



Bungaban Renewable Energy Project

Landscape & Visual Impact Assessment



We at Moir Studio acknowledge the traditional custodians of the lands and waters of Australia - most notably the Awabakal Nation in which our office resides and the Auburn Hawkwood People and the Iman People, on whose traditional land this Project resides. As a practice, we recognise First Nations' ongoing contribution to Country and deep spiritual connection to Place. We pay our respects to Elders both past and present.

Bungaban Renewable Energy Project

Landscape & Visual Impact Assessment

Prepared for
ERM

Project Number
2510

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A	14/10/2024	CA NL	JR AR	Draft LVIA Report
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Executive Summary

ERM has commissioned Moir Studio on behalf of Bungaban Renewable Energy Farm Pty Ltd (the Proponent), to prepare a Landscape and Visual Impact Assessment (LVIA) for the proposed Bungaban Renewable Energy Project (the Project), which is proposed on the traditional lands of the Auburn Hawkwood People and the Iman People, approximately 35 km northeast of Wandoan and 55 km southeast of Taroom in Queensland. The Project is located in Western Downs Regional Council and Banana Shire Council, and includes up to 204 wind turbine generators (WTGs) with an anticipated maximum tip height of 300 m.

In addition to the WTGs, ancillary infrastructure including access tracks, transmission lines, underground cabling, substations, Battery Energy Storage Systems (BESS), meteorological masts, communication towers and central operational and maintenance facilities (O&M) have been assessed in this LVIA.

Moir Studio have utilised a quantitative study methodology with regards to the *State Code 23: Wind Farm Development 2024*. Other relevant literature and guidelines such as the *AILA Guidance Note for Landscape and Visual Impact Assessment June 2018*, *Draft National Wind Farm Development Guidelines July 2010*, *Western Downs Regional Planning Scheme 2017* and the *Banana Shire Planning Scheme 2021*. Moir Studio's previous experience on large scale renewable infrastructure projects has also been considered in the Study Method.

Field work was undertaken by Moir Studio in September 2024 to determine the existing landscape character against which the Project has been assessed. The assessment determined the regional landscape character is typical of the Barakula and Banana-Auburn Ranges subregion of the Brigalow Belt Interim Biogeographic Regionalisation for Australia (IBRA) Bioregion.

Land in the area is predominantly utilised for cattle grazing, with some areas managed for resource attraction (production forestry).

The landscape was categorised into three (3) Landscape Character Units (LCUs). A quantitative frame of reference was applied to establish the Scenic Quality Rating of these LCUs which ranged from Low to Moderate.

The visual impact of a wind energy project will depend upon the characteristics and values of the existing landscape, the extent to which the existing landscape is changed by the Project and how these changes are perceived by individuals and the broader community. The assessment identified the key landscape features and viewpoints within the Study Area.

Key features which form a part of the existing landscape character assist in reducing the potential for viewing the Project. These include large areas of vegetation associated with State Forests and grazing paddocks, undulating topography, roadside vegetation and riparian vegetation associated with river and creek lines. The assessment of the potential impacts to the broader landscape character found that the Project could be undertaken whilst maintaining the key visual features and character of the landscape.

A detailed assessment was undertaken for a total of 11 public viewpoint locations. The assessment identified:

- Two (2) viewpoints have a NEGLIGIBLE visual impact
- Seven (7) viewpoints have a LOW visual impact
- One (1) viewpoint has a MODERATE-LOW visual impact
- One (1) viewpoint has a MODERATE visual impact

A total of seven (7) photomontages were prepared to illustrate the potential visual impacts from representative public viewpoint locations. The photomontages revealed that the potential visual impact is limited to areas in close proximity to the Project.

A visual catchment was defined based on the vertical field of view. Visibility of the Project varied with distance and visual angle, impacting its dominance in the landscape. The study area extends up to 17.2 km for assessing visual impact, considering topography and existing landscape, with WTGs noticeable up to 6.9 km away.

An assessment was undertaken to assess potential shadow flicker at existing and proposed land uses surrounding the Project in accordance with State Code 23: Wind Farm Development 2022 (SC23).

No non-associated dwellings were identified with potential shadow flicker hours as the distance between the nearest dwelling exceeds the maximum extent of shadows from the turbines. Therefore, the potential shadow flicker at all non-associated dwellings is at an acceptable level as per SC23 PO14.

Practical and feasible mitigation measures have been proposed for each of the non-associated dwellings with a moderate or high visual impact rating to reduce the potential visibility of the Project from the surrounding dwellings whilst maintaining key views, preserving the landscape character and the scenic quality of the area. Mitigation measures in keeping with the existing character include screen planting and supplementary planting of existing vegetation.

The existing landscape has the ability to absorb the Project with a relatively low degree of visual impact. With the implementation of the proposed mitigation where advised, the Project could be undertaken to maintain the landscape character of this area. In this regard, the Project satisfies the performance objectives outlined under SC 23 (PO14 and PO16).

Contents

1.0 Introduction	10	5.0 Existing Landscape Character	30	8.4 Results of Shadow Flicker Assessment on Road Users	88
1.1 Background	10	5.1 Existing Landscape Character Analysis	30	9.0 Associated Infrastructure	90
1.2 Relevant Experience	10	5.2 Regional Landscape Character	30	9.1 Overview of Associated Infrastructure	90
2.0 Study Method	12	5.3 Land Use	32	10.0 Nightlighting Assessment	93
2.1 Overview of the Study Method	12	5.4 Key Landscape Features	34	10.1 Overview of Aviation Hazard Lighting	93
2.2 Relevant Guidelines and Framework	12	5.5 Landscape Character Units (LCUs)	36	10.2 Aviation Hazard Lighting	93
2.3 Guideline and Legislative Framework	13	6.0 Viewpoint Analysis	42	10.3 Nightlighting Impacts	95
2.4 Report Structure	16	6.1 Viewpoint Analysis Methodology	42	10.4 Mitigation Recommendations	95
3.0 Project Overview	18	6.2 Viewpoint Selection Process	42	11.0 Mitigation Measures	97
3.1 Regional Context	18	6.3 Viewpoint Analysis Methodology	42	11.1 Overview of Mitigation Methods	97
3.2 The Project Site & Project Layout	18	6.4 Summary of Viewpoint Analysis	43	11.2 Project Layout and Design	97
3.3 The Project	19	6.5 Overview of Visual Impacts on LCUs	56	11.3 Off-site Screen Planting	98
3.4 Wind Turbine Design	21	6.6 Performance Objectives	57	12.0 Summary	100
4.0 Visual Catchment	23	7.0 Photomontages	59	12.1 Summary	100
4.1 Defining Visual Catchment	23	7.1 Overview of Photomontages	59		
4.2 Visual Catchment & Study Area Thresholds	25	7.2 Photomontage Selection Process	59		
4.3 Zone of Visual Influence	27	7.3 Photomontage Development Methodology	60		
4.4 Zone of Visual Influence Summary	27	8.0 Shadow Flicker Assessment	86		
		8.1 Overview of Shadow Flicker	86		
		8.2 Shadow Flicker Assessment Methodology	86		
		8.3 Results of Shadow Flicker Assessment on Dwellings	88		

Figures

Figure 01	Regional Context	10
Figure 02	Landscape & Visual Impact Assessment Process	12
Figure 03	High Landscape Value Areas	14
Figure 04	Landscape Types	15
Figure 05	Bioregion Location	18
Figure 06	Project Layout	20
Figure 07	Wind Turbine Parameters	21
Figure 08	Human Eye Vertical Line of Sight	23
Figure 09	Vertical Field of View and Potential Visual Dominance	24
Figure 10	Study Area	26
Figure 11	Zone of Visual Influence	28
Figure 12	Sub Bioregions	31
Figure 13	Land Use	33
Figure 14	Key Landscape Features	35
Figure 15	Landscape Character Units	37
Figure 16	Viewpoint Analysis Methodology	42
Figure 17	Viewpoint Locations	44
Figure 18	Photomontage Development	60
Figure 19	Photomontage Locations	61
Figure 20	Shadow Flicker Assessment	87
Figure 21	Recommended Light Shielding to reduce light spreading	95

Tables

Table 01	Key Landscape Assessment Requirements	14
Table 02	Report Structure	16
Table 03	WTG Dimensions for Visual Assessment	21
Table 04	Potential Visual Dominance based on Distance	23
Table 05	Visual Dominance for the Project	25
Table 06	Scenic Quality Frame of Reference	36
Table 07	LCU01 - Agricultural Pastures	38
Table 08	LCU02 - Watercourse Corridors	39
Table 09	LCU03 - State Forests & Vegetated Hills	40
Table 10	Visual Impact Rating	43
Table 11	Results of the Viewpoint Analysis	43
Table 12	Overview of Visual Impacts on LCUs	56
Table 13	Performance Objectives (Western Downs - HLV Area)	57

Images

Image 01	Typical WTG	19
Image 03	Typical O&M Facility	19
Image 05	Typical Singluar BESS Unit	19
Image 02	Typical 33kV Transmission Line	19
Image 04	Typical Transmission Tower	19
Image 06	Typical Substation	19
Image 07	WTGs located at 2 km	24
Image 09	WTGs located at 6 km	24
Image 08	WTGs located at 4 km	24
Image 10	WTGs located beyond 6 km	24
Image 11	Typical gently undulating topography within the Study Area	34
Image 12	Aerial view of Cockatoo Creek	34
Image 13	Typical vegetation character in the Study Area	34
Image 15	Cleared agricultural land from Ponty Pool Road	38
Image 14	Aerial view of agricultural pastures	38
Image 17	Vegetation aligning Johnsons Creek	39
Image 16	View of dry creek bed at Roche Creek	39
Image 18	Vegetation aligning Auburn River	39
Image 20	View toward Barakula State Forest from Roche Creek Road	40
Image 19	Aerial view of Warranna State Forest	40
Image 21	Example of shadow flicker at base of a WTG	86
Image 22	2 km from WTG (30 minutes after sunset)	93
Image 23	1.75 km from WTG (45 minutes after sunset)	93
Image 24	1.85 km from WTG (60 minutes after sunset)	93
Image 25	View toward BWF - 3.5 km from WTG	94
Image 26	View at night toward BWF - 3.5 km from WTG	94
Image 27	View toward BWF - 8.5 km from WTG	94
Image 28	View at night toward BWF - 8.5 km from WTG	94

Glossary & Terminology

Associated Dwelling

A landholder who has reached an agreement with the Applicant in relation to the Project but will not host project related infrastructure on their land

Associated Infrastructure

All the supporting structures, systems, and facilities that are necessary for the wind farm to operate effectively

Bioregion

An ecologically and geographically defined area characterised by its combination of geological features, climate, flora, and fauna.

Geographical Information Systems (GIS)

A system that captures, stores, analyses, manages and present data link to specific locations. This spatial data is linked to a digital database.

Land Use

The way the existing land is utilised, including but not limited to residential, commercial, industrial, agricultural, or conservation purposes.

Landscape and Visual Impact Assessment (LVIA)

A technical assessment to identify and assess the potential visual effects resulting from the Project on the landscape, individual receivers and on the overall visual amenity of the region in which the Project is sited.

Landscape

All the visible features, including landform, vegetation, buildings and infrastructure, contained within a holistic area.

Landscape Character

Landscape character refers to the distinct and recognisable pattern of physical elements that occur consistently in a particular landscape. The landscape character of an area is generally defined by the most dominant landscape element or unique combination of elements that occur within that landscape. It reflects how particular combinations of geology, landforms, soils, vegetation, land use and human settlements create a particular sense of place for different areas within the landscape.

Landscape Character Units

An area of landscape with similar properties or strongly defined spatial qualities that are distinct from areas immediately nearby within the Study Area.

Landscape Values

The qualities and attributes of a landscape that contribute to its overall visual, aesthetic, cultural, and environmental significance.

Local Government Area (LGA)

An administrative division of local governance and planning.

Mitigation Measures

Potential strategies or actions implemented to minimise or offset the adverse visual impacts of the Project.

Non-Associated Dwelling

A dwelling owned by a non-associated landholder

Photographic Survey & Fieldwork

A systematic process of collecting visual data in the form of photographs and surveys taken from various viewpoints within the Study Area to document the existing visual conditions.

Planning Scheme

A regulatory document that establishes the framework for land use, development, and infrastructure within a specific Local Government Area (LGA). It provides detailed guidance, rules, and standards designed to manage growth, safeguard the environment, and promote the orderly and sustainable development of communities.

Project Area

The lots on which the Project is situated.

Proponent

The party (i.e. Windlab) proposing the development

Sensitive Receptors

A point or area likely to experience a greater extent of visibility of the Project.

State Code

A set of statutory guidelines or standards that provide specific requirements, criteria, and assessment benchmarks for development applications. These codes are part of the broader planning framework used to ensure that development aligns with the state's planning policies, environmental objectives, and community expectations.

Strategic Plan Map

A visual representation within a planning scheme that depicts the long-term vision and policy direction for the future development of a Local Government Area (LGA).

Study Area

The geographical region or area under consideration in the preparation of a LVIA or VIA assessment.

Viewpoint

A specific location from which a view or landscape is observed. A viewpoint location is the geographic location or physical position (in GPS format) where the viewpoint was captured.

Visual Amenity

The overall visual quality of a landscape that considers factors including but not limited to views, natural features, and the built environment.

Visual Catchment

The geographical area from which a particular view can be observed.

Visual Effects

The effects on specific views and on the general visual amenity experienced by receptors.

Visual Impact

The observable and measurable change in the visual catchment caused by the Project. This is determined by considering the visual sensitivity and magnitude of change.

Visual Magnitude

The degree of visual change resulting from the Project, including but not limited to the size, scale, compatibility and duration of effect.

Visual Receivers/Receptors

Individuals and/or defined groups of people who have the potential to be affected by the Project.

Visual Sensitivity

The susceptibility of a landscape or visual resource to absorb impacts from a Project, land use change or the introduction of a new element into the landscape.

Visual Impact Assessment (VIA)

The process for determining the day-to-day visual effects of a Project on people's views from the private and public domain.

Visualisation

A computer-generated simulation, photomontage or other technique illustrating the predicted appearance and/or massing of the Project within the existing landscape.

Zone of Visual Influence (ZVI)

The extent of landscape area from which the Project can potentially be theoretically viewed based on topography alone.

Abbreviations

AILA

Australian Institute of Landscape Architects

AHL

Aviation Hazard Lighting

BESS

Battery Energy Storage System

BWF

Biala Wind Farm

CASA

Civil Aviation Safety Authority

DTM

Digital Terrain Model

EPHC

Environment Protection and Heritage Council

ERM

Environmental Resources Management

FOV

Field of View

GIS

Geographic Information System

ha

Hectares

LGA

Local Government Area

LCU

Landscape Character Unit

LVIA

Landscape and Visual Impact Assessment

NSW

New South Wales

NWFG

National Wind Farm Guidelines

PM

Photomontage

QLD

Queensland

RVAA

Residential Visual Amenity Assessment

SC

State Code

SNH

Scottish Natural Heritage

VRWFG

Visual Representation of Wind Farms Guidance

WTG

Wind Turbine Generator

ZVI

Zone of Visual Influence

01 Introduction



1.0 Introduction

1.1 Background

ERM has commissioned Moir Studio on behalf of Bungaban Renewable Energy Farm Pty Ltd (the Proponent), to prepare a Landscape and Visual Impact Assessment (LVIA) for the proposed Bungaban Renewable Energy Project (the Project). The Project is proposed on the traditional lands of the Auburn Hawkwood People and the Iman People, approximately 35 km northeast of Wandoan and 55 km southeast of Taroom in Queensland (refer to **Figure 01**).

