1: Size of main visible Project components

Infrastructure	Approximate size
BESS storage units	2.8 m high x 9.5 m long x 3.2 m wide (approximately)
Inverters	3.1 m high x 6 m long x 2.4 m wide (approximately)
Switchyard and substation	About 100 m long x around 75 m long, housing components of various heights, including auxiliary transformers around 9 m high and narrow lightning masts around 25 m high
Control room, switch room	Both would be around 4.1 m high x 2.7 m wide. The switch room would be around 25 m long, and the control room around 9.1 m long.
O&M building	4 m high x around 8 m long x around 5.1 m wide
Distribution kiosk	2.9 m high x around 8 m long
Water tank	3.6 m high x around 6 m wide
A northern and western attenuation noise wall surrounding the BESS	The northern wall would be 4 m high x around 130 m long. The western wall would be 5 m high x around 300 m long.
Chain wire fence	3 m high
Connection to existing TransGrid substation (underground transmission line)	Additional transmission poles are not proposed. The BESS connection to the existing 330 kV substation would be underground.

BESS and inverters

Nine hundred and sixty (960) BESS storage units are proposed, each 2.8 m high. The individual units would have a similar scale to a shipping container and be placed in ground-level rows on a levelled, development pad (raised around 200 mm above ground level). An image of the type of BESS storage units proposed to be installed is shown in [Figure 3-7](#).

The BESS storage units would be connected via underground cables to inverters placed in rows between the BESS storage units. The inverters would be around 3.1 m high. The BESS storage units and inverters would occupy an area around 3.5 ha, and would have prefabricated Colourbond cladding, coloured matt grey or other rural landscape colour in matt finish.



Figure 3-7: Typical BESS storage units and inverters

Substation and switchyard

The inverters would connect via underground cables to a proposed onsite substation and switchyard. The substation would include auxiliary transformers around 9 m high, and four lightning masts around 25 m high. The lightning masts are very slender (around 10 mm wide at

the tip). Most components within the switchyard would have a matt grey, green or zinc non-reflective finish (subject to detailed design). An elevation of the proposed substation showing the height of the main components, is shown in [Figure 3-9](#).

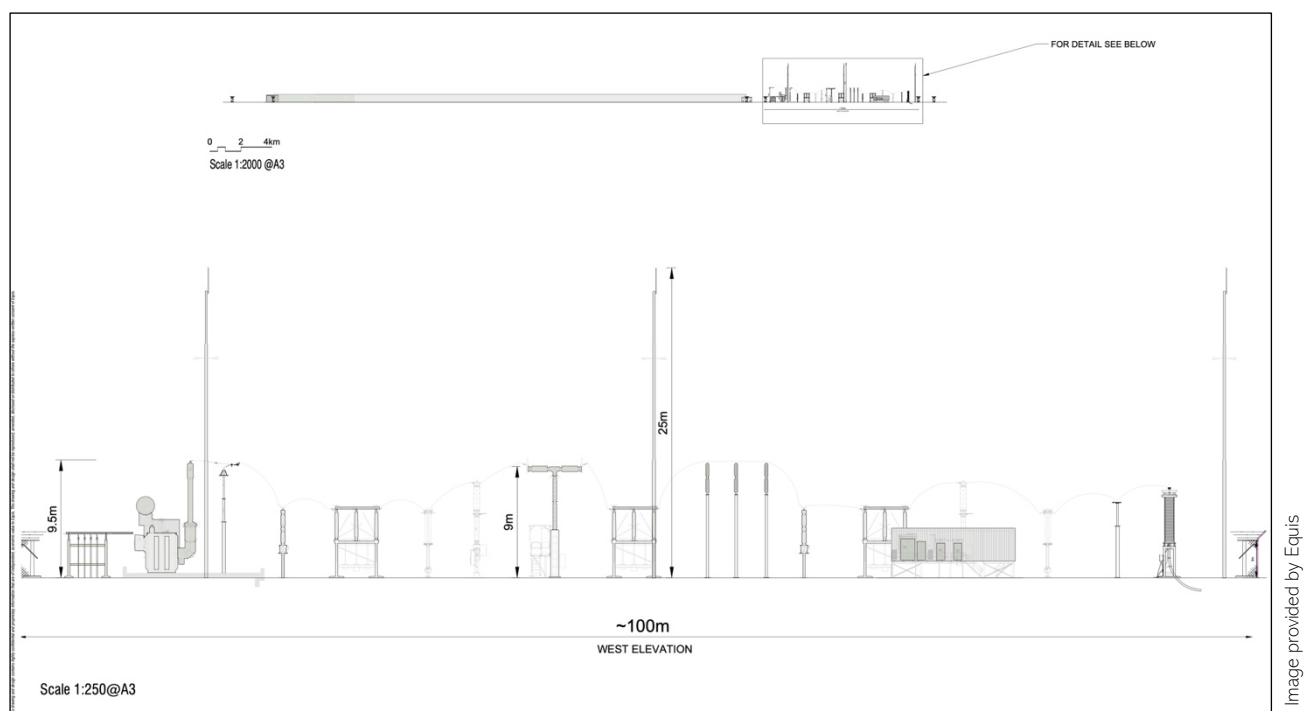


Figure 3-8: Existing TransGrid Tamworth Substation

The proposed substation would occupy a much smaller footprint (around 0.75 ha) compared to the existing 300 kV TransGrid Tamworth Substation (which occupies around 5 ha) just over 1 km away (shown in [Figure 3-9](#)).



Figure 3-9: Existing TransGrid Tamworth Substation

Underground transmission line

The proposed switchyard would connect to the existing TransGrid Tamworth Substation via a new 330 kV underground interconnecting transmission line. The new underground transmission line would not require new above ground transmission poles.

Control room and warehouse

Several small, prefabricated metal buildings are proposed within the BESS development footprint: a control room, operations and maintenance (O&M) storage room, and switch room.

The buildings would have prefabricated Colourbond cladding, and an inconspicuous colour that is darker and reduces contrast with the surrounding landscape – such as matt grey or other rural landscape colour in matt finish.

The control rooms and switch room would appear similar in appearance to the small, elevated building shown in the lower right corner of [Figure 3-7](#). The O&M building would have an appearance similar to a small rural shed.

Noise attenuation wall

A 75 mm thick brick or concrete noise attenuation wall would be installed along the northern and western sides of the BESS development footprint. The northern noise wall would be around 4 m high, and the western wall would be around 5 m high. A typical noise wall is shown in [Figure 3-7](#).

The Project noise wall would be subject to detailed design. The design intent is for a high-quality design finish, in a colour two to three shades darker than the surrounding landscape (a muted grey colour, or multi-shade dark grey) and possibly a textured finish.

There is also a short section of wall (4 m high) along the southern side of the substation.

Fencing

A perimeter chain mesh security fence, around 3 m high, would surround the northern, eastern, and southern sides of the BESS development footprint. The western side of the BESS would be enclosed via the western noise wall, and a section of 3 m chain mesh security fence (as shown in the inset of [Figure 3-2](#)).

The perimeter chain mesh fence has been positioned to retain as many existing trees as possible around the BESS development footprint. The fence would enclose the northern noise wall, substation and switchyard, and all BESS associated buildings. Access into the secured BESS would be via an entry gate at the access track along the northern perimeter.

A second fence (a high voltage chain mesh fence) would be installed around the switchyard and substation within the BESS footprint, 10 m from the perimeter fence.

Access

The proposed BESS would be accessed via Calala Lane by a new all-weather access road, located approximately 40 m west of the existing site access (the existing access is shown in [Figure 3-6](#)).

Lighting

The Project would include external security and emergency lighting, however, the BESS would not be permanently lit at night. Lights would not be turned on at night unless a specific security or emergency event required it. Proposed lighting would be designed to comply with *Australian Standard AS4284 1997 – Control of Obtrusive Effects of Outdoor Lighting* and principles of the *Dark Sky Planning Guideline*. The impact of lighting on the night sky is described in [SECTION 6](#).

3.4 Construction

Vegetation removal

The BESS development footprint is largely cleared of tall vegetation, however, there is a row of around 22 planted trees along a fence line within the BESS development footprint that would be removed for the Project. The trees are shown in [Figure 3-10](#).



Figure 3-10: Trees that would be removed along fence line within the development footprint (looking east)

The trees have been identified by Biosis (who have undertaken the ecological assessment of the Project) as River Red Gum (*Eucalyptus camaldulensis*) and could be up to 15 m high. They are considered by Biosis to be on Category 1 – Exempt Land for the purposes of the *Local Land Services Amendment Act, 2016*.

Derived native grassland is present along the proposed transmission corridor. Sections of the alignment would bore under trees (instead of open trenching) to avoid and minimise tree and grassland impacts. However, a small group of trees close to the BESS development footprint within the transmission corridor alignment would likely require removal. In addition, individual trees within the proposed new access road footprint would be removed.