This report provides a comprehensive assessment of visibility and potential visual impacts associated with the Project on the landscape character, landscape values, visual amenity, and any scenic vistas. This information will assist the community and relevant authorities in understanding and assessing the likely potential visual impacts.

Survey work was undertaken during September 2024 using key viewpoints and locations with potential views towards the Project. The report details the results of the fieldwork, documents the assessment of the landscape character and visual setting, and, if required, makes recommendations to assist in mitigating any potential impacts resulting from the Project.

1.2 Relevant Experience

Moir Landscape Architecture Pty Ltd, trading as Moir Studio, is a professional design practice and consultancy specialising in Landscape Architecture, Landscape Planning, and Landscape and Visual Impact Assessments. Our team has extensive experience undertaking LVIAs for large scale renewable energy developments. Based on our experience and the relevant guidelines, we have developed methodologies to ensure a comprehensive and qualitative assessment of the Project.

Relevant experience includes the preparation of LVIAs for the following Wind Energy Projects:

- Lakeland Wind Farm (Lakeland, Queensland)
- Stony Creek Wind Farm (Biggenden, Queensland)
- Wongalee Wind Farm (Wongalee, Queensland)
- Bodangora Wind Farm (Bodangora, New South Wales)
- Capital II Wind Farm (Bungendore, New South Wales)
- Uungula Wind Farm (Wellington, New South Wales)
- Hills of Gold Wind Farm (Nundle, New South Wales)
- Cherry Tree Wind Farm (Seymour, Victoria)



Figure 01 Regional Context
Basemap Source - Google Earth, 2024

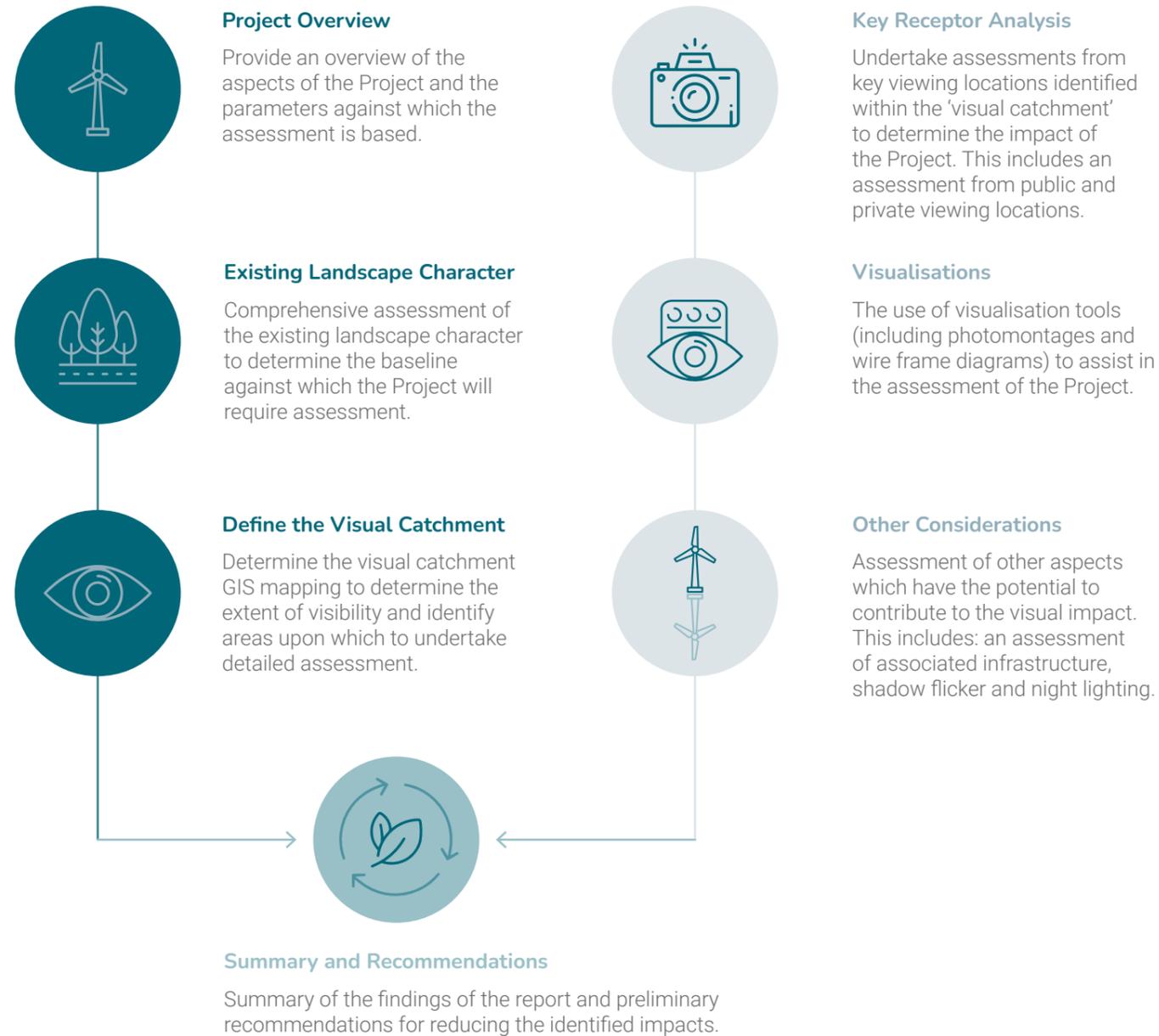
02 Study Method



2.0 Study Method

2.1 Overview of the Study Method

The fundamental steps in undertaking an LVIA are as follows:



2.2 Relevant Guidelines and Framework

The following provides an overview of the guidelines, relevant frameworks and considerations of authorities utilised to form the methodology for this LVIA.

2.2.1 Wind Farm State Code & State Development Assessment Provisions (2024)

The Wind Farm State Code, supported by its State Development Assessment Provisions, provides a consistent, coordinated, whole-of-government approach to assessing and regulating wind farm development across Queensland.

The code and guidelines aim to deliver quality renewable energy outcomes while protecting communities from the adverse impacts of wind farm development. The wind farm state code is within the *State Development Assessment State Code 23: Wind Farm Development*.

Relevant Performance Outcomes:

PO14 Development is designed, constructed and operated so that the modelled blade shadow flicker impacts on existing or approved sensitive land uses do not exceed 30 hours per annum and 30 minutes per day.

PO16 Development in an area identified by state or local government planning instruments as having high scenic amenity is sited and designed to protect the scenic amenity and landscape values of the locality and region.

To address these performance outcomes above - a visual assessment should identify and propose measures to avoid or minimise adverse impacts from the development on significant landscape values and scenic amenity, including viewing corridors and viewpoints.

The LVIA report should include the following content:

- include visual simulations or photomontages demonstrating the anticipated visual appreciation of the proposed turbines from key public viewpoints and viewing corridors
- an assessment of how the turbines visible from view points and/or viewing corridors does not adversely impact on the scenic amenity.

Figure 02 Landscape & Visual Impact Assessment Process

2.2.2 AILA Guidance Note for Landscape & Visual Impact Assessment (2018)

The Australian Institute of Landscape Architects (AILA) developed Guidance notes for preparing LVIA's. The document provides a practical framework for the practice of LVIA among Registered Landscape Architects. The LVIA process reflects the best practice guidelines outlined in the Guidance Notes, which include terminology, principles, and methodology.

2.2.3 Draft National Wind Farms Development Guidelines (2010)

The Environment Protection and Heritage Council (EPHC) have developed *Draft National Wind Farms Development Guidelines* (July 2010) to provide a consistent framework and methods for assessing issues unique to wind turbine developments. References to these guidelines have been made throughout the report.

2.3 Guideline and Legislative Framework

2.3.1 Banana Shire Planning Scheme

Part 2 - Strategic Framework of the Banana Shire Planning Scheme (2021) states the Council's intent to ensure that development enhances the rural sector and economy without compromising the existing amenity, landscape and environmental values (Banana Shire Planning Scheme, 2021).

No scenic amenity within this planning scheme is identified within the Study Area, and therefore, it does not require additional assessment as part of landscape character analysis.

2.3.2 North Burnett Regional Planning Scheme

Part 3 - Strategic Framework of the North Burnett Regional Planning Scheme (2020) (NBRPS) states the planning intent to protect and maintain the region's rural character. The strategic outcomes listed under 3.3 Natural Environment and Sustainability state the Council's intent to conserve, enhance and restore the natural environment and its assets, connectivity, ecological processes, biodiversity and scenic amenity values (North Burnett Regional Planning Scheme, 2020).

No scenic amenity within this planning scheme is identified within the Study Area, and therefore, it does not require additional assessment as part of landscape character analysis.

2.3.3 Western Downs Regional Planning Scheme

The Western Downs Regional Planning Scheme (2019) outlines strategic outcomes in protecting the scenic amenity of Western Downs. Outcomes include:

- *The location and scale of development complement the scenic amenity values represented by the upland and lowland character types identified on Strategic Plan Map 3 – Community Identity and Landscape Character:*
 - (a) *Forest communities in 'Forest Uplands' landscapes are protected and enhanced;*
 - (b) *Visual buffers between development and Scenic routes are maintained in 'Grazed Uplands' landscapes;*
 - (c) *Forest and woodland communities in 'Forested and Woodland Downs' landscapes are protected and enhanced;*
 - (d) *Visual buffers between development and Scenic Routes are maintained in 'Open Downs' landscapes.*
- *Development avoids, where practicable, or otherwise lessens, negative impacts on the visual significance of High Natural Landscape Value Areas identified on Strategic Plan Map 3 - Community Identity and Landscape Character.*

As per the Western Downs Regional Planning Scheme (WDRPS), areas of the Study Area are identified as high landscape value (HLV) areas. As a result, the Planning Scheme requirements outlined in SC6.4 and Planning Scheme Policy 3 must be reviewed and analysed as part of the landscape character assessment.

The purpose of the Planning Scheme Policy 3 - Landscape character analysis guidelines is to:

- *Maintain and enhance the landscape character, scenic amenities and tourism values of the locality and the Western Downs region;*
- *Mitigate the scenic amenity impacts of structures visible positioned on a ridgeline when viewed from a highway, main road or scenic route.*

Table 01 outlines the key landscape assessment requirements and where they are found in the report.

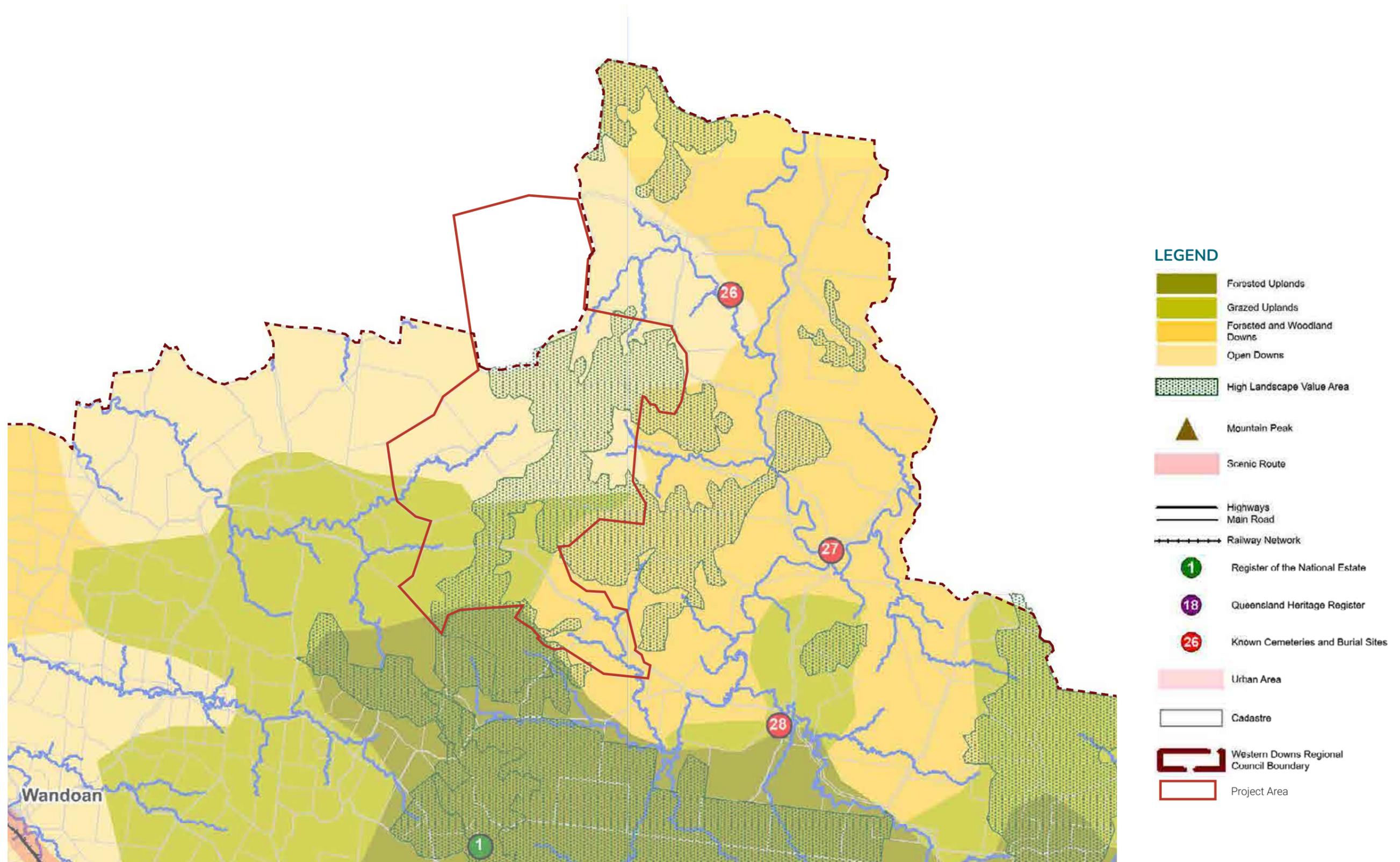


Figure 04 Landscape Types
 Basemap Source - Western Downs Regional Council

2.4 Report Structure

Table 02 provides an outline of the report structure. Detailed methodologies for each part of the assessment have been included in the relevant chapters of the report.

Report Structure
Project Overview & Defining Visual Catchment
<ul style="list-style-type: none"> • Section 3.0 - Project Overview • Section 4.0 - Defining the Visual Catchment
Landscape Character Analysis
<ul style="list-style-type: none"> • Section 5.0 - Landscape Character Analysis
Visual Impact Assessment
<ul style="list-style-type: none"> • Section 6.0 - Viewpoint Analysis • Section 7.0 - Photomontages • Section 8.0 - Shadow Flicker Assessment • Section 9.0 - Associated Infrastructure • Section 10.0 - Nightlighting Assessment
Response to Impacts
<ul style="list-style-type: none"> • Section 11.0 - Mitigation Measures • Section 12.0 - Summary

Table 02 Report Structure

03 Project Overview



3.0 Project Overview

3.1 Regional Context

The Project is located in Queensland's Western Downs Regional and Banana Shire Local Government Areas (LGA), approximately 35 km northeast of Wandoan and 55 km southeast of Taroom in Queensland. The Project Area is located on land within the Rural Zone of the Banana Shire Council and the Western Downs Regional Council, with the current and future predominant land use being cattle grazing. The Project is located within the Brigalow Belt Bioregion (refer to **Figure 05**), under the Barakula, Banana-Auburn Ranges and Taroom Downs subregion classification.

3.2 The Project Site & Project Layout

The Project Site is located directly north of Barakula State Forest and is surrounded by several other state forests. The localised terrain consists of undulations of sandstone and alluvial plains. The Project is surrounded by dense vegetation associated with the surrounding state forests and creek corridors.

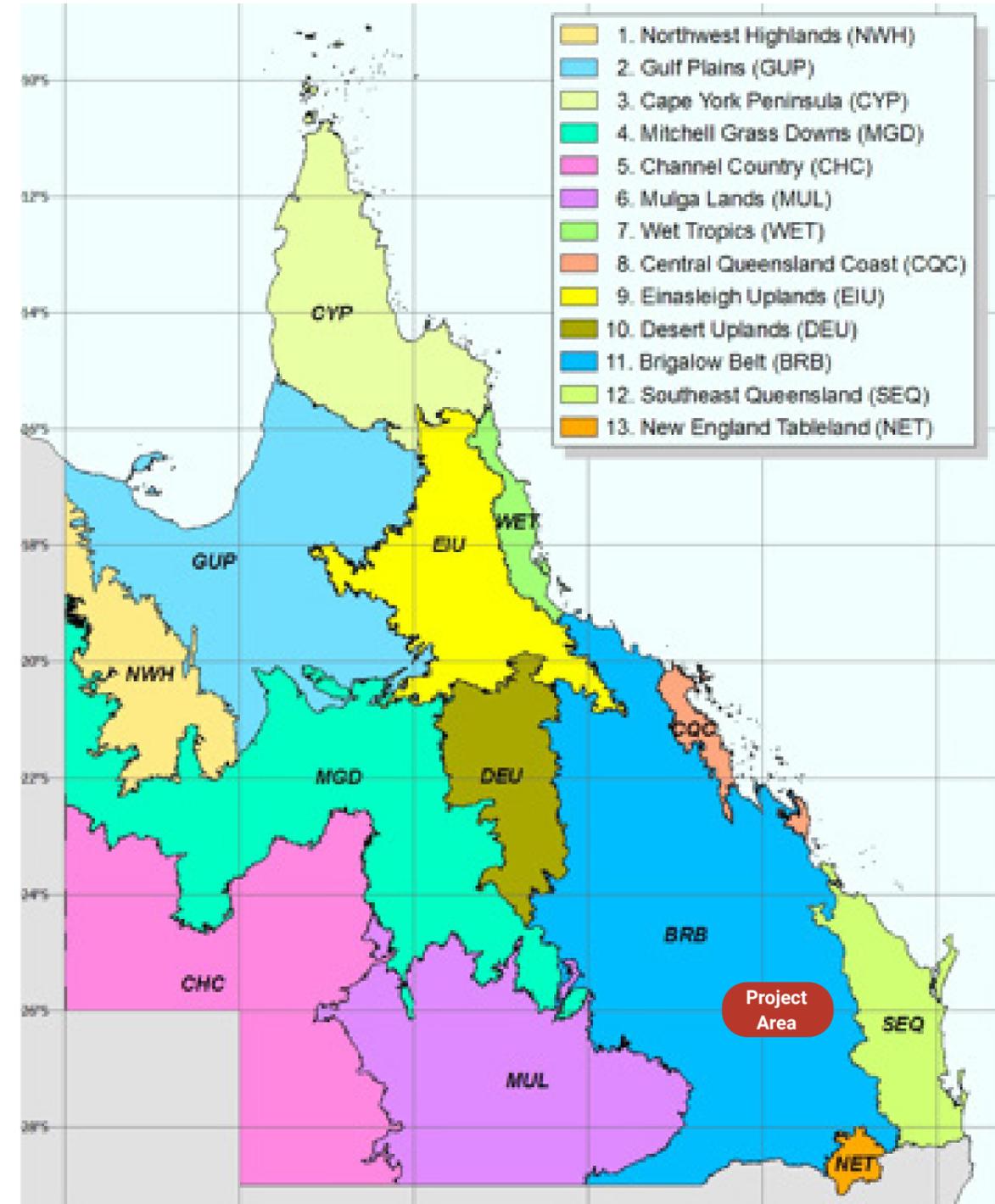


Figure 05 Bioregion Location
Basemap Source - Adapted from IBRA V5, 2000

3.3 The Project

The Project would involve the construction, maintenance and decommissioning of 204 Wind Turbines Generators (WTG) and associated infrastructure, which includes:

- WTG foundations and hardstand areas;
- Temporary infrastructure such as concrete batching plants, laydown areas and communications towers;
- Access tracks, underground cabling;
- Electrical connections and substations;
- Battery Energy Storage Systems (BESS);
- Permanent meteorological masts; and
- Central operational and maintenance (O&M) facilities.

The Project Area is approximately 50,311 hectares (ha) and comprises 13 land parcels and local road reserves. The total maximum development footprint during construction activities is approximately 2,550.3 ha. Following construction activities, the proponent will rehabilitate or progressively restore temporary construction areas resulting in an operational footprint of 549.3 ha (approximately 1% of the Project Area). The Project and its associated infrastructure are presented in **Figure 06**.

Section 9.0 of this report provides an overview of the assessment of the potential visual impacts resulting from the associated infrastructure. For further information on the Project infrastructure, please refer to section 4 of the Planning Report.



Image 01 Typical WTG



Image 03 Typical O&M Facility



Image 05 Typical Singluar BESS Unit



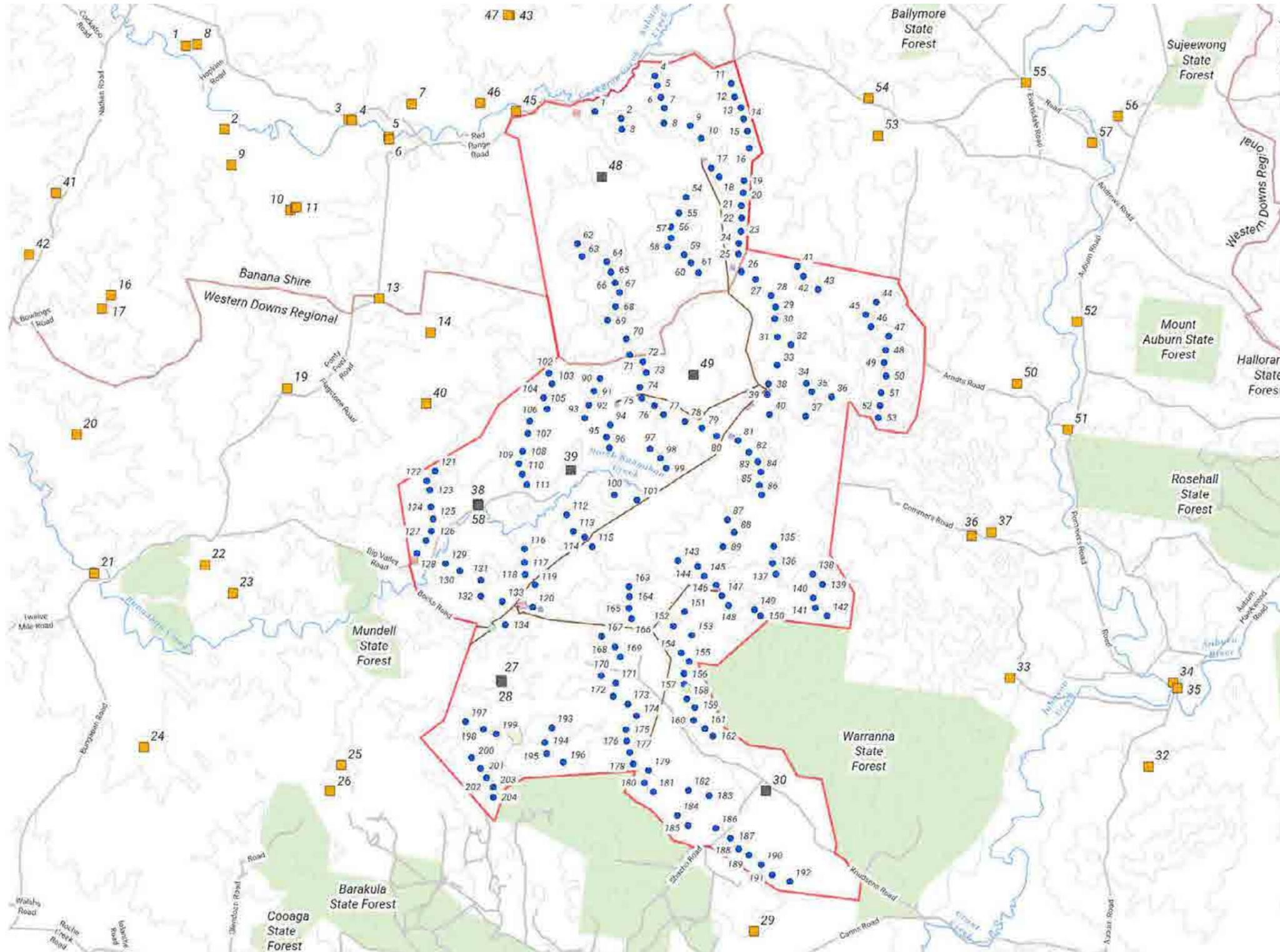
Image 02 Typical 33kV Transmission Line



Image 04 Typical Transmission Tower



Image 06 Typical Substation



Project Layout

Refer to Section 3.2

LEGEND

- Project Area
- Proposed WTGs
- Non-Associated Dwellings
- Associated Dwellings
- Proposed Transmission Line
- Quarry
- Export Switchyard
- Concrete Batching
- Collector Substation
- Site Office
- LGA Boundary
- Roads
- Contours
- State Forests
- Watercourse



Figure 06 Project Layout
Basemap Source - ESRI, 2024

3.4 Wind Turbine Design

The proposed turbines have a maximum blade tip height of **300 m**. The turbines will typically have:

- A 4-7 part tubular steel tower holding the nacelle;
- Three blades mounted to a rotor hub on a tubular steel tower or hybrid concrete-steel tower, with a combined height of blade and tower limited to a maximum tip height of 300 m;
- A gearbox and generator assembly housed in a nacelle; and
- Adjacent hardstands for use as crane pads and assembly and laydown areas.

If hybrid concrete-steel tower sections are used, temporary on-site concrete batching and casting facilities for the production of these concrete tower segments will be required, in addition to the three (3) concrete batching plants currently planned. This will be confirmed during the detailed design process.

Table 03 provides an overview of the dimensions of the turbine components used for this assessment.

At this stage in the Project, a turbine model has not been selected by the Proponent. The final model will be determined as part of the detailed design process. To ensure potential visual impacts can be appropriately considered and addressed, this assessment assumes conservative 'worst-case' turbine dimensions for modelling and visualisation purposes (refer to **Figure 07** & **Image 01**).

WTG Components		
Project Component	Dimensions used in LVIA	Quantity
Make / Model / Power	TBC	Up to 204 WTGs
Uppermost Blade Tip	300 m	
Tower (Hub) Height	200 m	
Blade Length	100 m	

Table 03 WTG Dimensions for Visual Assessment

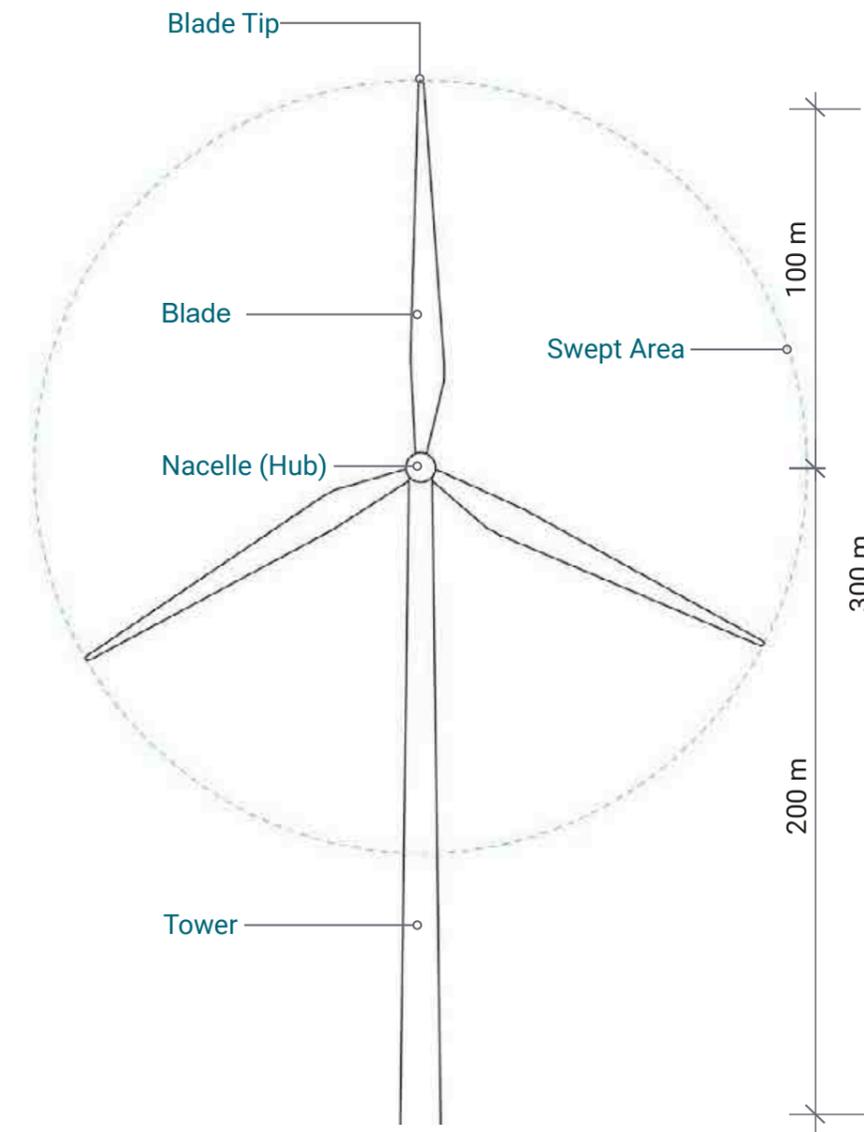


Figure 07 Wind Turbine Parameters

04 Visual Catchment



4.0 Visual Catchment

4.1 Defining Visual Catchment

The visual catchment of the Project has been defined based on the parameters of the accepted extent of human vision, including our vertical field of view. To facilitate an objective assessment of visibility, the potential visual prominence of the Project is related to the distance from a receptor. Therefore, the extent of the Study Area is determined by the distance within which the proposed 300 m WTGs have the potential to be a significant element within the view (refer to **Table 04**).

4.1.1 Viewshed Calculation

Distance zones have been calculated using the parameters of the human eye and are based on the typical line of sight for a person standing at ground level (Torrejon et al., 2013; Panero & Zelnik, 1979). Given the spatial arrangement and layout of the Project - the vertical field of view provides a basis for calculating the extent of the viewshed.

Figure 08 shows that generally the vertical field of view for a person standing at ground level is between 10 - 15°. The theoretical extent of the viewshed is considered to be the distance at which the tallest component of the Project would take up less than 5% or 0.5° of the general field of view experienced.