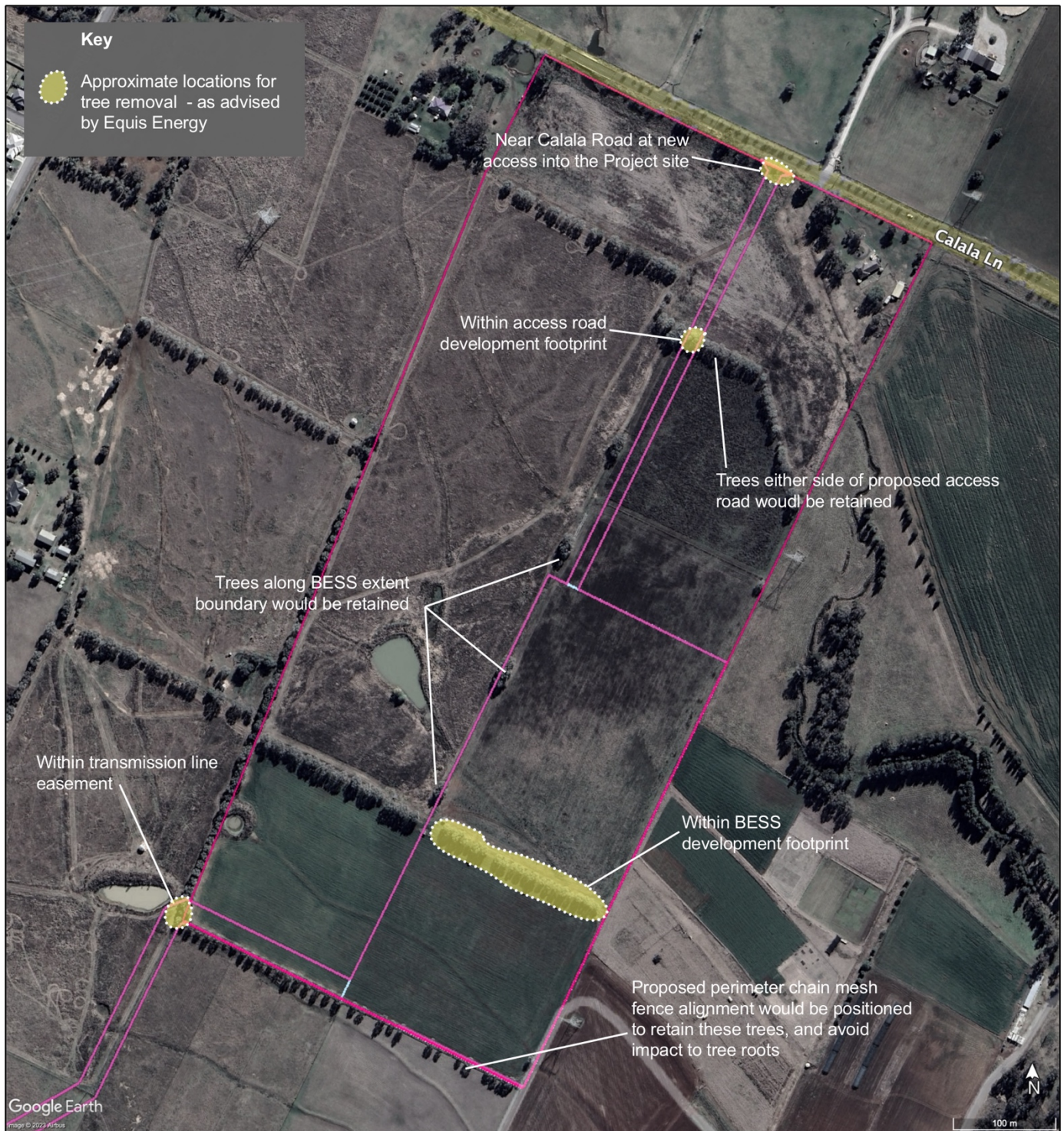
Existing trees along the western and southern boundary of the development footprint would be retained (trees along the southern boundary are shown in Figure 3-11). It is understood that all other trees at the Project address would be retained. The approximate location of proposed trees to be removed is shown in Figure 3-12.



Figure 3-11: Trees along the southern boundary of the development footprint

Figure 3-12
Trees identified for removal (approximate)

PROPOSED CALALA BATTERY ENERGY STORAGE SYSTEM
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Site activities, equipment, and traffic

The proposed new site access to the BESS development footprint would be established and used during construction (and operations).

A temporary construction compound and storage area would be located near the proposed BESS development footprint. Parking for construction worker and site vehicles and equipment would also be provided close to the development footprint.

Construction would require use of excavators and earth movers, and truck and trailers to deliver the prefabricated components and fill, to site.

Road closures are not anticipated. The construction period would take 8 - 12 months. Night work is not anticipated.

3.5 Main visible changes

Upon completion, the main visible changes resulting from the Project would be:

- Removal of around 22 native trees within the development footprint, possibly up to 15 m high. Removal of individual native trees within the new access footprint, and within the transmission line easement. Possible removal of some trees along the southern boundary of the BESS development footprint.
- A long, solid noise attenuation wall, up to 4 m high and around 130 m long on the northern side of the BESS storage units, and up to 5 m high and around 300 m long on the western side of the BESS. A short section of noise wall up to 4 m high around the substation.
- A 3.5 ha area (approximately) of BESS storage units (around 2.8 m high, similar in scale to shipping containers), and inverters (around 3.1 m high), in prefabricated Colourbond, coloured matt grey or other rural landscape colour in matt finish.
- A new substation and switchyard (occupying around 0.75 ha) with tall, narrow components (up to 9m high for the transformers and up to 25 m high for the lightning masts).
- Elevated site buildings (up to 4.1 m) in prefabricated Colourbond, coloured matt grey or other rural landscape colour in matt finish.
- A new site access off Calala Lane.

A bird's-eye view render of the Project following completion is shown in [Figure 3-13](#). Note that the render does not show existing trees along the western boundary of the BESS that would be retained, and the cleared, hard surface shown west of the western noise wall is not proposed.

Figure 3-13
Bird's-eye view of the Project on completion, looking east

PROPOSED CALALA BATTERY ENERGY STORAGE SYSTEM
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Image provided by Equis Energy
Note that image has some inaccuracies and is provided as a general indication of the proposal only



As outlined in [SECTION 2](#), impact on landscape character is determined by combining the sensitivity of the existing landscape to change, and the predicted magnitude of change that would result from the Project. The possible level of impact to landscape character ranges from 'High' to 'Negligible'. This assessment has determined that impact of the Project on landscape character would be **moderate-low**.

4.1 Existing landscape character

Regional landscape and broad landscape character zones

Calala is within the New England Tablelands region of NSW. The broad landscape of this region comprises elevated undulating granitic slopes with pasture grasses and sparse trees. The elevated slopes form a common and distinctive background to local views.

The local land use is primarily agricultural and features open pastures, timber fencing, sheds, farm machinery, homesteads set back from sealed or unsealed roads, generally surrounded by trees. Trees frequently line property boundaries, fence lines and creeks corridors. The agricultural landscape includes several large institutional facilities: Farrer Memorial Agricultural High School, Tamworth Agricultural Institute, the NSW Department of Primary Industries, and the NSW Office of Water.

Energy infrastructure has a strong visual presence via numerous transmission towers and TransGrid's large Tamworth Substation (which occupies around 5 ha of land). Closer to Tamworth, land use becomes predominantly residential, with density increasing with proximity to the city. There are large lots (0.5 – 1 ha 'large lot residential') with mostly single-storey homes surrounded by large, grassed yards; brick and tile detached single-storey dwellings on 800 m² lots (approximately); and older-style, detached single-storey dwellings with large gardens and trees on 2,000 m² lots (approximately).

Local landscape character is illustrated by the collection of photographs in [Figure 4-2](#).

Physical characteristics of the Project site

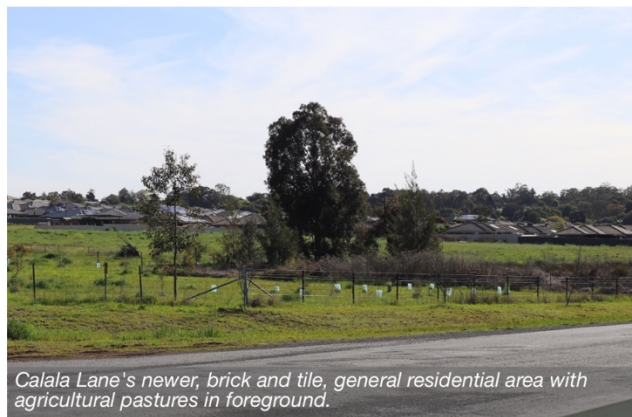
The Project site is typical of the surrounding agricultural area. It comprises cleared paddocks used for grazing and cropping, post and wire fencing, trees along most fence lines, a water storage dam, and homestead set back from the road. The site is generally low lying. A photograph of the Project site is shown in [Figure 4-1](#) (additional images of the site are provided in [SECTION 3.1](#)).



Figure 4-1: Project site (viewed from within the development footprint)

Figure 4-2
Selection of photographs collectively illustrating local landscape character

PROPOSED CALALA BATTERY ENERGY STORAGE SYSTEM
 LANDSCAPE CHARACTER AND VISUAL IMPACT ASSESSMENT



Planning matters relevant to landscape character

The Project site and surrounding landscape are located within Tamworth Regional Council Local Government Area (LGA). *Tamworth Regional Local Environmental Plan 2010* (LEP) is in force. Under the LEP, the site is zoned RU4 'Primary Production Small Lots'.

There is no reference in the LEP to scenic amenity or protection of scenic qualities within Zone RU4. An objective of the zone, however, is to '*minimise conflict between uses within this zone and land uses within adjoining zones*'. The closest adjoining zones are: R5 'Large lot residential' (the 0.5 -1 ha lots); and R1 General Residential (the 800 m² residential lots). An extract of the land zoning map is provided at Figure 4-3.