It should be noted that this methodology for calculation considers the viewer to be in a static position. With an overall height of WTGs of up to 300 m, the distance would comprise 5% (0.5°) of the vertical field of view up to 34.4 km (as shown in **Table 05**).

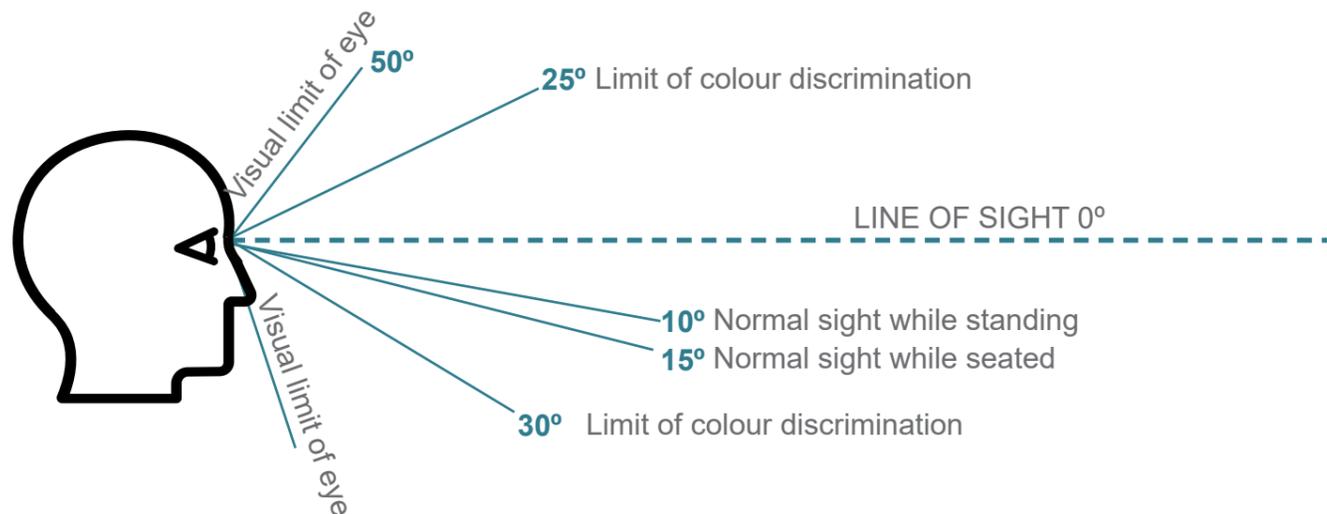


Figure 08 Human Eye Vertical Line of Sight
Source - Torrejon et al., 2013; Panero & Zelnik, 1979

4.1.2 Visual Prominence and Distance from the Wind Farm

The visual prominence of a turbine is not equal across an entire viewshed. The distance of a receptor to the closest turbine is a significant factor in determining the visual prominence of the Project. The NWFG offer guidance based on previous studies undertaken when reviewing wind farm developments and the potential visual prominence (Environment et al., 2010). **Table 04** outlines an example of potential visual prominence of a Project for a 100 m WTG.

This framework assists in determining the project-specific visual dominance magnitude lines outlined in **Table 05**.

Potential Visual Dominance	
Distance from WTG:	Potential Visual Dominance:
>12 km	Visually Insignificant A very small element in the landscape which is difficult to discern and is likely to be indiscernible under poor weather conditions. Rotor blade movement is likely to be visible on a clear day.
6 - 12 km	Potentially Noticeable but will not dominate the landscape The development may be noticeable. The degree that it intrudes on the view will increase as distance decreases.
2.5 - 6 km	Potentially Noticeable and can dominate the landscape The development is likely to be highly noticeable, although the degree of visual intrusion will depend on the landscape setting, intervening elements and the extent of visibility.
1 - 2.5 km	Highly Visible and will usually dominate the landscape The development will be highly visible.
< 1 km	Will always be visually dominant in the landscape The development will be highly visible.

Table 04 Potential Visual Dominance based on Distance
Source - EPHC, 2010

Assessment of the visual scale and prominence of turbines over a range of distances establishes whether these proposed elements will likely be dominant, noticeable, discernible or insignificant features within the viewshed. **Image 07 - Image 10** illustrate the visual prominence of turbines.

The relative visual prominence of turbines is also based on the parameters of the human eye and the vertical angle of view.



Image 07 WTGs located at 2 km
 Highly visible and are dominant in scale relative to elements such as fence posts and vegetation visible in the foreground



Image 08 WTGs located at 4 km
 Likely to diminish in scale relative to other elements such as fence posts and intervening vegetation in the foreground.



Image 09 WTGs located at 6 km
 Likely to appear smaller in scale relative to vegetation and structures in the foreground.



Image 10 WTGs located beyond 6 km
 Likely to be visible and appear smaller in scale relative to vegetation and structures in the foreground and middleground.

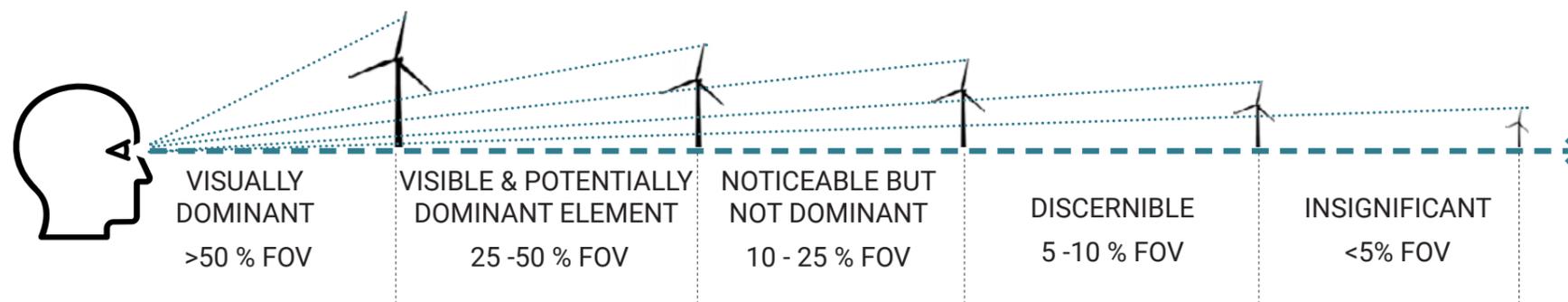


Figure 09 Vertical Field of View and Potential Visual Dominance

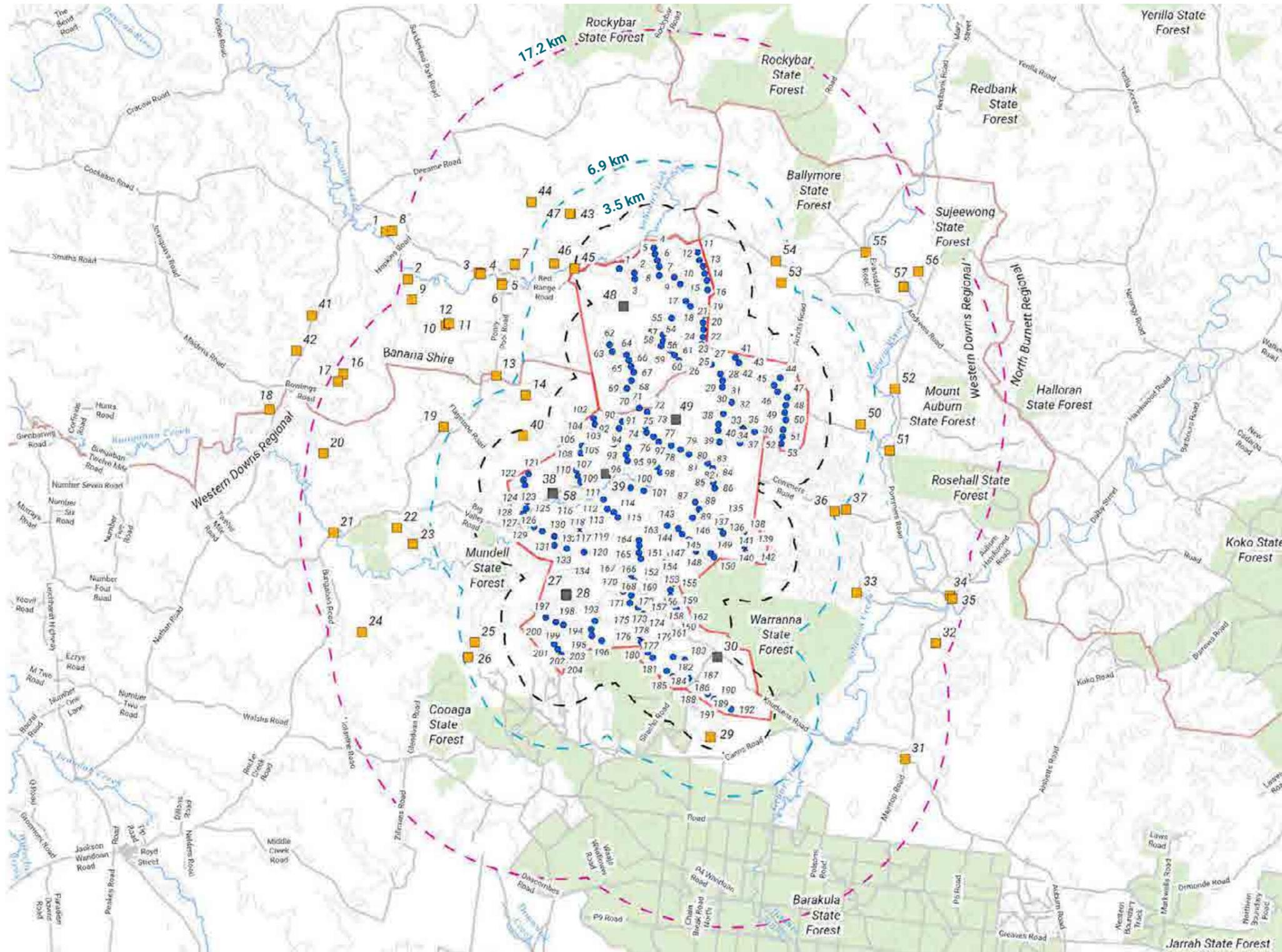
Potential Visual Dominance		
Visual Catchment (vertical angle of view)	Distance from Receptor to WTGs	Potential Visual Dominance:
0.5° (<5% FOV)	>34.4 km	Visually Insignificant A small thin line in the landscape.
0.5 - 1.0° (5 - 10% FOV)	17.2 - 34.4 km	Potentially Noticeable but will not dominate the landscape The Project may be noticeable. The degree that it intrudes on the view will be dependent on how well it integrates with the landscape setting.
1.0 - 2.5° (10 - 25% FOV)	6.9 - 17.2 km	Noticeable and potentially a visible element in the landscape The degree that it intrudes on the view will be dependent on sensitivity of the viewer and the landscape.
2.5 - 5.0° (25 - 50% FOV)	3.5 - 6.9 km	Visible and potentially dominant The Project will be visible, although the degree of visual intrusion will depend on the landscape setting, intervening elements and the extent of visibility. It is likely that beyond 6.2 km the WTGs will diminish in scale relative to other elements in the fore and middleground such as fences, intervening structures such as sheds, vegetation, etc.
> 5° (>50% FOV)	< 3.5 km	Will always be visually dominant The Project will always be a dominant element in the landscape, unless screened by intervening vegetation or structures.

Table 05 Visual Dominance for the Project

4.2 Visual Catchment & Study Area Thresholds

When measuring the visual dominance of the Project, WTGs within 6.2 km will be viewed as a new element in the landscape and potentially dominant. It is likely that beyond 6.2 km, WTGs will diminish in scale and, when viewed in the background, will not visually dominate the landscape (refer to **Figure 09**). Therefore, with this consideration regarding the nominated thresholds of visual predominance - the Study Area thresholds as shown in **Figure 10** is determined to be:

- Landscape Character Assessment (**17.2 km** from nearest WTG)
- Visual Impact Assessment (**6.9 km** from nearest WTG)



Study Area

Refer to Section 4.2

LEGEND

- Project Area
- Proposed WTGs
- Non-Associated Dwellings
- Associated Dwellings
- Study Area (17.2 km from WTGs)
- Visual Catchment (6.9 km from WTGs)
- Visual Catchment (3.5 km from WTGs)
- LGA Boundary
- Roads
- State Forests
- Contours
- Watercourse



Figure 10 Study Area
Basemap Source - ESRI, 2024

4.3 Zone of Visual Influence

An initial visibility assessment was undertaken using Zone of Visual Influence (ZVI) mapping. This tool assists in defining the Project's 'Visual Catchment.'

The ZVI represents the area over which the Project can theoretically be viewed and is based on a Digital Terrain Model (DTM). The ZVI is a desktop tool intended to make fieldwork and assessment more efficient by excluding areas screened by topography. Fieldwork assessments are then undertaken predominantly within the areas with potential visual impacts.

The ZVI presents a bare-ground scenario—i.e., a landscape without screening, structures, or vegetation— and is usually on a base map (*Landscape Institute, 2013*). It is important to note that the ZVI is based solely on topographic information. This form of mapping is acknowledged as providing a worst-case scenario and is used purely as a desktop assessment tool to determine areas for detailed assessment.

The assessment of the ZVI will consider 17.2 km from the Project.

4.4 Zone of Visual Influence Summary

A WTG with a blade tip height of 300 m has been considered to provide a worst case scenario.