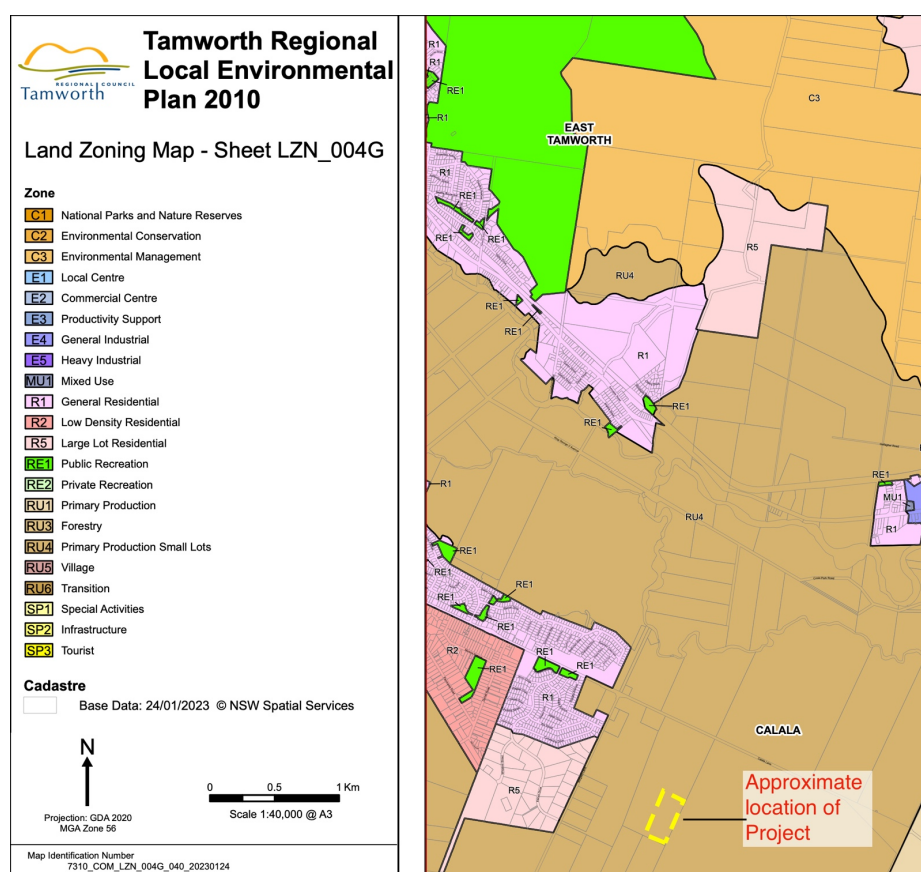


Figure 4-3: Land zoning in vicinity of Project (extract of Land Zoning Map, LZN_004G)

An objective of Zone R5 is '*to provide residential housing in a rural setting while preserving, and minimising impacts on, environmental sensitive locations and scenic quality*'. The adjoining RU4 zone contributes to the 'rural setting' and 'scenic quality' that would be experienced by the residents of the R5 zone.

There is no reference to scenic amenity or scenic protection within Zone R1.

Heritage matters and landscape character

An assessment of impact to Aboriginal cultural heritage items was undertaken by Biosis (*Calala Battery Energy Storage System, Calala: Aboriginal Cultural Heritage Assessment, 2023*). The assessment found there are 97 Aboriginal cultural heritage sites registered within 8.5 km. None are within the Project site. Due to the high levels of disturbance identified, the site was assessed as having low archaeological potential.

Biosis also undertook an assessment of impact to historical archaeology (*Calala Battery Energy Storage System, Calala: Historical Archaeological Impact Statement, 2023*). The assessment found there were no listed items, or items of heritage significance, within, or adjacent to, the study area. The Project site has been assessed as possessing low archaeological potential.

4.2 Impact to landscape character

The assessment of impact to landscape character is detailed in Table 4-1. The table includes criteria used to assess sensitivity (designations, quality, and cultural values) and magnitude (scale, contrast and duration), and a description of the unique factors contributing to the rating.

The existing sensitivity of the landscape to absorb a change such as the Project has been assessed as **low**. The magnitude of change on the landscape has been assessed as **moderate**. The combination of low (sensitivity) and moderate (magnitude of change) results in a **moderate-low** impact to landscape character.

Table 4-1: Assessment of impact to landscape character

Sensitivity	Magnitude of change	Landscape character impact
Low <i>Landscape designations</i> - The Project Area is not within a designated scenic landscape, and does not have recognised national or regional scenic landscape value. - The rural landscape character of Zone RU4 has not been locally recognised within the LEP, and scenic quality within the zone is not specified for protection. - However, the rural character of the zone would contribute to the 'scenic quality' and 'rural setting' of adjoining residential zones. <i>Landscape quality/characteristics</i> - The rural / agricultural landscape of the site is typical of the local rural landscape and one that is common throughout the New England Region. - The landscape has some attractive elements; however, scenic quality is diminished by visual detractors, including: numerous transmission towers, the existing substation, and dense residential development. <i>Cultural heritage</i> - The wider landscape contains cultural heritage sites of local importance to aboriginal people; however, none were within the Project site. - There are no historical heritage items, within, or adjacent to the Project site.	Moderate <i>Physical scale</i> - The Project would occupy a much larger built footprint than surrounding built structures. - The noise attenuation wall at 4 to 5 m in height, around 130 m long on the northern side and around 300 m long on the western side, would be longer than other built structures in the vicinity. - The individual BESS units, inverters, control room and warehouse would be generally lower in height than, and of a similar scale to, surrounding agricultural sheds. - However, the proposed quantity and placement of BESS units would be uncharacteristic of the landscape. <i>Visibility</i> - The proposed removal of trees within the development footprint, would remove a feature typical of the agricultural landscape, and increase exposure of the site. - Although large, the Project would be located on a flat, relatively inconspicuous site, and there is minimal change to landform proposed. <i>Contrast / introduction of new elements</i> - The noise attenuation wall's likely muted grey colour would reduce its contrast, and it would be lower in height than surrounding trees to be retained. - The BESS units would be largely screened behind the noise wall. - The taller elements within the BESS development footprint, such as the elevated control room, would be coloured a muted grey to reduce contrast with the landscape. - The Project is located near existing energy infrastructure, with numerous transmission towers located within the agricultural area. - The proposed substation would be a relatively familiar element within this landscape, with similar characteristics to the existing transmission towers and similar to, although much smaller than, the existing TransGrid Tamworth substation. <i>Duration</i> - The changes could last for 30 years, affecting the landscape for a relatively long period of time. - Upon decommissioning, the landscape could be restored to agricultural land use.	Moderate-low

As outlined in [SECTION 2](#), the impact on each view is determined by combining the sensitivity of the view to change, and the predicted magnitude of change the Project would have on the view. The possible level of impact to each view ranges from 'High' to 'Negligible'. This assessment determined that the highest visual impact would be '**moderate**' at one residence, and '**moderate-low**' at three residences. The impact to remaining viewpoints was assessed as '**low**'.

5.1 Visibility

To determine locations with potential visibility to the Project, a viewshed was prepared. The viewshed reveals locations with a 'theoretical' line of sight to the Project, based on the height of the main visible components within the development footprint such as the 4 – 5 m high noise attenuation wall and the 4.1 m high prefabricated buildings¹².

The viewshed is based on landform/topography and does not take account of intervening elements such as vegetation or buildings which could obstruct views. Therefore, the projected direct line of sight is 'theoretical', and visibility must be confirmed during the site inspection.

The Project's theoretical viewshed is shown in yellow in [Figure 5-1](#) and extends for a 5 km radius from the Project noise wall. Receivers (R) within the viewshed are identified in the figure. The host landholder (R78) is not included in the assessment.

Beyond 5 km from the Project, additional sensitive viewing locations have been identified. Two locations providing wide scenic vistas of the local area are included in the 'theoretically' visible locations for assessment:

- Oxley Scenic Lookout (around 7 km to the north-west), and
- Flagstaff Mountain Lookout (around 6.2 km to the north).

5.2 Viewpoints

'Theoretically' visible locations were investigated during the field inspection to confirm visibility.

The investigation found that the Project is NOT likely to be visible from the following locations as views are screened by intervening vegetation, farm sheds and other built structures:

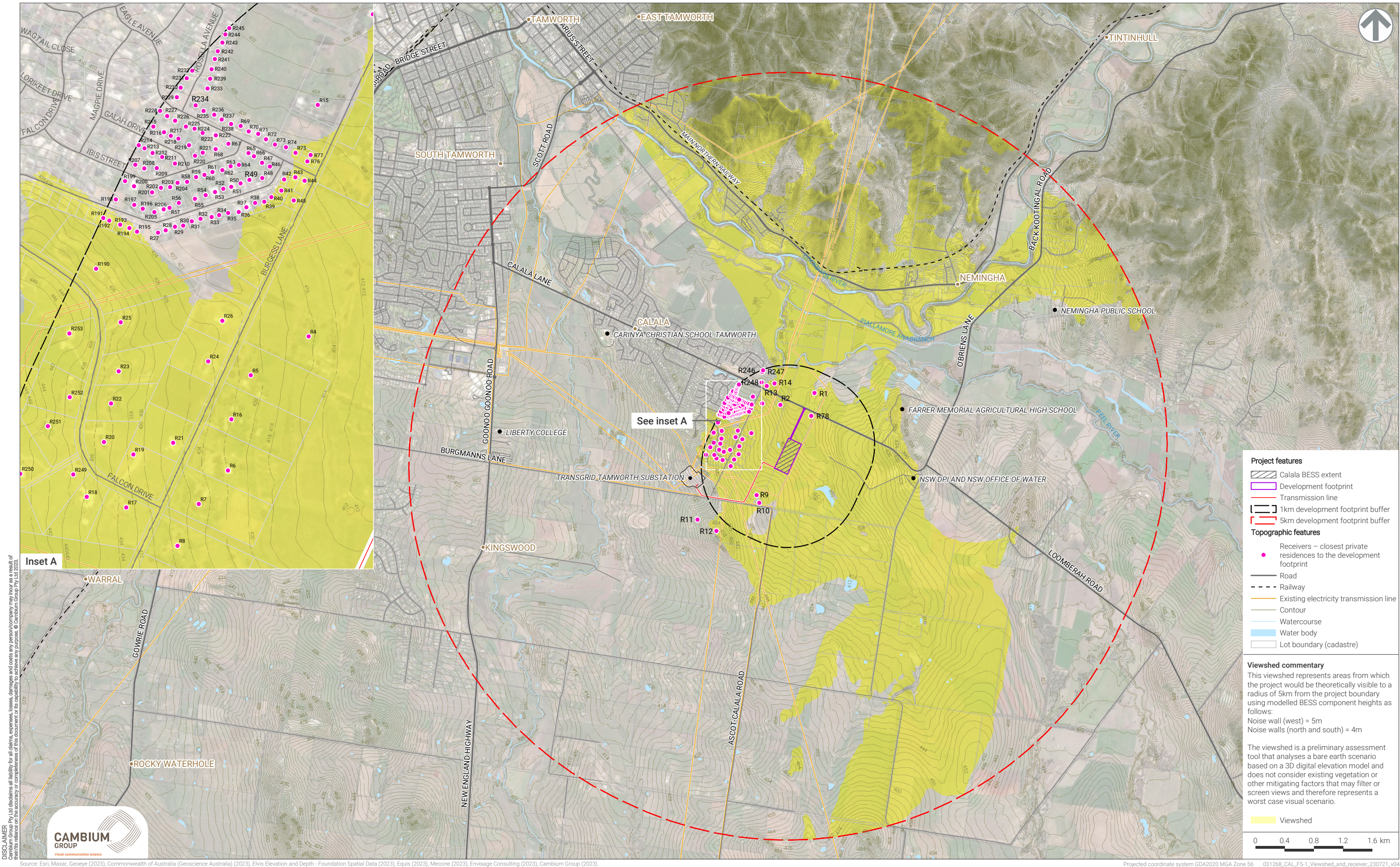
- Oxley Scenic Lookout
- Most residences on the eastern side of Burgess Lane (R3, R4, R5, R16, R6 and R7)
- Residences on the western side of Burgess Lane (R26, R24, R21, R17)
- A residence on the southern side of Calala Lane (R2)
- A residence on Burgmanns Lane (R10).

¹ The viewshed was based on the following: Noise wall = 4m, Battery enclosure = 2.7m, Inverter station = 2.9m, Switch room = 4.1m, Control room = 4.5m and Warehouse = 4.5m. The target (viewer) height was 1.5m. The extent of the viewshed is 5 km from the fence surrounding the BESS.

² The viewshed excludes the tall, narrow substation elements such as the transformers. The transformers are up to 10.3 m high. Including these components would skew the results of the viewshed, as, although these components are tall, they are narrow, and are generally less visible against the sky or vegetated background, compared to wider, solid components.

Figure 5-1
Viewshed and receivers

PROPOSED CALALA BATTERY ENERGY STORAGE SYSTEM | LANDSCAPE AND VISUAL IMPACT ASSESSMENT



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Source: Esri, Maxar, Geoeye (2023), Commonwealth of Australia (Geoscience Australia) (2023), Elvis Elevation and Depth - Foundation Spatial Data (2023), Equis (2023), Mecone (2023), Envisage Consulting (2023), Cambium Group (2023).

Projected coordinate system GDA2020 MGA Zone 56 031268_CAL_F5-1_Viewshed_and_receiver_230721_v04

The investigation found that the Project would be (at least partially) visible from the following viewpoints identified in [Figure 5-2](#):

- Residential viewpoints (VPs):
 - R1 on the northern side of Calala Lane
 - R8 on the eastern side of Burgess Lane
 - R9 on the northern side of Burgmanns Lane
 - R12 on the southern side of Burgmanns Lane
 - A few residences within the General Residential Zone
 - Some residences within the Large Lot Residential Zone, and
 - Some elevated residential areas along the A15/B56 (Nemingha and East Tamworth).
- Non- residential viewpoints:
 - Burgess Lane
 - Burgmanns Lane
 - Calala Lane
 - Institutional facilities to the east (Farrer Memorial High School, NSW Department of Primary Industries, Tamworth Agricultural Institute and NSW Office of Water), and
 - Flagstaff Mountain.

Each of the above viewpoints determined as having likely visibility to the Project, are assessed in [Section 5.3](#).

A single viewpoint has been selected to represent clusters of residences in the General Residential Zone, the Large Lot Residential Zone, and Nemingha / East Tamworth. Single representative viewpoints are also used to assess road corridors and the institutional facilities. Each representative viewpoint represents multiple viewing locations with similar viewing characteristics, similar orientation, and proximity to the Project.

5.3 Assessment of impact

Assessment results are presented in [Table 5-1](#). Annotated photographs are included to show the existing view where possible. Private property was not accessed during field investigations. Views have been assessed from the nearest publicly accessible location.

To view each photograph most realistically (portraying most closely the view that is seen in the landscape), enlarge each photograph to A3 size (on screen or in print), then, view the image a comfortable arm's length away.

Figure 5-2
Assessed viewpoints

PROPOSED CALALA BATTERY ENERGY STORAGE SYSTEM
LANDSCAPE CHARACTER AND VISUAL IMPACT ASSESSMENT

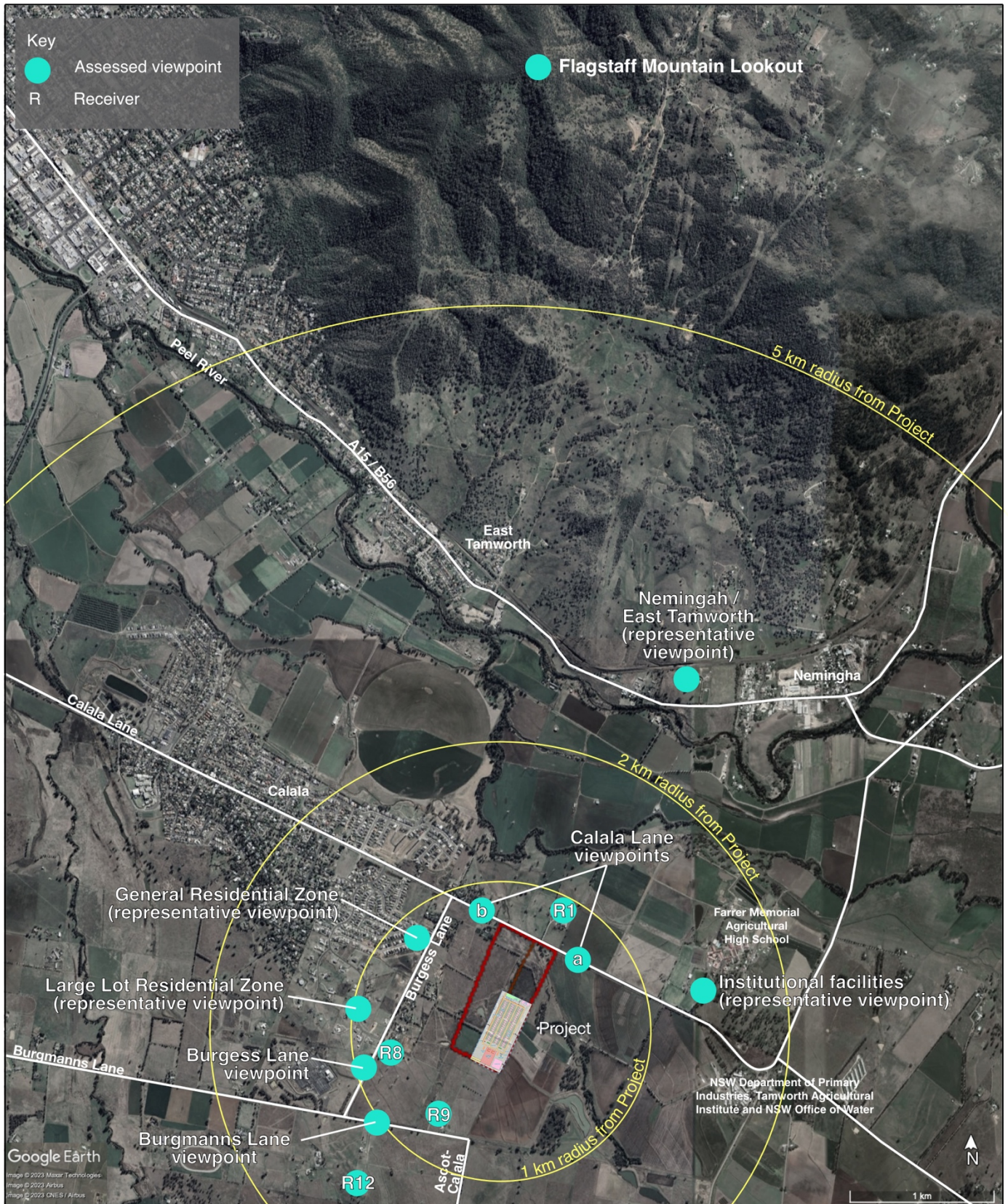


Table 5-1: Assessment of impact to views

Viewpoint	Existing sensitivity	Magnitude Of Change	Rating of Visual Impact
R1: Private residence, 473 Calala Lane, Calala. A photograph of the existing view looking toward the Project site from the closest public viewpoint to R1 (Calala Lane entrance to R1) is shown in Figure 5-3. A photograph looking toward R1 from the Project site is shown Figure 5-4.	Moderate: - View is from an elevated residence around 700 m from the Project development footprint. - The view toward the Project site is partially obstructed by vegetation around the residence and between the residence and the Project site. - The existing view includes transmission towers, institutional facilities and Calala Lane traffic.	Low: - The Project would be evident; however, only a small proportion of the existing view would be affected, due to the screening effect of intervening vegetation. - The Project would occupy a relatively small portion of the wide view likely available, and would be unlikely to change the focus of the view (of the broader agricultural landscape and ridgelines in distance). - Heavy vehicles accessing the site during construction would be visible. Following construction, the site entry would be used primarily by light vehicles and access would be minimal.	Moderate-low