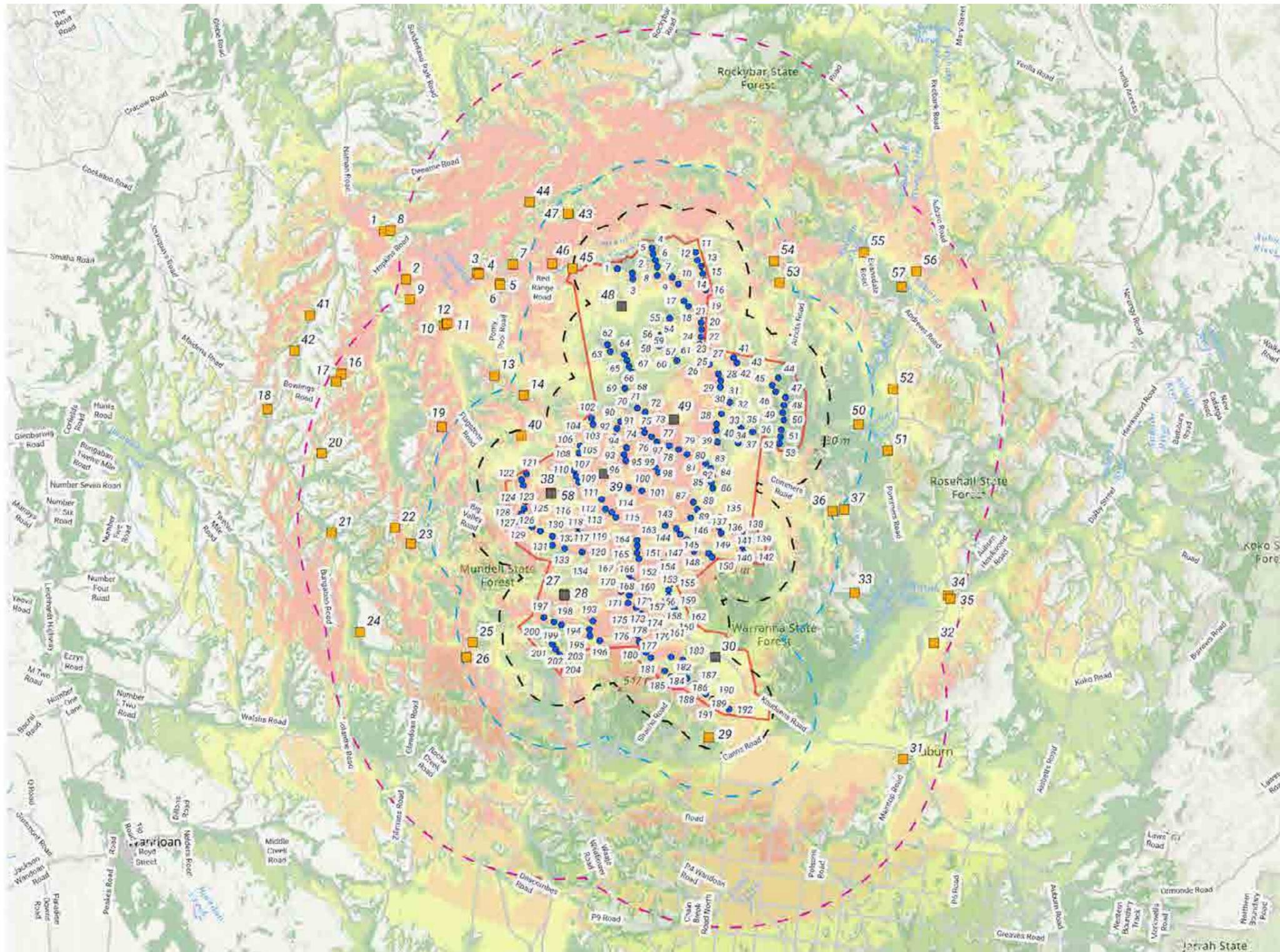
The ZVI diagrams have been determined using Digital Topographic Modelling (DTM) and 3D modelling software, 'ArcGIS'.

Summary of Findings:

- Based on topography alone, due to the gently undulating terrain within the Study Area, the Project will be visible to the immediate surroundings, with visibility decreasing as you move beyond the Study Area to the east. It is to be noted that large areas within the Study Area are State Forests, consisting of established productive native forests that will likely screen-open views towards the Project and will be assessed in **Section 6.0**.
- The ZVI indicates that non-associated dwellings to the northwest, west and southwest have the potential to view the majority of the project due to the character of the topography.
- Reduced visibility is shown to the east along with the lower terrain aligning Auburn River.
- All 13 non-associated dwellings within 6.9 km have visibility of the Project.

The ZVI has been used to identify areas of potentially high visibility, which informs fieldwork ground-truthing to identify locations that require further assessments.

It is noted that existing screening, including structures or vegetation, has not been considered in the preparation of the ZVIs. Further assessment and fieldwork ground-truthing would be required to determine the potential visual impacts with consideration to existing screen factors. Therefore, this assessment presents a conservative worst-case scenario.



Zone of Visual Influence

Refer to Section 4.3

LEGEND

- Project Area
- Proposed WTGs
- Non-Associated Dwellings
- Associated Dwellings
- Study Area (17.2 km from WTGs)
- Visual Catchment (6.9 km from WTGs)
- Visual Catchment (3.5 km from WTGs)
- Roads
- Contours
- Watercourse

ZVI LEGEND

- 1%-20% (up to 40 WTGs)
- 21%-40% (41 - 81 WTGs)
- 41%-60% (82 - 122 WTGs)
- 61%-80% (123 - 163 WTGs)
- 81%-100% (164 - 204 WTGs)



Figure 11 Zone of Visual Influence
Basemap Source - ESRI, 2024

05 Existing Landscape Character



5.0 Existing Landscape Character

5.1 Existing Landscape Character Analysis

The Landscape Character Analysis establishes the existing landscape and visual conditions through descriptions, mapping and photographic representations. The Study Method for undertaking the Landscape Character Analysis has been established in accordance with the State Development Assessment State Code 23: Wind Farm Development Provisions (2024) and the AILA Guidance Notes for Landscape and Visual Impact Assessment (2018) where relevant and in conjunction with previous experience on large scale wind energy projects.

5.2 Regional Landscape Character

5.2.1 Bioregion Context

The Project is located within Queensland's 'Brigalow Belt Bioregion' under the Interim Biogeographic Regionalisation for Australia (IBRA). The Brigalow Belt Bioregion extends from south Townsville to New South Wales (NSW) (DES, 2018) and consists of 38 subregions. The Study Area extent consists of four (4) subregions (refer to **Figure 12**):

- Barakula
- Banana-Auburn Ranges
- Taroom Downs
- Carnavon Ranges

5.2.2 Barakula Subregion

The majority of the land within the Study Area sits within this subregion. This subregion forms part of the Brigalow Belt South IBRA sub-bioregion. It *'consists primarily of dissected low Jurassic sandstone and lateritised sandstone hills, plateau remnants and scarps, interspersed with and surrounded by undulating plains. It is centred on the Barakula area with a tongue extending north to Monto. In low hilly country, the predominant vegetation is an open forest/woodland of narrow-leaved ironbark, spotted gum, cypress pine and bulloak with dusky-leaved ironbark, narrow-leaved white mahogany, Tom Russell mahogany and thready-barked she-oak (Casuarina inophloia) characteristic of crests and scarps forms near pure stands along the crest of the Great Dividing Range'* (SEED, 2024).

5.2.3 Banana-Auburn Subregion

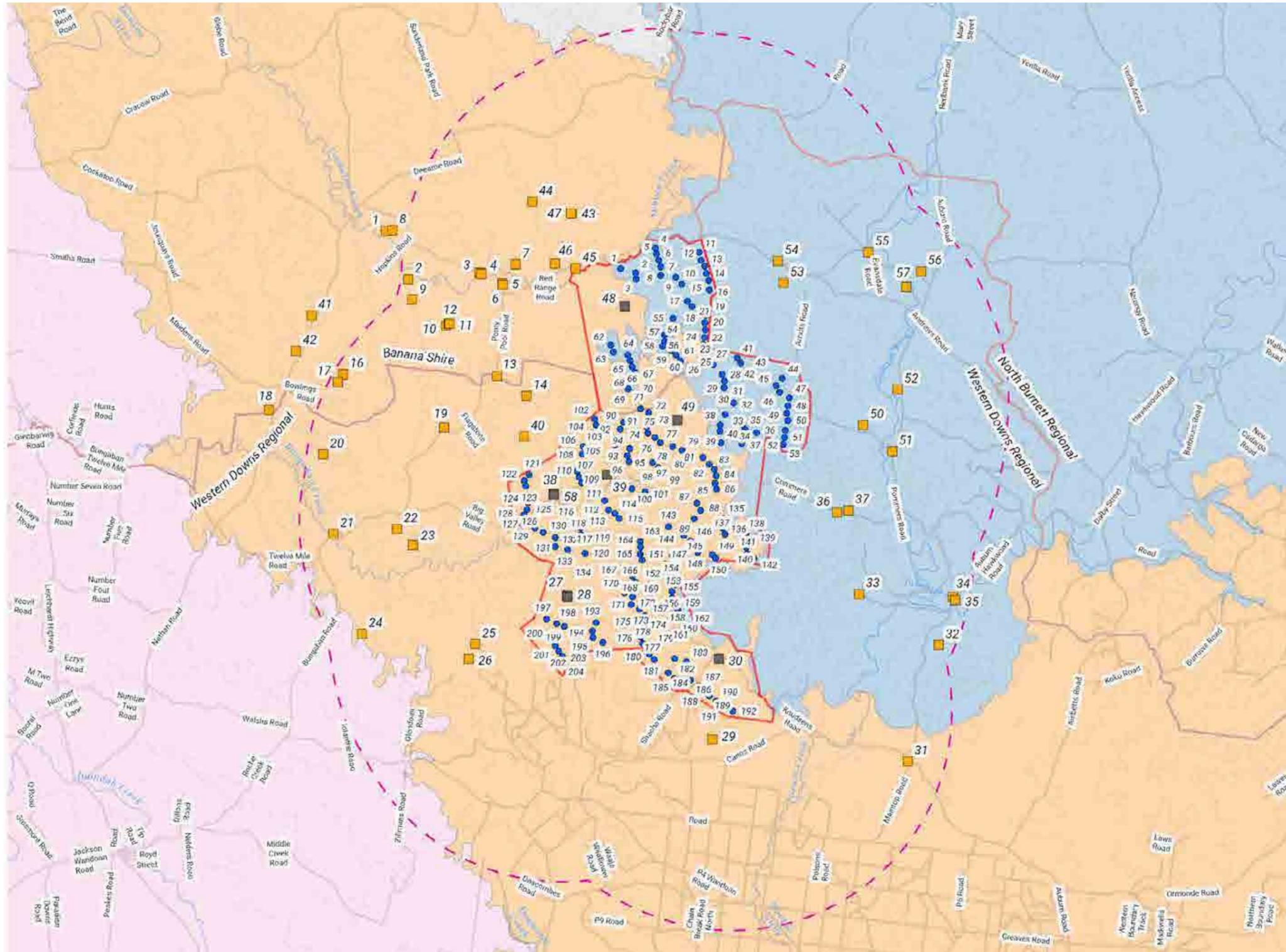
This subregion occupies a significant section of the northeast of the Project. The subregion comprises of *'complex geology but is dominated by granodiorites and other igneous rocks. It has two distinct parts centred on the Auburn Range in the north with a smaller area west of Proston-Wondai. The landscape is predominantly hilly. Silver-leaved ironbark (Eucalyptus melanophloia) woodlands are widespread, usually with red bloodwood (Corymbia erythrophloia). Narrow-leaved ironbark (Eucalyptus crebra) is dominant in steeper areas with shallow soils. Colluvial and alluvial areas carry woodlands of poplar box (Eucalyptus populnea) or forest red gum (E. tereticornis) and Moreton Bay ash (C. tessellaris) and bulloak (Allocasuarina luehmannii). There are small areas of brigalow (Acacia harpophylla) scrub and vine thicket.'* (SEED, 2024).

5.2.4 Taroom Downs Subregion

The subregion is located southwest of the Study Area. *'The Taroom Downs is an undulating subregion formed on the argillaceous sediments of the Injune Downs Group of the Great Artesian Basin. The vegetation is dominated by brigalow (Acacia harpophylla), with areas of vine thicket and bluegrass (Dichanthium sericeum) downs'* (SEED, 2024).

5.2.5 Carnavon Ranges

The subregion is located in the north of the Study Area. The Carnavon Range is a plateau section of the mountain range that forms part of the Great Dividing Range. *'Carnavon Ranges an extensive belt of predominantly coarse sand stones that form the north-eastern margin of the Great Artesian Basin... Soils are predominantly coarse, with deep sands or with deep sandy-surfaced texture contrast soils on less steep areas. A mixed Eucalypt woodland or forest, usually with a shrubby understorey, is the most widespread vegetation type'* (SEED, 2024).



Sub Bioregions

Refer to Section 5.2

LEGEND

- Project Area
- Proposed WTGs
- Non-Associated Dwellings
- Associated Dwellings
- Study Area (17.2 km from WTGs)
- LGA Boundary
- Roads
- Contours
- Watercourse
- Banana-Auburn Ranges
- Barakula
- Carnarvon Ranges
- Taroom Downs

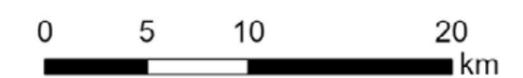
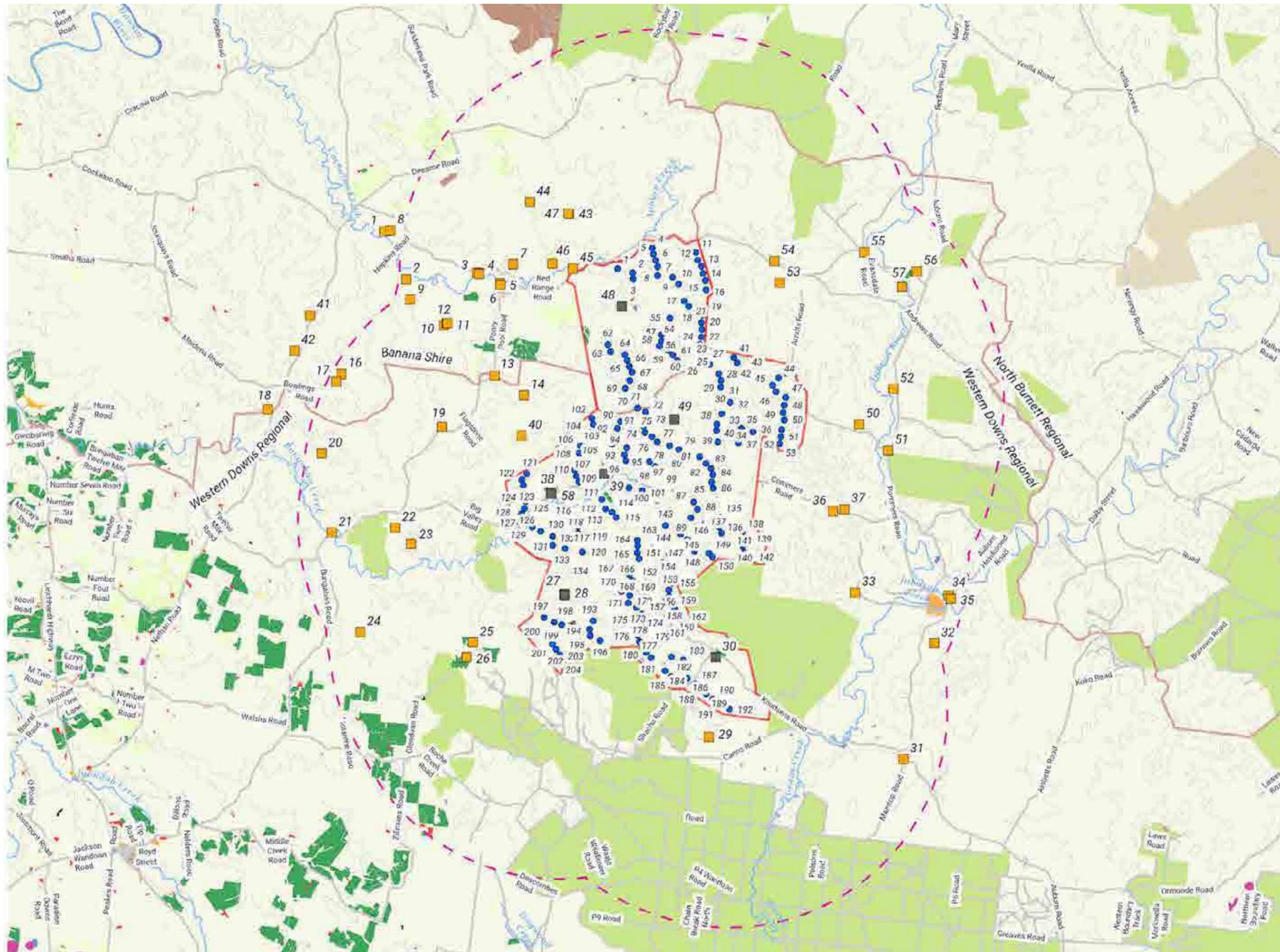


Figure 12 Sub Bioregions
Basemap Source - ESRI, 2024

5.3 Land Use

As shown in **Figure 13** land within the Study Area predominantly comprises grazing native vegetation and production forestry surrounding the Project. Other land uses defined by land use mapping produced by the Queensland Government (QSpatial, 2024) predominantly comprise:

- Grazing native vegetation
- Production forestry
- Cropping
- Grazing modified pastures
- Services
- Lakes, Rivers, Reservoirs/Dams



Land Use

Refer to Section 5.3

LEGEND

- Project Area
- Proposed WTGs
- Non-Associated Dwellings
- Associated Dwellings
- Study Area (17.2 km from WTGs)
- LGA Boundary
- Roads
- Nature conservation
- Managed resource protection
- Other minimal use
- Grazing native vegetation
- Production forestry
- Grazing modified pastures
- Cropping
- Irrigated cropping
- Intensive animal husbandry
- Manufacturing and industrial
- Residential
- Services
- Utilities
- Transport and communication
- Mining
- Waste treatment and disposal
- Lake
- Reservoir/dam
- River
- Marsh/wetland
- Contours
- Watercourse



Figure 13 Land Use
Basemap Source - ESRI, 2024

5.4 Key Landscape Features

5.4.1 Landform & Geology

The Study Area predominantly consists of gently undulating plains with low hills, with some areas of prominent steep peaks. It also consists of dissected low Jurassic and lateralised sandstone hills, mainly found along creek banks. Because of the varying landforms, the soil types vary in sections of the Study Area, from deep red soils with tall open forests to grey-cracking clay soils to alluvial plains (SEED, 2024).