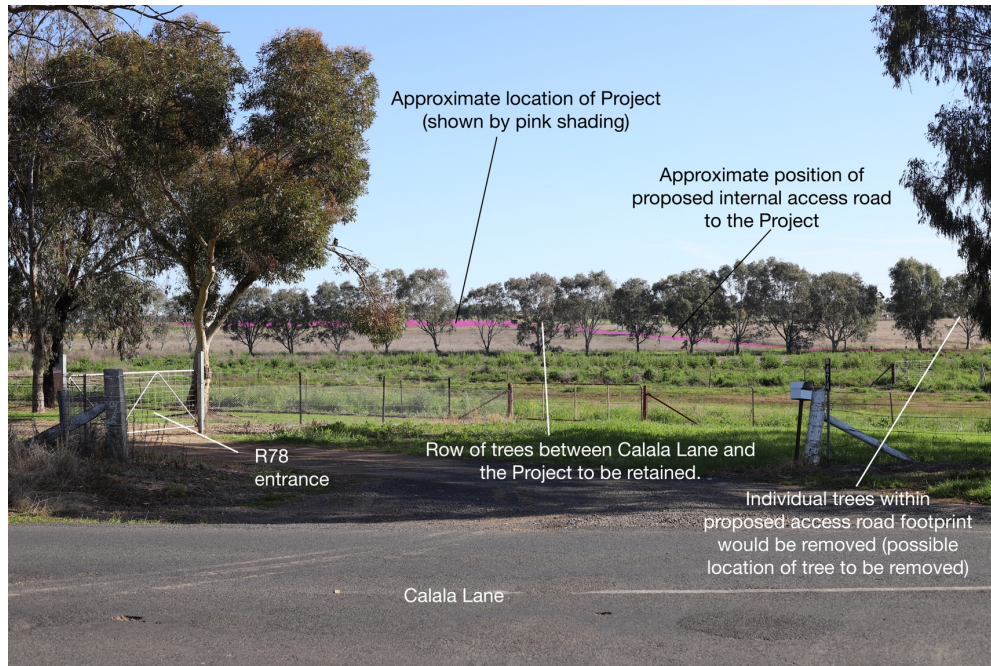


Figure 5-3: View from Calala Road entrance to R1, looking south toward the Project site



Figure 5-4: View from Project site looking north toward R1

Viewpoint	Existing sensitivity	Magnitude Of Change	Rating of Visual Impact
R8: Private residence, 111 Burgess Lane, Calala. (Note: This viewpoint is also representative of other residences on the eastern side of Burgess Lane. Even though views were not identified from those residences during the site inspection, it is possible some residents could view the Project site, particularly if vegetation close to the residences is removed). A photograph of an existing view toward the Project site from the closest public viewpoint to R8 (Burgess Lane) is shown at Figure 5-5. A photograph looking toward R8 from the Project site is shown Figure 5-6.	Moderate: - Residence is on the eastern side of Burgess Lane, around 600 m from the Project development footprint. - There are existing trees surrounding the R8 property, screening most views toward the Project site, however, there are some through views. - The residence is very close to an existing transmission line and existing views are affected by multiple transmission towers.	Low: - Trees that could be removed within the transmission line easement, near the BESS footprint, may increase exposure of the Project. - Most screening trees in the landscape would be retained (including the trees along the southern boundary of the development footprint). - Proposed infrastructure, including the chain mesh fence and proposed substation components would be visible beyond the screening trees, however, would not contrast significantly with the surrounding landscape, due to the vegetated background and presence of other energy infrastructure in view (including an existing transmission tower which is barely visible). - Remaining trees along the fence lines in the surrounding landscape would largely screen the noise wall.	Moderate-low

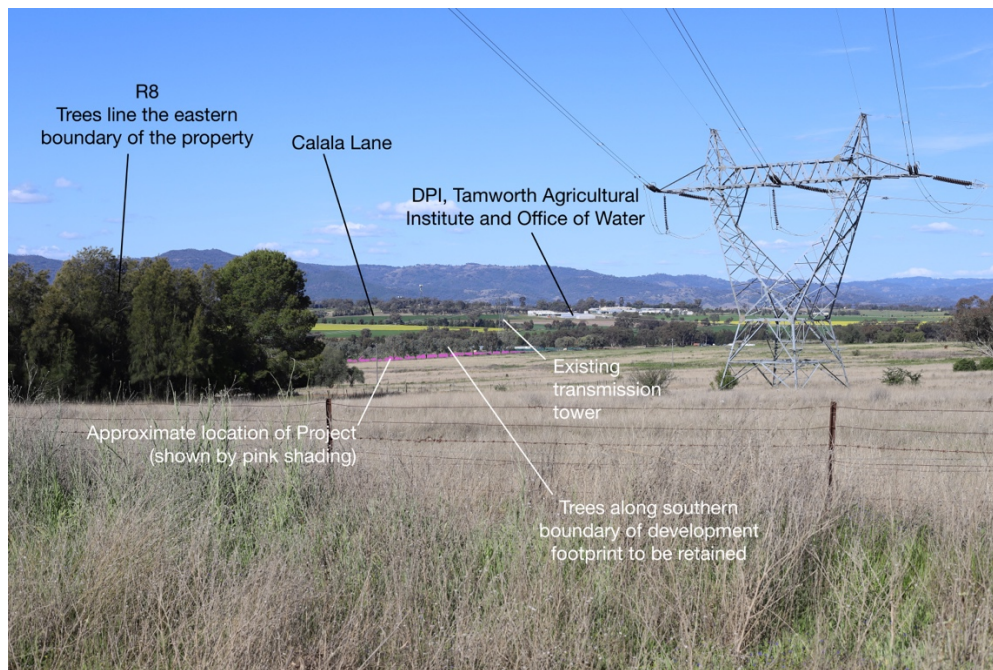


Figure 5-5: View looking east toward Project site from Burgess Lane near R8



Figure 5-6: View from Project site looking south-west toward R8

Viewpoint	Existing sensitivity	Magnitude Of Change	Rating of Visual Impact
R9: Private residence, 795 Burgmanns Lane Calala. The private property was visited 18 October 2023. A photograph of an existing view toward the Project site from the residence is shown at Figure 5-7. A photograph looking toward R9 from the Project site is shown Figure 5-8.	Moderate: ▪ The residence is around 450 m to the south of the development footprint and around 12 m higher in elevation than the Project site. ▪ The existing view is wide and includes agricultural pastures and vegetated ridgelines. ▪ The existing view includes transmission lines and towers.	Moderate: ▪ The Project site is currently partially screened by existing trees along the southern boundary, which would be retained. ▪ Beyond the boundary trees, the proposed chain mesh fence and taller substation components would be visible mid-ground. ▪ The BESS storage units may be visible beyond the substation, although would occupy a relatively small area within the wide view available, and be largely screened by existing trees to be retained. ▪ There would be a noticeable change to the view, at least initially.	Moderate

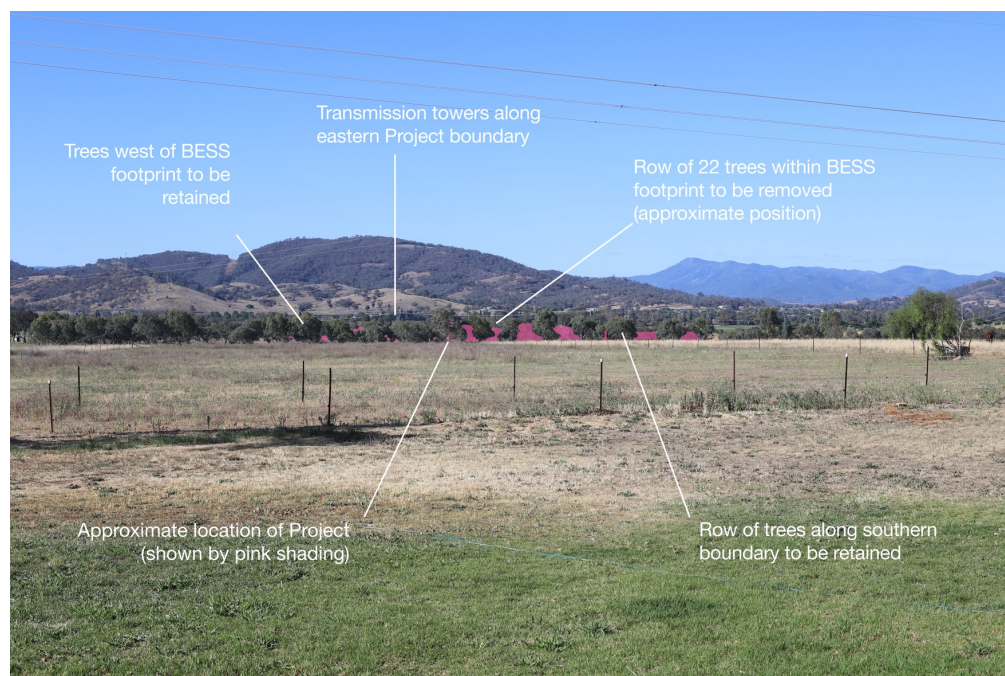


Figure 5-7: View looking north toward Project Site from R9 residence



Figure 5-8: View looking south toward R9 from the Project site

Viewpoint	Existing sensitivity	Magnitude Of Change	Rating of Visual Impact
R12: Private residence, 744 Burgmanns Lane, Kingswood. Attempt was made to assess the view from the residence; however, access was not possible. A photograph of an existing view toward the Project site from the closest public viewpoint to R12 (Burgmanns Lane at the entrance to R12) is shown at Figure 5-9. Note that R12 is around 14 m higher in elevation compared to Burgmanns Lane. A photograph looking toward R12 from the Project site is shown Figure 5-8.	Moderate: - A residence on the southern side of Burgmanns Lane, around 1.1 km from the Project site. - Although further from the site, the viewpoint is elevated (around 44 m higher in elevation than the Project site), and views are wide. - The existing view includes numerous transmission lines and towers.	Low: - The Project is likely to be evident, although would occupy a relatively small area of the wide view available. - Most trees in the landscape would be retained, limiting exposure to the development site, partially screening the noise wall and BESS. - The Project would be unlikely to detract from the focus of the view – the wide panorama of vegetated ridgelines.	Moderate-low