5.4.2 Hydrology

The general topography and geographical character form a network of creeks and gullies with dense vegetation corridors. These include Bungaban Creek, North Bungaban Creek, Cockatoo Creek, Johnsons Creek, Grant Creek, Spring Creek, Box Tree Gully, Red Range Creek and Auburn River.

Several gullies lie east of the Study Area, merging with the Auburn River. The steep, undulating terrain of the state forests to the east forms a seamless flow for the Auburn River, with dense, tall vegetation aligning the river corridors.

5.4.3 Vegetation & State Forests

The Study Area is characterised by its semi-arid woodland environment. Key vegetation types include cypress pine, bulloak, narrow-leaved ironbark, spotted gum and forest red gum.

The predominant vegetation feature within the Study Area is the State Forests, which include the Barakula, Warranna, Rockybar, Ballymore, Mundell, Mount Auburn, Rosehall and Cooaga State Forests. Of the state forests surrounding the Project, Barakula is considered the largest in Queensland and the southern hemisphere, covering 283,000 hectares. It comprises various vegetation communities, including eucalypt forests, cypress pine woodlands, heathlands and spinifex (Queensland Government, 2024). A section of the Barakula State Forest sits within the Study Area and occupies a significant portion to the immediate south of the Project.

5.4.4 Local Roads

There are no highways or major roads within the Study Area. Some local low-use roads within the Study Area include Auburn Road, Big Valley Road, Knudsens Road, Red Range Road and Arndts Road. These roads are primarily unsealed or partially sealed public road reserves that mainly provide access to rural properties within the immediate area.

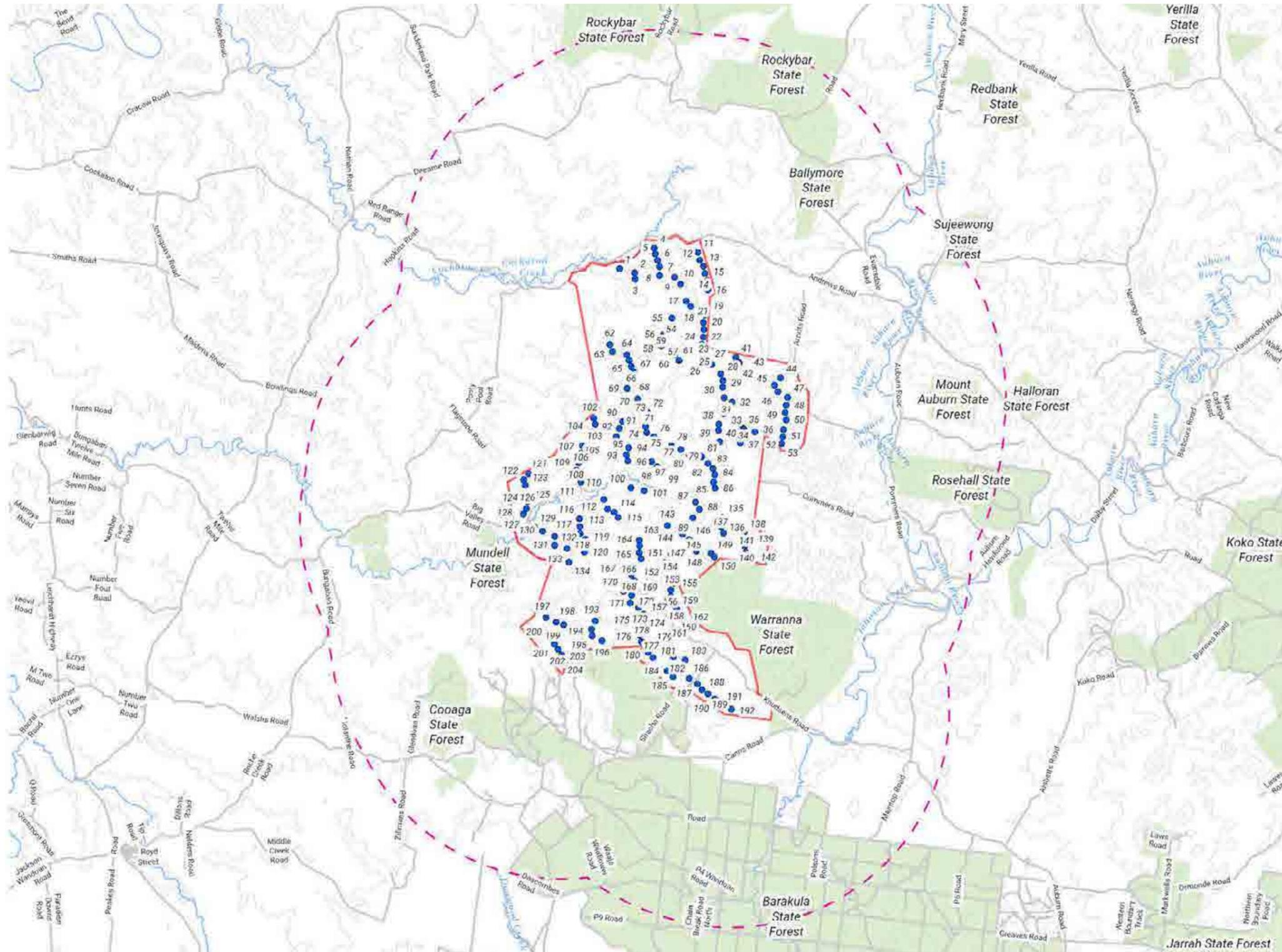


Image 11 Typical gently undulating topography within the Study Area



Image 12 Aerial view of Cockatoo Creek

Image 13 Typical vegetation character in the Study Area



Key Landscape Features

Refer to Section 5.4

LEGEND

- Project Area
- Proposed WTGs
- Study Area (17.2 km from WTGs)
- Roads
- State Forests
- Contours
- Watercourse

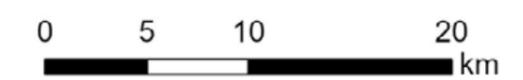


Figure 14 Key Landscape Features
Basemap Source - ESRI, 2024

5.5 Landscape Character Units (LCUs)

Landscape Character Units refer to 'areas of homogenous patterns of visual, physical, environmental and cultural characteristics such as landform, vegetation, water form and land use, as well as individual features' (Draft National Wind Farm Development Guidelines, 2010).

Due to the large scale of the Study Area and varying landscape character, the Study Area has been categorised into three (3) Landscape Character Units (LCU) to assist in the assessment. The LCUs are classified by slight variations in the landscape's geology, topography, land use and vegetation, which create distinct character areas within the Study Area. A combination has informed the LCUs of land use patterns, vegetation coverage, topographical maps, site images and site inspection.

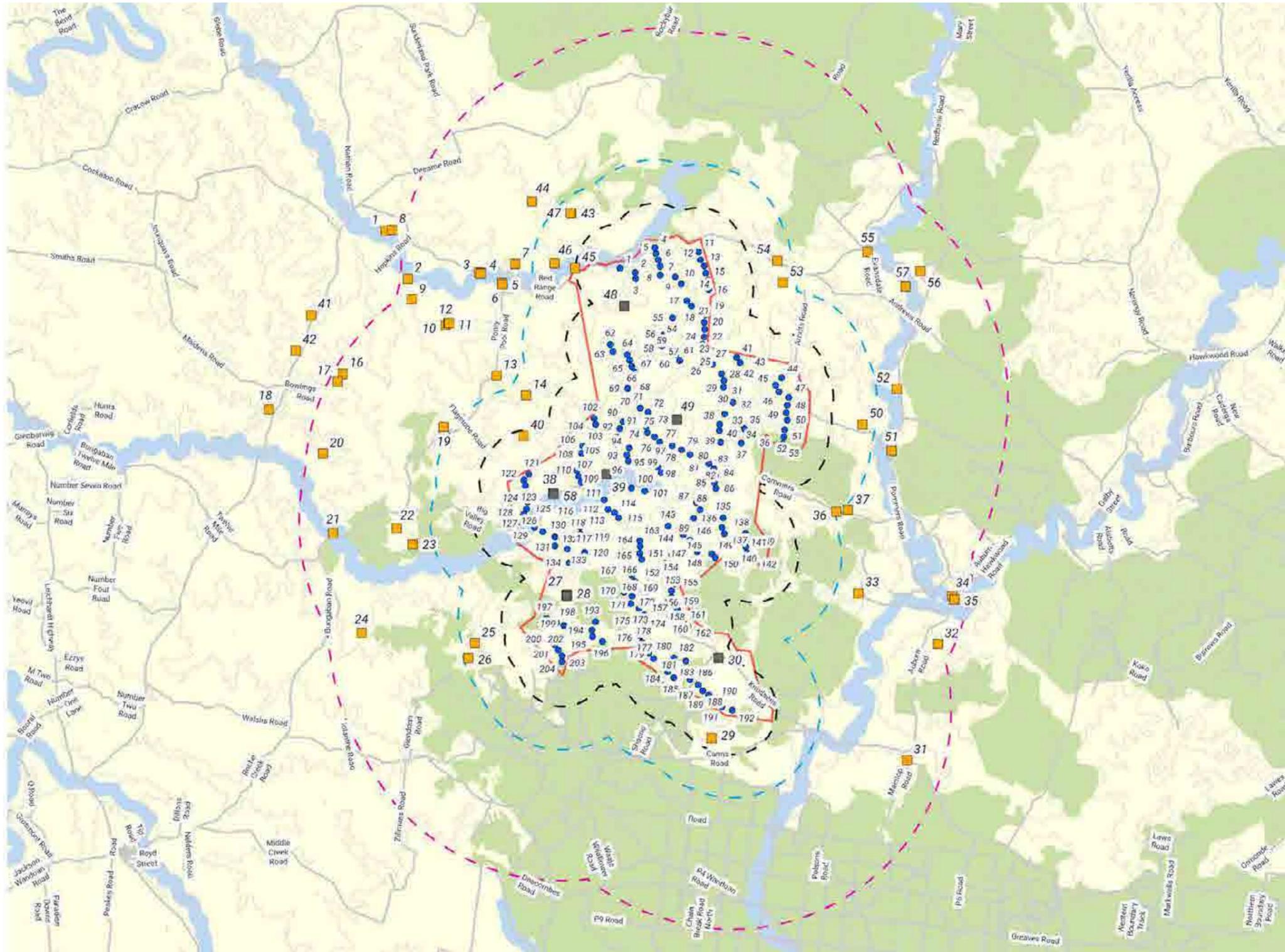
The general extent of the LCUs is shown in **Figure 15** on the following page, and a detailed description has been provided for each LCU.

The Scenic Quality 'Frame of Reference' has been applied to each LCU (refer to **Table 06**) to determine the level of visual significance. A Scenic Quality 'frame of reference' has been formulated by MS utilising an approach to landscape sensitivity assessment by Natural England (Tudor & Natural England, 2019).

Each category of the 'Frame of Reference' has been quantified for each Landscape Character Unit to determine a Low, Moderate or High Scenic Quality Rating.

SCENIC QUALITY FRAME OF REFERENCE			
SCENIC QUALITY RATING	LOW	MODERATE	HIGH
LANDFORMS	<ul style="list-style-type: none"> Flat topography Absence of landscape features Open, broad extents of spaces 		<ul style="list-style-type: none"> Diversity in topographical range Unique landscape features Intimate spaces
WATERFORM	<ul style="list-style-type: none"> Absence of water 		<ul style="list-style-type: none"> Presence of water Visually prominent lakes, reservoirs, rivers streams and swamps.
VEGETATION	<ul style="list-style-type: none"> Absence of vegetation Lack of diversity Land cleared of endemic vegetation Low level of connection between vegetation and landscape / topography 		<ul style="list-style-type: none"> Abundant vegetation High diversity High retention of endemic vegetation High level of connectivity between natural landscape and landforms
HUMAN INFLUENCE	<ul style="list-style-type: none"> High population High density in settlement High presence of infrastructure High levels of landscape modification 		<ul style="list-style-type: none"> Low / dispersed population No settlement Absence of infrastructure Landscape in natural state
ACTIVITY	<ul style="list-style-type: none"> High levels of traffic movement Presence of freight and passenger transport networks Presence of production or industry 		<ul style="list-style-type: none"> Low traffic movement Absence of freight and passenger transport Absence of production or industry
RARITY	<ul style="list-style-type: none"> Typical landscape within a local and regional context 		<ul style="list-style-type: none"> Unique combination of landscape features in a local and regional context
RELATIONSHIP WITH ADJOINING LANDSCAPES	<ul style="list-style-type: none"> Low visible connection with adjoining landscapes Low variability between adjoining landscapes Landscape features do not contribute to amenity from adjoining landscapes 		<ul style="list-style-type: none"> High visibility with adjoining landscapes High variability and contrast with adjoining landscapes Landscape features contribute significantly to amenity of adjoining landscapes

Table 06 Scenic Quality Frame of Reference



Landscape Character Units

Refer to Section 5.5

LEGEND

- Project Area
- Proposed WTGs
- Non-Associated Dwellings
- Associated Dwellings
- Study Area (17.2 km from WTGs)
- Visual Catchment (6.9 km from WTGs)
- Visual Catchment (3.5 km from WTGs)
- Roads
- Contours
- LCU01: Agricultural Pastures
- LCU02: Watercourses
- LCU03: State Forests & Vegetated Hills

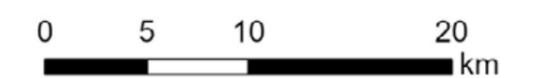


Figure 15 Landscape Character Units
Basemap Source - ESRI, 2024

5.5.1 LCU01 - Agricultural Pastures

The majority of the Project sits within this LCU. The land use primarily includes land cleared for grazing and cropping. The land within this LCU is highly modified. Vegetation within the LCU consists of boundary and fenceline vegetation. The terrain within this LCU can be classified as predominantly undulating, with some areas of reduced undulations.