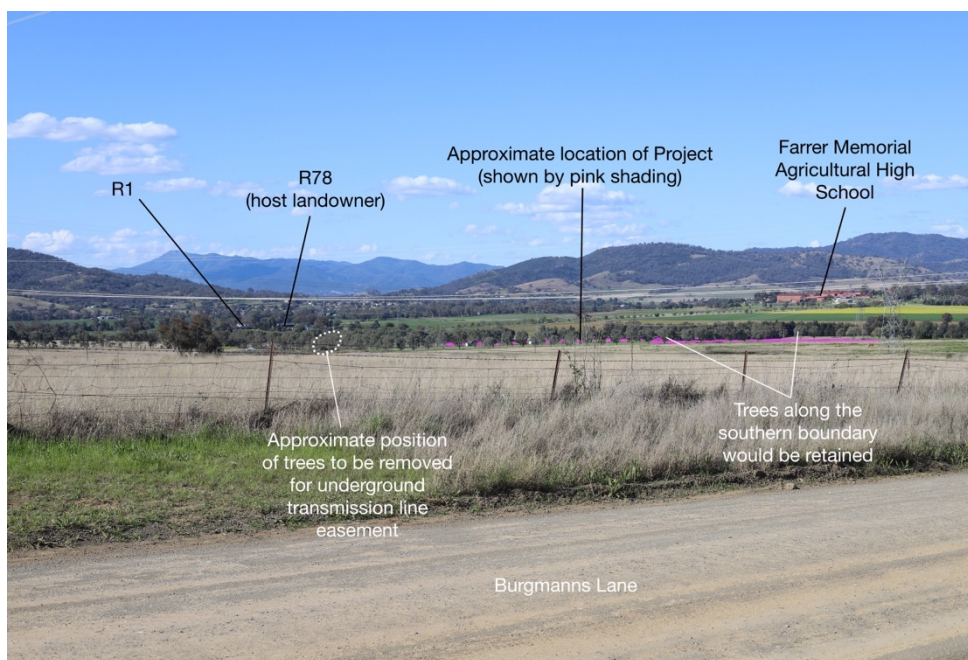


Figure 5-9: View looking north-east toward Project Site from Burgmanns Lane (nearest public viewpoint to R12)

Viewpoint	Existing sensitivity	Magnitude Of Change	Rating of Visual Impact
General Residential Zone, Burgess Lane. A photograph looking west toward the General Residential Zone from the Project site is shown in Figure 5-10. From publicly accessible locations near the General Residential Zone, it was not possible to view the Project site.	Low: - A cluster of residences located adjacent Burgess Lane, around 650 m from the development footprint. - The Project site is not readily visible from the residences. - Most views are screened by existing vegetation and buildings along the eastern side of Burgess Lane.	Low: - The Project is unlikely to be visible, or a small proportion would be visible, if at all. - Most vegetation in the landscape would be retained, screening most views from ground level. - There would be little real change to the perception of the view.	Low



Figure 5-10: View looking west toward the General Residential Zone from the Project Site

Viewpoint	Existing sensitivity	Magnitude Of Change	Rating of Visual Impact
Large Lot Residential Zone A photograph of an existing view toward the Project site from a representative viewpoint on Pinstripe Road within the Large Lot Residential Zone, is shown in Figure 5-11 .	Low: - A cluster of elevated residences on the western side of Burgess Lane, around 750 m from the Project site. - Views are wide, focusing on the background vegetated ridgelines and mid-ground agricultural pastures. - The Project site is mostly screened by vegetation.	Low: - The Project would occupy a relatively small proportion of the view. - It would not detract from the existing visual focus – the wide panorama of vegetated ridgelines. - It would be mostly screened by existing trees to be retained.	Low

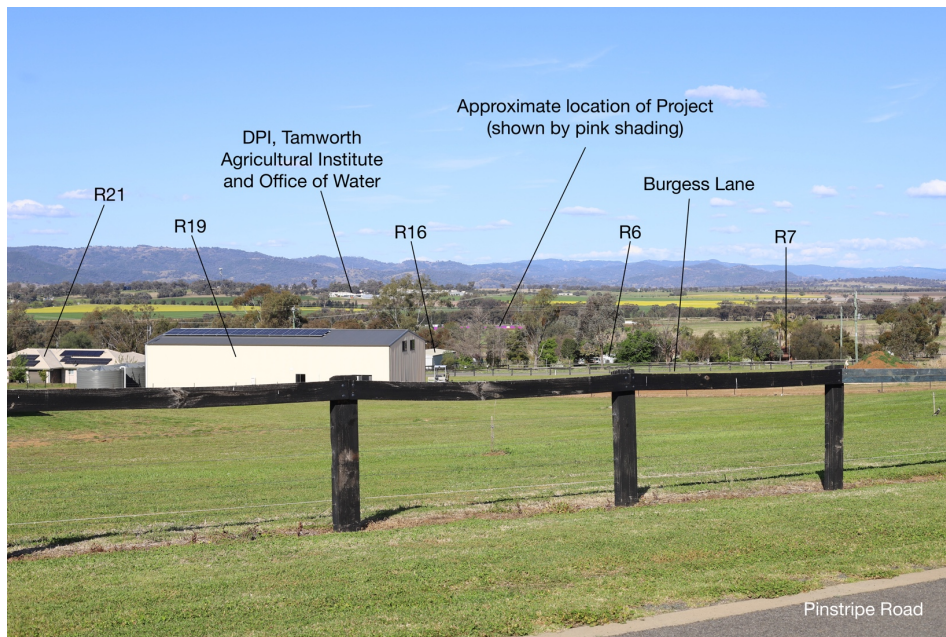


Figure 5-11: View looking east toward Project site from Large Lot Residential representative viewpoint

Viewpoint	Existing sensitivity	Magnitude Of Change	Rating of Visual Impact
Nemingha/East Tamworth. Single elevated homes and clusters of elevated residences on the southern side of A15/B56 road corridor. A photograph looking toward these residential areas from the Project site is shown Figure 5-12 . Additional elevated Nemingha residences are shown in Figure 5-4 .	Low: - Viewing distance is over 2.5 km from the proposed development footprint. - The Project site would be at least partially visible, from some residences, although the view down to the Project site is not the primary focus. - Views would be wide and include numerous transmission lines and towers, as well as the large institutional buildings.	Low: - The Project would result in an additional large-scale built feature in the view, but not detract from the focus of the view – the wide panorama of vegetated ridgelines. - The Project would occupy a relatively small proportion of the view, and be partially screened by existing trees.	Low



Figure 5-12: View looking north from Project site toward elevated residential areas of Nemingha and East Tamworth

Viewpoint	Existing sensitivity	Magnitude Of Change	Rating of Visual Impact
Calala Lane A photograph of an existing view from Calala Lane looking toward the Project site while travelling toward Tamworth (viewpoint a) is shown in Figure 5-13. A photograph of an existing view from Calala Lane looking toward the Project site while travelling away from Tamworth (viewpoint b) is shown in Figure 5-14.	Low: - The public road corridor is around 480 m from the Project site, and accessed by a relatively large number of local residents who would use the road frequently. - The road is not a scenic corridor or primary tourism route, and is affected by views of existing transmission towers. - The road provides temporary, brief views for travellers moving west and east along the road corridor. - There are some open views of the Project site when travelling west, partially screened by existing trees. The view of the Project site when travelling east is largely screened by existing vegetation.	Low to moderate: - Travelling west along Calala Lane would provide the most exposed view of the Project. - The Project would be evident; however, it would be viewed for a very brief period while in transit, and affect a relatively small proportion of the total linear view available from the road. - Views of the substation would generally fit within the visual context of transmission towers. - Viewed from the east, the BESS storage units would be screened by the noise attenuation wall. The likely grey muted colour of the noise attenuation wall would decrease its visibility, and it would not greatly contrast the background landscape. It would also be partly screened by existing trees to be retained. - Viewed from the west, the BESS storage units would not be screened by the noise attenuation wall or proposed landscaping. The BESS units would be the most visible component of the Project.	Low

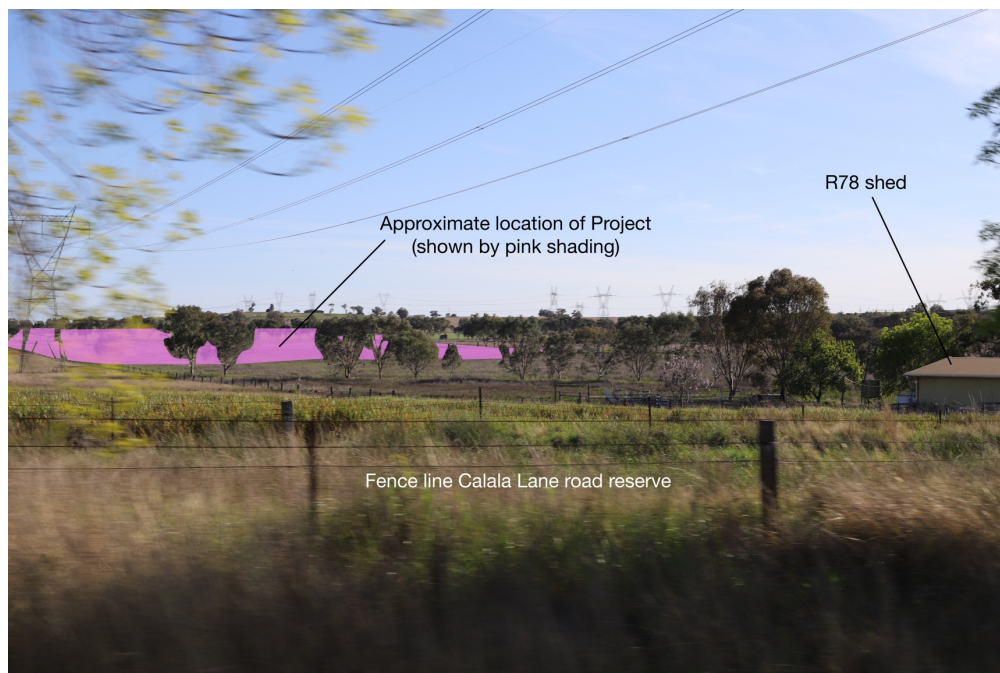


Figure 5-13: View from Calala Lane, looking south-west toward the Project site (viewpoint a)



Figure 5-14: View from Calala Lane, looking south toward the Project site (viewpoint b)

Viewpoint	Existing sensitivity	Magnitude Of Change	Rating of Visual Impact
Burgess Lane A photograph of an existing view toward the Project site from Burgess Lane is shown at Figure 5-5 .	Low: - The road is unsealed, and at least 600 m from the development footprint. - Public views toward the Project site are available for the relatively small number of local residents who would access the road. - The view toward the Project site is temporary and brief.	Low: - The Project would occupy a relatively small proportion of the view. - The Project would be visible for brief periods while in transit. - The Project would be, at least partially, screened by vegetation.	Low

Viewpoint	Existing sensitivity	Magnitude Of Change	Rating of Visual Impact
Burgmanns Lane A photograph of an existing view toward the Project site from Burgmanns Lane is shown at Figure 5-9 .	Low: - The road is unsealed and at least 540 m from the development footprint. - Public views toward the Project site are available for the relatively small number of local residents who would access the road. - The view toward the Project site is temporary and brief.	Low: - The Project would occupy a relatively small proportion of the view. - The Project would be visible for brief periods while in transit. - The Project would be, at least partially, screened by vegetation.	Low

Viewpoint	Existing sensitivity	Magnitude Of Change	Rating of Visual Impact
Institutional facilities: Farrer Memorial Agricultural High School, NSW Department of Primary Industries, Tamworth agricultural Institute and NSW Office of Water. A photograph of an existing view toward the Project site from Farrer Memorial Agricultural High School is shown at Figure 5-15.	Low: - The institutional buildings are elevated and over 1.2 km east of the Project. They would have at least a partial view over the Project site. - The buildings are temporarily occupied by relatively large number of workers and students. However, the view is incidental to the purpose of being at the facility. The buildings have not been designed for, or focus on, the view. - The existing view includes transmission towers and lines.	Low: - The Project would be partially screened by existing trees. - The substation would not greatly contrast the background landscape. - The BESS units would be the most visible component, however, they would be coloured a matt grey (or other rural landscape colour) to reduce their contrast with the surrounding landscape, and would not adversely affect the outlook from the buildings.	Low



Figure 5-15: View from Farrer Memorial High School looking south-east toward the Project site

Viewpoint	Existing sensitivity	Magnitude Of Change	Rating of Visual Impact
Flagstaff Mountain Lookout	Low: - Flagstaff Mountain Lookout would be accessed by a relatively small number of residents, walking the 'challenging' Kamilaroi Walking Track. The lookout is only accessible by walking the approximately 2 hours (5 km) track from Endeavour Drive, East Tamworth. - Its possible there could be views of the site, as people hike to and from the lookout. However, from investigating publicly available photographs taken at the summit, the Project site does not appear to be within view. - Viewing distance is over 5 km from the Project. - Views available are wide and include existing energy infrastructure, transmission towers and lines.	Low: - If it was visible, the Project would occupy a very small area within view and result in a minor change to the view overall. - It would not affect the focus of the view or be particularly conspicuous (attracting attention). - It would be partially screened by intervening vegetation.	Low

5.4 Summary of visual impact

A summary of assessment findings is presented in Table 5-2 and shows the highest visual impact would be experienced by residents of four homes located on larger properties within a kilometre of the Project (R1, R8, R9 and R12).

Table 5-2: Summary of visual impact to viewpoints

Viewpoint	Sensitivity	Magnitude	Assessed visual impact
R1: Private residence (Calala Lane)	Moderate	Low	Moderate-low
R8: Private residence (Burgess Lane eastern side) ³	Moderate	Low	Moderate-low
R9: Private residence (Burgmanns Lane northern side)	Moderate	Moderate	Moderate
R12: Private residence (Burgmanns Lane southern side)	Moderate	Low	Moderate-low
General Residential Zone	Low	Low	Low
Large Lot Residential Zone	Low	Low	Low
Nemingha / East Tamworth	Low	Low	Low
Calala Lane	Low	Low	Low
Burgess Lane	Low	Low	Low
Burgmanns Lane	Low	Low	Low
Institutional Facilities	Low	Low	Low
Flagstaff Mountain Lookout	Low	Low	Low

The assessed impact to R9 was the highest at 'moderate'. R9 is one of the closest residences to the Project (around 450 m away), and has an elevated, and likely relatively clear view across the Project site. Exposure to the proposal would be obscured partially by existing trees along the southern boundary to be retained, however, views of the substation and BESS would be possible beyond the trees, changing the outlook from R9. Background vegetation and existing infrastructure in the landscape would reduce contrast and conspicuousness of the proposal.

From R1, R8 and R12 (assessed as 'moderate-low'), the Project would likely be visible to some extent, however, would be less of a focus of within the view - being either a smaller component within the wider view available (R1 and R12), or being filtered by intervening trees (R8).

The remaining viewpoints were assessed as 'low':

- A small number of General Residential Zone homes around 650 m from the Project on Burgess Lane and elevated Large Lot Residential homes around 750 m from the Project to the west. From these residences, the Project would be mostly obscured by intervening vegetation and buildings, and not prominent in the view.
- Elevated Nemingha and East Tamworth residences over 2 km away, north of the A15/B56 road corridor. Views from these residences are wide. The Project site would occupy a small area within the view, and visibility would be limited by existing, intervening vegetation.
- Calala Lane, Burgess Lane and Burgmanns Lane (around 450 m - 550 m away). The view from these public roads constantly changes with movement. The view toward the Project, is temporary, limited by existing vegetation, and affected by existing transmission lines and towers.
- Institutional facilities to the east (Department of Primary Industries, Tamworth Agricultural Institute, Office of Water and Farrer Memorial Agricultural High School). Views from these work/school-based buildings are not considered visually sensitive. The view of the Project would be at least partially screened by existing vegetation and affected by existing transmission lines and towers.

³ Note that R8 is representative of other residences on the eastern side of Burgess Lane. Even though views from the other Burgess Lane residences were not identified during the site inspection, it is possible some residents have a view through to the Project site, particularly if vegetation close to the residences is removed.

6.1 Dark Sky Planning Guidelines

The NSW Dark Sky Planning Guideline (Department of Planning and Environment, June 2023) provides guidance to manage light in the 'Dark Sky Region' of NSW. The 'Dark Sky Region' is centred upon the site of Australia's most important visible-light Observatory at Siding Spring, located on the edge of the Warrumbungle National Park. Operation of the Observatory is dependent on the dark night sky being free from light pollution.

The *Dark Sky Planning Guideline* informs development controls that apply to land within the local government areas of Coonamble, Dubbo Regional, Gilgandra and Warrumbungle, and the assessment of significant development within 200 km of the Siding Spring Observatory. The Observatory is around 180 km to the west of the Project site, therefore, the guideline applies to the Project.

The Guideline provides technical information on good lighting design, use of shielded, downward facing and site appropriate lighting.

6.2 Existing lighting

There is no lighting associated with current rural activities at the existing Project site. Agriculture, generally, emits low levels of light into the atmosphere and has minimal impact on levels of artificial skyglow⁴⁵.

Surrounding the Project site, however, is urban development, including residences, street lighting, sports fields (at Farrer Memorial Agricultural High School) and commercial buildings. Lighting associated with the surrounding area and its night-time use, would potentially have a significant effect on the existing level of artificial skyglow⁶.

6.3 Lighting associated with the Project

The Project is not a major light-generating activity. The Project would have minimal lighting and would not change the night-time appearance of the existing night sky. Illuminated signage, gas flares and other major light emitting activities (such as mining and extractive industries) are not associated with the Project.

Although lighting would be installed, the Project would NOT be lit at night. All permanent external lighting:

- Would be low intensity lighting (except where required for safety or emergency purposes)
- Would not shine above the horizontal, and
- Would comply with Australian/New Zealand Standard AS/NZS 4282:2019 – *Control of Obtrusive Effects of Outdoor Lighting* and principles of the *Dark Sky Planning Guideline*.

During commissioning, temporary targeted lighting would be used at the location of specific BESS storage units and inverters, and not light the whole site. This temporary lighting would be shielded and directed toward the work area.

During operation:

- The BESS would not be lit at night, and workers would not attend the site at night except in emergency or security situations. There would be no permanent night lighting installed within the BESS.

⁴ p11, *Dark Sky Planning Guideline*, 2023. Artificial skyglow is the brightness of the night sky created by light from human-made sources.

⁵ p12, *Dark Sky Planning Guideline*, 2023. Many activities associated with agriculture in the surrounding rural area, including grazing livestock and producing crops, generally emit only low levels of light into the atmosphere and have a minimal impact on levels of artificial skyglow.

⁶ p12, *Dark Sky Planning Guideline*, 2023. Urban development, including sports fields, industrial and commercial buildings, housing, advertising signage and street lights, has a significant effect on the level of artificial skyglow.

- Lighting would be installed at each inverter station but would not be in use at night, unless required for emergency purposes. Inverter maintenance would occur during the day.
- Lighting would be installed at the substation for security and maintenance purposes. The lighting is expected to only be used during emergencies, or for security purposes.

Lighting design principles based on the *Dark Sky Planning Guideline*, are included in mitigation measures in [SECTION 7](#).

7.1 Purpose

Mitigation is recommended to reduce the visual impact of the Project to views. Although there are very few existing residences that would see the Project, community concerns regarding the Project's visual impact have been raised. A summary of community concerns is provided in [Section 7.2](#).

7.2 Community visual concerns

Visual impact was raised as an issue of potential concern by residents during community engagement arranged by the Proponent, which included a Project mailout (September 2022), doorknocking (October 2022), a community information session (held 14 December 2022), online survey, one-on-one meetings, phone calls and emails.

Visual concerns were raised by 5 of the 14 neighbouring landholders during community engagement. Residents noted that the existing rural residential character and peaceful outlook were valued. They did not want their rural outlook to be adversely affected "by looking at ugly batteries or cement walls".

7.3 Recommended mitigation measures

Mitigation measures are recommended to reduce the visual impact of the Project and are listed in [Table 7-1](#). Measures include perimeter landscaping, colour recommendations, and implementation of lighting design principles.