Image 14 Aerial view of agricultural pastures



Image 15 Cleared agricultural land from Ponty Pool Road

LANDSCAPE CHARACTER UNIT	KEY LANDSCAPE FEATURES (dominant features within this zone)	KEY VIEWPOINTS	Application of Scenic Quality Rating Frame of Reference							SCENIC QUALITY RATING
			Landform	Waterform	Vegetation	Human Influence	Activity	Rarity	Relationship with Adjoining Landscapes	
LCU01 - Agricultural Pastures	Bungaban Creek, Cockatoo Creek, Johnsons Creek, Grant Creek, Auburn Creek.	Ponty Pool Road, Auburn Road, Bungaban Road, Roche Creek Road	H							LOW
			M							
			L	■	■	■	■	■	■	

Table 07 LCU01 - Agricultural Pastures

5.5.2 LCU02 - Watercourse Corridors

This LCU consists of the distinct corridors of the Auburn River and a series of creeks and gullies within the Study Area. The main creek corridors include Bungaban Creek, North Bungaban Creek, Cockatoo Creek, Johnsons Creek, Grant Creek, and Auburn Creek.

The vegetation of the water corridors distinguishes the character of this LCU.



Image 16 View of dry creek bed at Roche Creek



Image 17 Vegetation aligning Johnsons Creek



Image 18 Vegetation aligning Auburn River

LANDSCAPE CHARACTER UNIT	KEY LANDSCAPE FEATURES (dominant features within this zone)	KEY VIEWPOINTS	Application of Scenic Quality Rating Frame of Reference							SCENIC QUALITY RATING
			Landform	Waterform	Vegetation	Human Influence	Activity	Rarity	Relationship with Adjoining Landscapes	
LCU02 - Watercourse Corridors	Auburn River, Bungaban Creek, North Bungaban Creek, Cockatoo Creek, Johnsons Creek, Grant Creek, Auburn Creek.	Auburn River, Johnsons Creek, Roche Creek	H							MODERATE
			M							
			L	■	■	■	■	■	■	

Table 08 LCU02 - Watercourse Corridors

5.5.3 LCU03 - State Forests & Vegetated Hills

This LCU consists of the Barakula, Warranna, Rockybar, Ballymore, Mundell, Mount Auburn, Rosehall, Cooaga State Forests, and the surrounding vegetated hills in the Study Area.

The State Forests are predominantly used for grazing native vegetation and producing native forests. The land is modified and logged intermittently, with endemic native woodlands interspersed throughout the area. The Barakula State Forest south of the Project is the largest in the southern hemisphere, housing the production of various native trees, including cypress pine.

The prime native vegetation communities are associated with the Barakula, Banana-Auburn, and Taroom Downs subregions.



Image 19 Aerial view of Warranna State Forest



Image 20 View toward Barakula State Forest from Roche Creek Road

LANDSCAPE CHARACTER UNIT	KEY LANDSCAPE FEATURES (dominant features within this zone)	KEY VIEWPOINTS	Application of Scenic Quality Rating Frame of Reference							SCENIC QUALITY RATING
			Landform	Waterform	Vegetation	Human Influence	Activity	Rarity	Relationship with Adjoining Landscapes	
LCU03 - State Forests & Vegetated Hills	Barakula, Warranna, Rockybar, Ballymore, Mundell, Mount Auburn, Rosehall, Cooaga State Forests	Roche Creek Road, Knudsens Road, Auburn Road	H							LOW
			M							
			L	■	■	■	■	■	■	

Table 09 LCU03 - State Forests & Vegetated Hills

06 Viewpoint Analysis



6.0 Viewpoint Analysis

6.1 Viewpoint Analysis Methodology

The viewpoint analysis considers the likely visual impacts of the Project on the existing landscape character and visual amenity by selecting prominent sites, otherwise referred to as viewpoints.

Once the viewpoints have been selected, panoramic photographs are taken on a level tripod at a height of 150cm (to represent eye level). Photographs were taken with a Canon EOS R5 Mirrorless Camera through a 50mm fixed-focal lens, which closely represents the central field of vision of the human eye.

To ensure accuracy, the viewpoints' visual impact and topographic and aerial information are assessed on-site. The potential visual impacts are analysed for each viewpoint through a combination of 3D terrain modelling, topographic maps, and on-site analysis. Viewpoint photographs and analysis have been included in the following pages. The findings of the viewpoint analysis have been quantified and are summarised in **Table 11**.

6.2 Viewpoint Selection Process

Figure 17 identifies the locations of the viewpoints. Each viewpoint sheet notes the direction of the viewpoints. Topographical maps, fieldwork observations, and other relevant influences, such as access, landscape character, and the popularity of vantage points, have informed the selection of the viewpoints.

11 viewpoints were selected from publicly accessible locations to represent a range of views surrounding the Project Area.

Viewpoints are selected to illustrate a combination of the following:

- Areas of high landscape or scenic value
- Visual composition (e.g. focused or panoramic views, simple or complex landscape patterns)
- Range of distances
- Varying aspects
- Various elevations
- Various extents of development visibility (full and partial visibility)
- Views from major routes

6.3 Viewpoint Analysis Methodology

The potential visual impact of the Project is then assessed based on the relationship between the visual sensitivity (refer to **Section 6.3.1**) and visual magnitude (refer to **Section 6.3.2**).

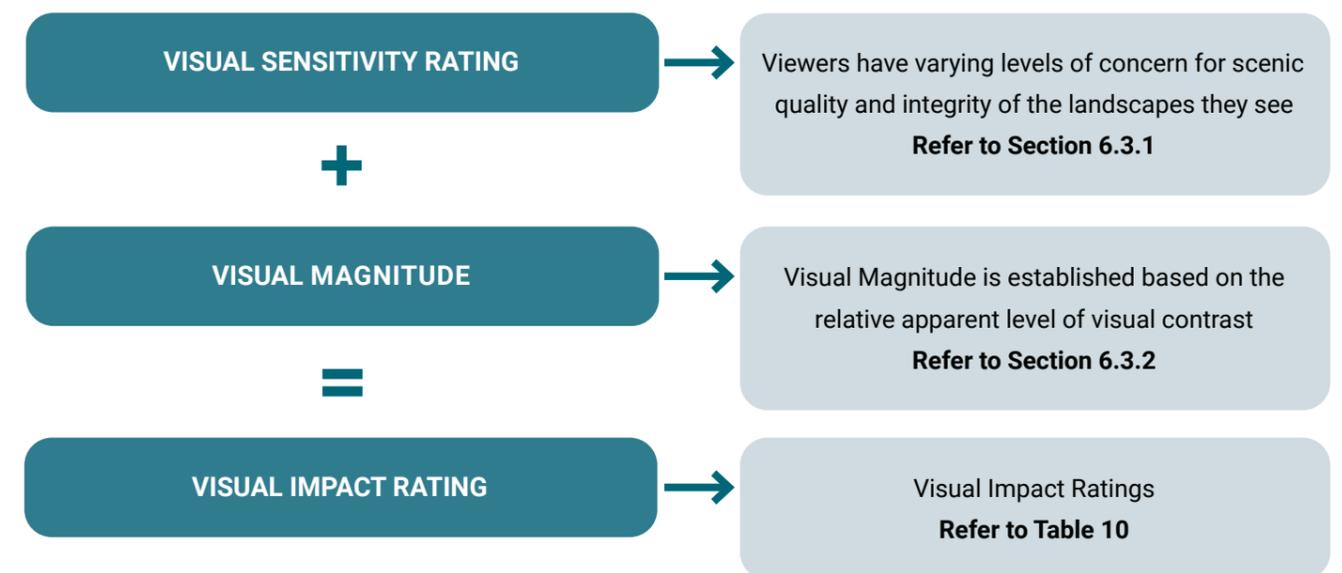


Figure 16 Viewpoint Analysis Methodology

6.3.1 Visual Sensitivity

Visual sensitivity measures how critically people from different areas view a change to the existing landscape. The assessment is based on the number of people affected, land use, and the viewer's distance from the proposal. As Section 5.6 outlines, the scenic quality of the receptor has also been considered when determining the visual sensitivity.

For example, a significant change not frequently seen may result in low visual sensitivity, although its impact on a landscape may be high. Generally, the following principles apply:

- Visual sensitivity decreases as the viewing time decreases.
- Visual sensitivity decreases as the number of potential viewers decreases.
- Visual sensitivity can also be related to viewer activity (e.g. a person viewing an affected site whilst engaged in recreational activities will be more strongly affected by change than someone passing a scene in a car travelling to a desired destination).

6.3.2 Visual Magnitude

Visual magnitude refers to the extent of change that receptors will experience. The objective ways of measuring and assessing the magnitude of change are determined by the combination of these factors identified below. These factors include:

- **Size and scale** - including the extent of existing landscape elements that may be lost and the contribution of that element to the character of the landscape;
- The **extent** to which the development becomes a minor or major element in the landscape and its **dominance** in the visual catchment;
- The extent to which the development changes the key characteristics of the landscape, which are critical to its distinctive character;
- The geographic area of the landscape over which the effects will be experienced. This could vary from the immediate setting of the development to larger scales where the development may influence several landscape character units;
- The **duration** and **reversibility** of the effects on the landscape; and/or
- The level of **contrast** and **compatibility**

6.3.3 Visual Impact

Visual Impact refers to the change in the landscape appearance due to the Proposal. Visual impact is the combined effect of visual sensitivity and magnitude (refer to **Table 10**).

This process involves a qualitative assessment of the conclusions of visual impact ratings for each viewpoint. The analysis considers other relevant influencing factors that are not easily addressed through the quantitative analysis.

Visual Impact				
		SENSITIVITY		
		LOW	MODERATE	HIGH
MAGNITUDE	HIGH	MODERATE	HIGH-MODERATE	HIGH
	MODERATE	MODERATE-LOW	MODERATE	HIGH-MODERATE
	LOW	LOW	MODERATE-LOW	MODERATE
	NEGLIGIBLE	NEGLIGIBLE		

Table 10 Visual Impact Rating

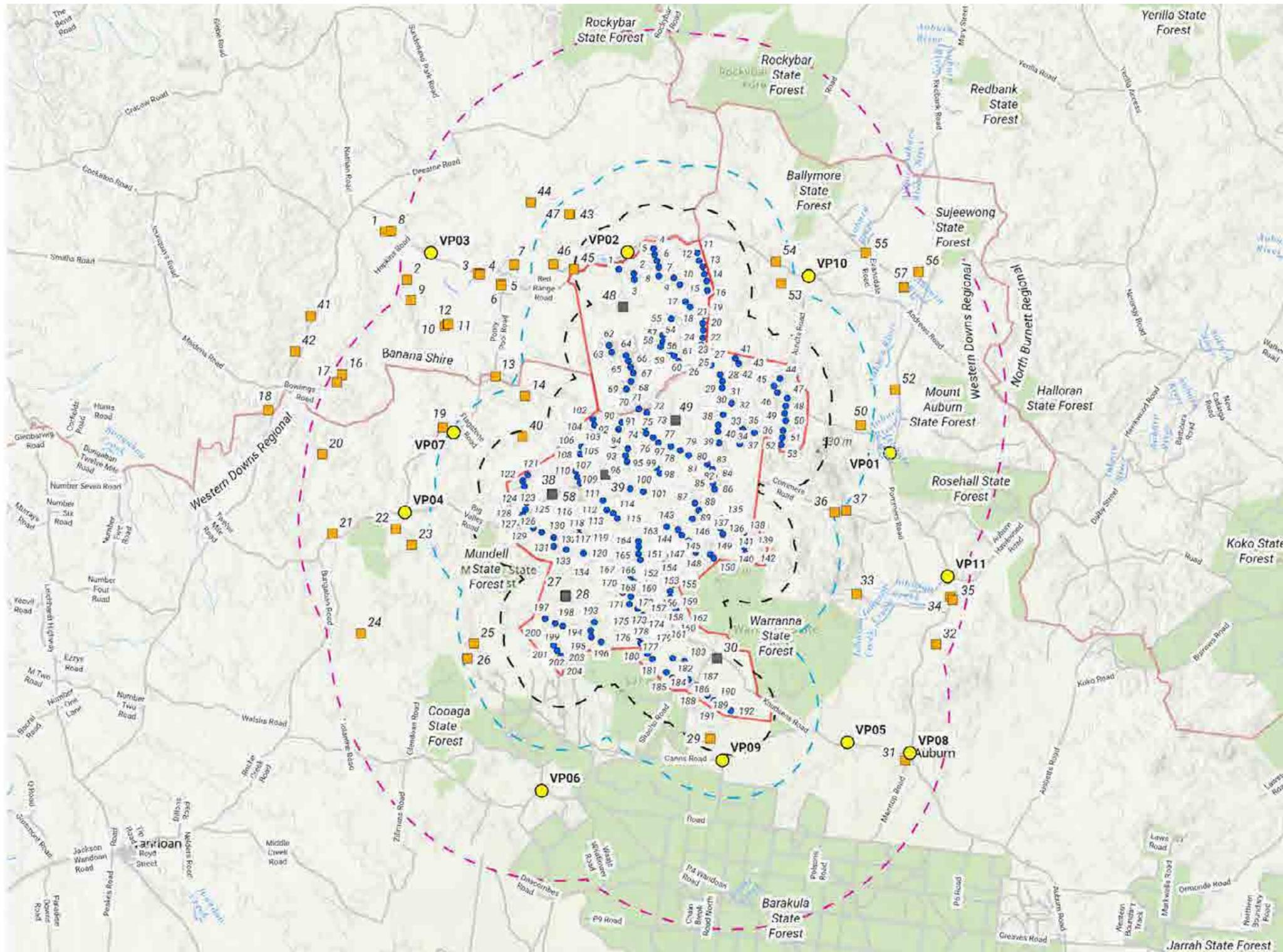
6.4 Summary of Viewpoint Analysis

The viewpoint analysis determined that two (2) viewpoints have a NEGLIGIBLE visual impact, seven (7) viewpoints have a LOW visual impact, one (1) viewpoint has a MODERATE-LOW visual impact, and one (1) viewpoint has a MODERATE visual impact.

It is noted that the VP02 is located in Banana Shire Council, which has no scenic amenity provisions within the planning scheme, and therefore, it does not require additional assessment as part of the viewpoint analysis.