Table 7-1: Mitigation measures

Intent	Timing	Measure
Avoid night sky impacts	Design	- Design and install lighting to follow good lighting design principles identified within the <i>Dark Sky Planning Guidelines</i>⁷: 1. Light must have a clear purpose 2. Eliminate upward spill light 3. Direct light downward, not upwards, and avoid light trespass 4. Use shielded fittings 5. Avoid excess lighting 6. Switch lights off when not needed 7. Use energy efficient bulbs 8. Use asymmetric beams 9. Direct lights away from reflective surfaces 10. Use warm white colours.
	Construction	- Ensure all lights are turned off before vacating the construction site at the end of the day. - Lighting to be installed in accordance with <i>AS4228-1997 - Control of Obtrusive Effects of Outdoor Lighting</i>.
	Operation	- Switch lights off when not required. - Ensure lights are only used in exceptional circumstances – emergency or security situations.
Reduce visibility and contrast of Project in the landscape	Design	- If possible, test noise wall colour selection prior to implementing across the site for visual compatibility and minimal contrast. Assess colours as they would be seen from the most affected viewpoints to determine which colour is more effective blending with the background. - Do not install highly reflective materials. Treat the BESS and ancillary components with a non-reflective finish. - Do not paint Project components white unless there is a safety or functional requirement to do so. White is generally the most conspicuous colour. Lighter colours should be avoided. - Specify substation to have a low-reflectivity, neutral colour finish. Insulators at substations should be non-reflective and non-refractive. - Use semi-gloss or matt finish throughout the Project, rather than gloss finish. - Surrounding chain mesh fence should have a dulled finish to reduce contrast.

⁷ Section 4.1, New South Wales Department of Planning & Environment, *The Dark Sky Planning Guideline*, 2023

Intent	Timing	Measure
		- Keep non-reflective finishes and colour-treated coatings in good repair. Reapply if the surface is subject to fading or flaking.
	Construction	- Keep site tidy and neat. - If soils are disturbed (e.g., during the construction of internal roads or due to wear and tear of surfaces from vehicle movement), introduce wind erosion controls to reduce the potential for dust: • bring water cart to site and water exposed surfaces • avoid ground disturbance on high wind days - cover stockpiles of loose materials (if any).
	Operation	- Do not install commercial messages or large-scale signage at the Project entrance on Calala Lane. Signage (if required) should be of sufficient size to contain only information sufficient for the basic facility and company identification, for safety, navigation, and delivery purposes.
Minimise impact to existing landscape character and retain existing screening vegetation	Design	- Ensure the design maximizes tree retention within the Project site. - Realign chain mesh fence along the southern boundary of the development footprint avoiding existing trees, or select an installation technique that would have minimal impact on root zone to enable retention of existing trees.
	Construction	- Protect existing trees (that are to be retained) during construction activities to prevent damage from vehicle movements, stockpiling, and construction activities.
Enhance screening of Project	Design	- Include perimeter screen planting around the development footprint along the northern and western boundaries. - A concept landscape plan has been provided (refer to Section 7.4). - Where perimeter screening planting has not been feasible (along the eastern and southern development footprint boundaries due to safety and maintenance concerns) discuss screening alternatives with the most affected residents, such as planting within their property, or close to their residence, to filter views. - Prepare a detailed landscape plan that is informed by consultation with local land care and Council, to ensure appropriateness of species planting strategy.

7.4 Concept landscape plan

Perimeter planting around the BESS development footprint is recommended to reduce visibility of the Project. A concept landscape plan for the Project is provided at [Figure 7-1](#). The concept landscape plan outlines the intended planting strategy to establish a quick growing dense screen along the northern and western boundaries of the development footprint, and includes a draft planting schedule (list of appropriate plant species), planting guide and ongoing management.

It has not been feasible to propose perimeter planting along the southern and eastern boundaries of the development footprint, or along the existing transmission line easement, due to safety and maintenance concerns.

A detailed landscape plan would be prepared in a later detailed design stage.

7.5 Detailed landscape plan

Following project approval, and prior to landscape implementation, a detailed landscape plan would be prepared which would refine the concepts presented in the concept landscape plan. It is recommended that the detailed landscape plan be prepared with input from local Landcare and Council. Final species selection, ratio/rate of planting, location and width of planting, and other information presented in the concept landscape plan may vary depending on future advice, the Project construction program and plant availability at the time.

The detailed landscape plan is to include a landscape maintenance plan for the operational period of the Project, to ensure proposed landscaping achieves, and continues to achieve, intended outcomes. The maintenance plan is to include:

- A defined initial establishment period of a minimum of 18 months.
- A schedule for monitoring planting areas and watering during the establishment period.
- Ongoing maintenance practices during and post establishment (such as a weeding/mulching regime).
- Guidance for replacement planting (for plants that fail to thrive).

Figure 7-1
Concept landscape plan

PROPOSED CALALA BATTERY ENERGY STORAGE SYSTEM
LANDSCAPE CHARACTER AND VISUAL IMPACT ASSESSMENT



Proposed visual change

The Project would result in the installation of multiple BESS storage units (around 2.8 m high), with associated site buildings (around 4.1 m high), and substation (with tall narrow components such as transformers around 9m high and lightning masts around 25 m). The BESS facility would include a noise attenuation wall, around 130 m long and 4 m high along the northern boundary; around 300 m long and 5 m high along the western boundary, and a short 4 m high section around the substation. A 3 m high chain mesh fence would be installed along the Project northern, eastern and western boundary of the development footprint.

The Project would require the removal of planted native trees within the development footprint, new site access road, and transmission line easement. Additional transmission poles/towers are not proposed. The BESS connection to the existing 330 kV Transgrid Tamworth Substation would be underground.

Landscape screening is proposed along the northern and western sides of the Project to screen the noise attenuation wall. Landscaping along the southern and eastern sides of the Project was not possible due to safety and maintenance concerns.

Landscape character impact

The landscape comprises rural pastures and a background of surrounding ridgelines. It also includes numerous transmission towers, an existing substation, large institutional facilities and dense residential development.

The Project would occupy a relatively large footprint, however, be located mostly on relatively low-lying land, and result in minimal change to landform. The proposed tree removal would affect a feature typical of the landscape and increase exposure of the site. The proposed muted grey colouring of most Project components and density of remaining trees in the landscape, are expected to reduce the contrast and conspicuousness of the Project.

The assessment determined that the impact of the Project on landscape character would be **moderate-low**.

Impact on views

The proposed Project site has relatively low visibility, limited by landform and vegetation, and is within an existing energy landscape (that is, there is existing energy infrastructure including multiple transmission towers in the vicinity). However, the location is visually sensitive, being around 450 m to the closest existing residences and around 700 m from new residential estates (zoned R1 General Residential and R5 Large Lot Residential).

Most residential viewers are located on the western side of the Project. The BESS storage units would be screened from western viewpoints by the proposed noise attenuation wall, which in turn would be partially screened by existing trees within the landscape. Proposed landscaping along the western side of the Project would enhance screening of the noise wall over time.

The proposed substation and BESS storage units would be more visible to elevated residential viewers to the south of the Project. The BESS storage units would also be the most visible component of the Project viewed from the main public view (Calala Lane travelling west). Screen planting was not possible along the southern or eastern side of the Project to screen the view from these viewpoints.

Twelve representative residential and non-residential viewpoints were identified for assessment - having at least partial visibility to the Project. A summary of assessment findings is presented in [Table 8-1](#).

The highest visual impact '**moderate**' was predicted for one residence (R9). It is one of the closest residences, located south of the Project, and has an elevated view. Following installation of the Project, the view would include the proposed chain mesh fence along the southern Project boundary, and taller substation components. Some parts of the BESS may be visible; however, it would be largely screened by existing trees to be retained. The outlook would noticeably change, at least initially. A '**moderate-low**' impact was predicted for three other nearby residents (R1, R8 and R12). From these residences, the Project would likely be visible to some extent, however, would be less of a focus of within the view - being either a smaller component within the wider view available (R1 and R12), or being filtered by intervening trees (R8).

The remaining viewpoints were assessed as having a '**low**' visual impact, including Calala Lane which is the most impacted public viewpoint. The Project would be visible to Calala Lane road users travelling west for a brief period (while in transit) and would be viewed in its energy landscape context (adjacent existing transmission towers).

Table 8-1: Summary of visual impact to viewpoints

Viewpoint	Sensitivity	Magnitude	Assessed visual impact
R1: Private residence	Moderate	Low	Moderate-low
R8: Private residence	Moderate	Low	Moderate-low
R9: Private residence,	Moderate	Moderate	Moderate
R12: Private residence	Moderate	Low	Moderate-low
General Residential Zone	Low	Low	Low
Large Lot Residential Zone	Low	Low	Low
Nemingha / East Tamworth	Low	Low	Low
Calala Lane	Low	Low	Low
Burgess Lane	Low	Low	Low
Burgmanns Lane	Low	Low	Low
Institutional Facilities	Low	Low	Low
Flagstaff Mountain Lookout	Low	Low	Low

Lighting

There is minimal lighting associated with the Project. The Project would not be lit at night, except for security or emergency purposes. Lighting installed would comply with Australian/New Zealand Standard AS/NZS 4282:2019 – *Control of Obtrusive Effects of Outdoor Lighting* and principles of the *Dark Sky Planning Guideline*.

There would be no changes to the night-time appearance of the vicinity due to the Project.

Mitigation

Mitigation has been recommended to reduce the visual impact of the Project to views, particularly views of the noise attenuation wall. Measures include perimeter landscaping (along the northern and western boundaries, colour recommendations, and implementation of lighting design principles.

Biosis, 2023, *Calala Battery Energy Storage System, Calala (SSD – 52786213): Aboriginal Cultural Heritage Assessment*

Biosis, 2023, *Calala Battery Energy Storage System, Calala (SSD – 52786213): Historical Archaeological Impact Statement*

Biosis, 2023, *Calala Battery Energy Storage System, Calala (SSD-52786213): Archaeological Report*

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Tamworth Regional Local Environmental Plan 2010

Thorvaldson, F. *Characteristic Landscape and Visual Landscape Regions of New South Wales*. In *Landscape Australia* 4/1996. p319

Transport for NSW, 2020, *Guideline for Landscape Character and Visual Impact Assessment, Environmental Impact Assessment Practice Note EIA-N04*