Results of the Viewpoint Analysis					
Viewpoint	Location	Distance to Nearest WTG	Visual Sensitivity	Visual Magnitude	Visual Impact Rating
VP01	Near Auburn River State School, Auburn Road, Auburn	8.56 km	LOW	LOW	LOW
VP02	Red Range Road, Cockatoo	1.49 km	LOW	HIGH	MODERATE
VP03	Red Range Road, Cockatoo	14.83 km	LOW	LOW	LOW
VP04	Big Valley Road, Bungaban	8.86 km	LOW	LOW	LOW
VP05	Knudsens Road, Auburn	9.53 km	LOW	NEGLIGIBLE	NEGLIGIBLE
VP06	Roche Creek Road, Roche Creek	10.23 km	LOW	LOW	LOW
VP07	Ponty Pool Road, Bungaban	6.72 km	LOW	LOW	LOW
VP08	Knudsens Road, Auburn	14.50 km	LOW	NEGLIGIBLE	NEGLIGIBLE
VP09	Canns Road, Auburn	3.97 km	LOW	MODERATE	MODERATE - LOW
VP10	Andrews Road, Sujeewong	8.04 km	LOW	LOW	LOW
VP11	Auburn Road, Auburn	15.4 km	LOW	LOW	LOW

Table 11 Results of the Viewpoint Analysis



Viewpoint Locations

Refer to Section 6.1

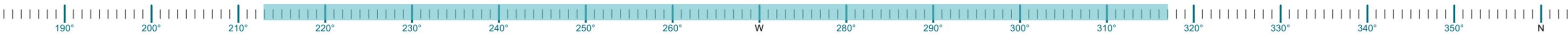
LEGEND

- Project Area
- Proposed WTGs
- Non-Associated Dwellings
- Associated Dwellings
- Viewpoint Locations
- Study Area (17.2 km from WTGs)
- Visual Catchment (6.9 km from WTGs)
- Visual Catchment (3.5 km from WTGs)
- LGA Boundary
- Roads
- State Forests
- Contours
- Watercourse

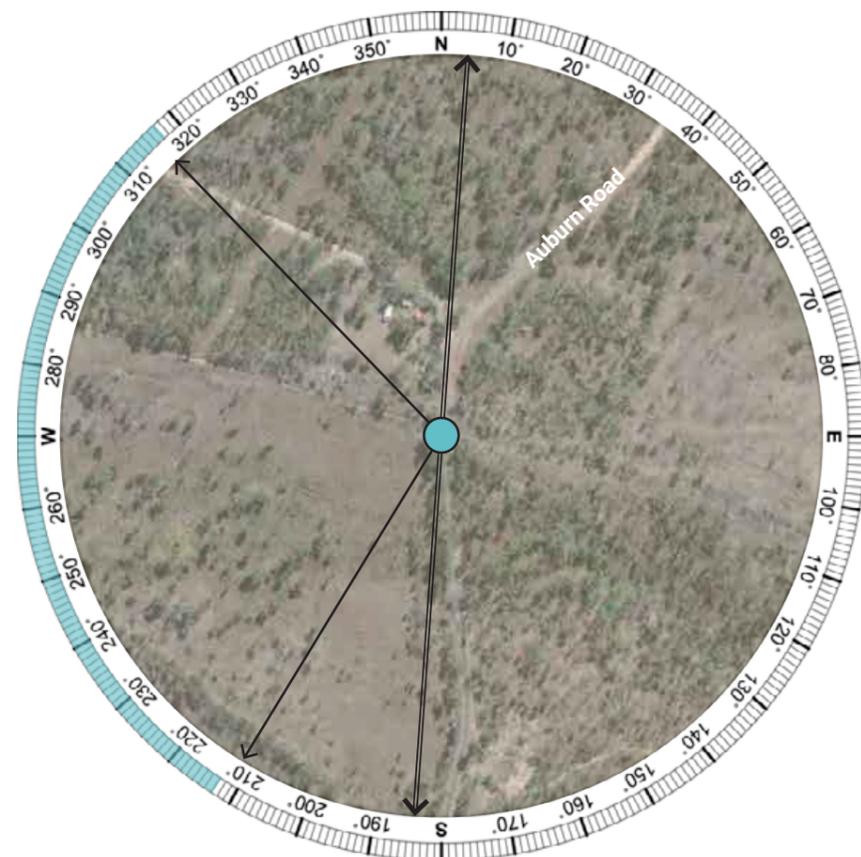
Figure 17 Viewpoint Locations
Basemap Source - ESRI, 2024

Viewpoint:

VP01 Auburn Road, Auburn



Extent of Potential Visibility



Viewpoint Summary:

Location: Near Auburn River State School, Auburn Road, Auburn
 Elevation: 304 m

Coordinates: 25°50'58.34"S, 150°34'8.75"E
 Distance to Project: 8.56 km

Viewing Direction: West

Visual Sensitivity: LOW

Visual Magnitude: LOW

Visual Impact: **LOW**

- Extent of Panorama
- Approximate Extent of Project

Aerial Source: ESRI, 2024

Existing Landscape Character Description:

This viewpoint is located along sealed Auburn Road, near the Auburn River State School, looking west toward the Project.

The surrounding landscape is characterised by undulating topography, with dense vegetation along the road corridor. The dense vegetation surrounding the road corridor is associated with the Rosehall State Forest east of the Project. The land is utilised for native grazing and production forestry.

Filtered views of the vegetated hills to the west form part of the background of views from this location.

The visual sensitivity of this viewpoint has been rated as **LOW**.



Potential Visual Impact:

From this location, the Project will be a new visual feature in the landscape along the distant ridgeline to the west. Dense vegetation within the immediate foreground will fragment most of the turbines, except one fully visible WTG to the immediate west.

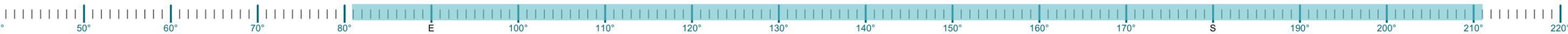
Due to the distance of the proposed WTGs, it is unlikely that the Project will dominate or disturb the existing landscape feature of this view. Therefore, the visual magnitude has been rated as **LOW** - resulting in a **LOW** visual impact overall.

As shown in Section 7.0 - a photomontage has been prepared from this location to demonstrate this.

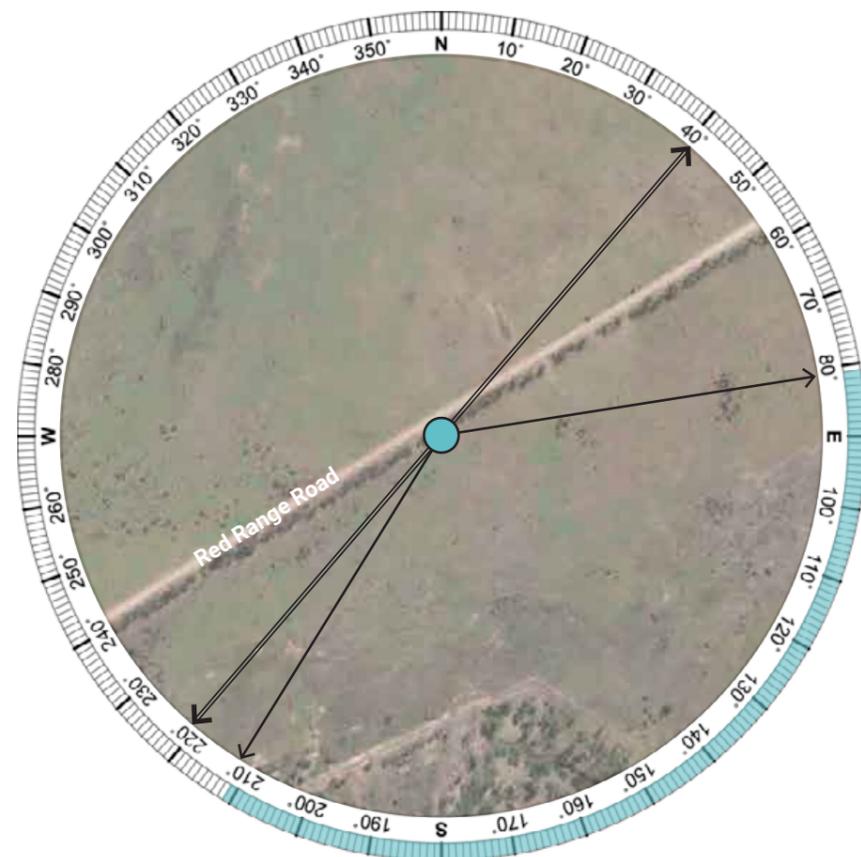
VP Location

Viewpoint:

VP02 Red Range Road, Cockatoo



Extent of Potential Visibility



Viewpoint Summary:

Location:	Elevation:
Red Range Road, Cockatoo	318 m
Coordinates:	Distance to Project:
25°42'12.64"S, 150°21'58.35"E	1.49 km
Viewing Direction:	
Southeast	
Visual Sensitivity:	
LOW	
Visual Magnitude:	
HIGH	
Visual Impact:	
MODERATE	

- Extent of Panorama
- Approximate Extent of Project

Aerial Source: ESRI, 2024

Existing Landscape Character Description:

This viewpoint is located along the unsealed Red Range Road, looking southeast toward the Project.

The surrounding land is characterised by the gently undulating topography. It is predominantly cleared for and been utilised for agricultural pastures, with limited vegetation visible in the foreground. Dense vegetation associated with Auburn Creek is visible in the background of the view.

The visual sensitivity of this viewpoint has been rated as **LOW**.

Potential Visual Impact:

From the unsealed road to the north, the Project will introduce a new visual element due to its close proximity to the viewpoint looking south.

The magnitude of the viewpoint is assessed as **HIGH**, reflecting the alteration of landscape character in the immediate area. It is important to note that this viewpoint is situated along a low-use unsealed road, characterised by low sensitivity and a modified landscape in the foreground, resulting in an overall low scenic quality.

As a result, the combined results lead to a **MODERATE** visual impact overall.

As shown in Section 7.0 - a photomontage has been prepared from this location to demonstrate this.



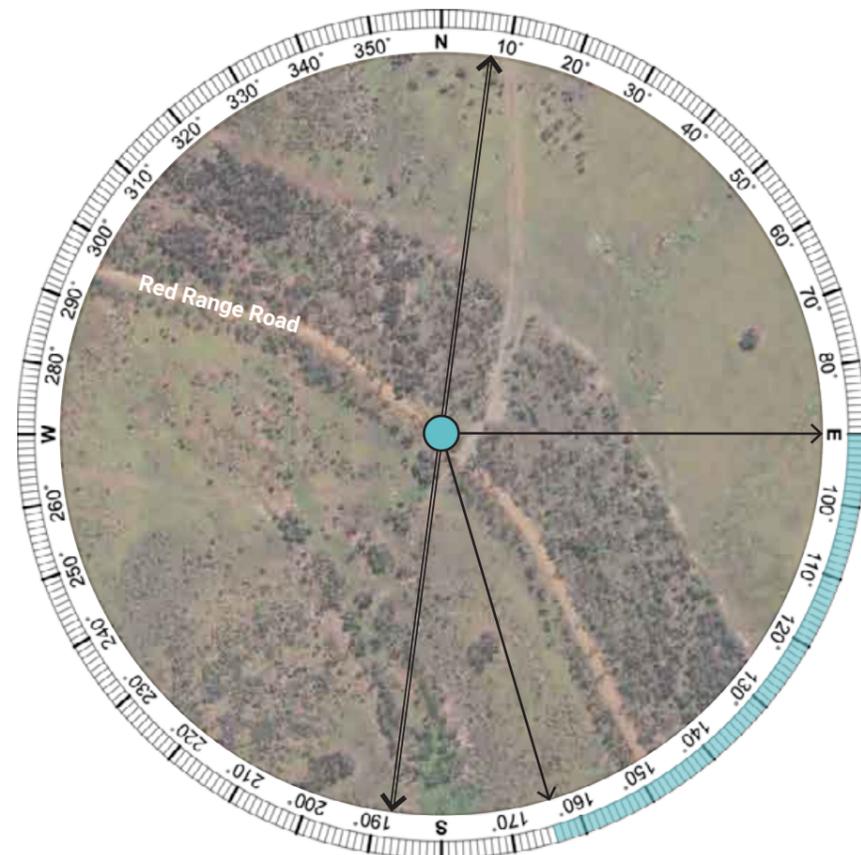
VP Location

Viewpoint:

VP03 Red Range Road, Cockatoo



Extent of Potential Visibility



Viewpoint Summary:

Location:	Elevation:
Red Range Road, Cockatoo	236 m
Coordinates:	Distance to Project:
25°42'4.34"S, 150°12'44.57"E	14.83 km
Viewing Direction:	
East	
Visual Sensitivity:	
LOW	
Visual Magnitude:	
NEGLECTIBLE	
Visual Impact:	
NEGLECTIBLE	

- ⇒ Extent of Panorama
- Approximate Extent of Project

Aerial Source: ESRI, 2024

Existing Landscape Character Description:

This viewpoint is located on the unsealed Red Range Road, looking southeast toward the Project.

The surrounding landscape is characterised by gently undulating topography, and dense to scattered native vegetation lines the road and filters views from this location.

Grazing native vegetation is the predominant land use in the area.

The visual sensitivity of this viewpoint has been rated as **LOW**.

Potential Visual Impact:

Due to the distance from this viewpoint and intervening screening elements in the foreground, including established vegetation - the Project will be screened, with no opportunity for visibility from this location. This results in a **NEGLECTIBLE** visual magnitude.

Combined with a **LOW** sensitivity, this leads to an overall **NEGLECTIBLE** visual impact.



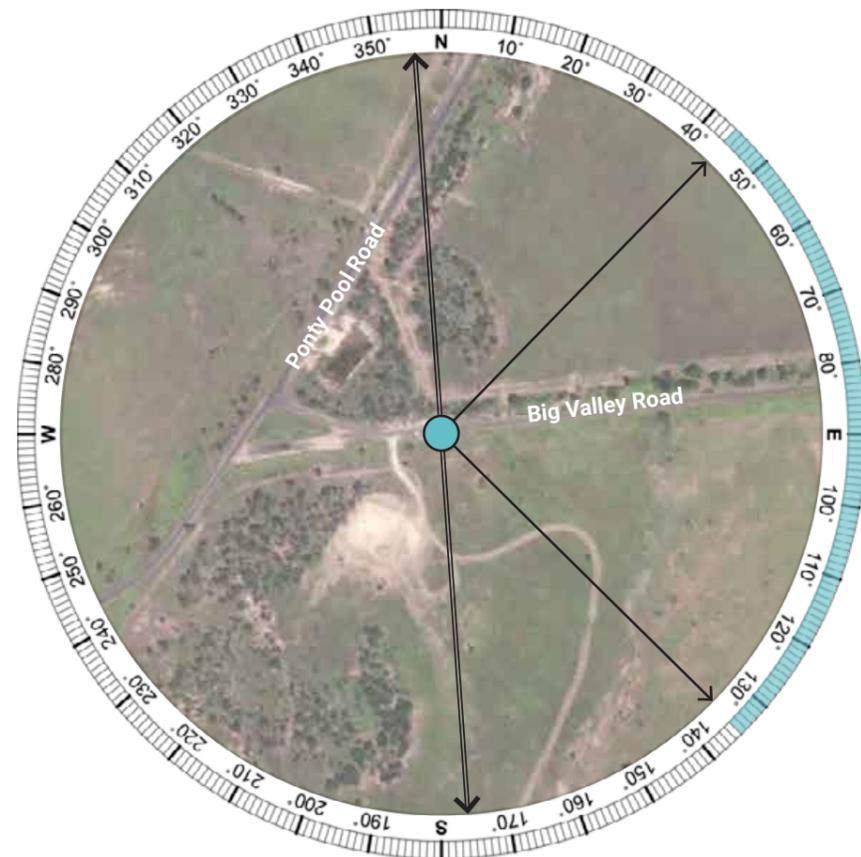
VP Location

Viewpoint:

VP04 Big Valley Road, Bungaban



Extent of Potential Visibility



Viewpoint Summary:

Location:	Elevation:
Big Valley Road, Bungaban	342 m
Coordinates:	Distance to Project:
25°53'5.09"S, 150°11'14.74"E	8.86 km
Viewing Direction:	
East	
Visual Sensitivity:	
LOW	
Visual Magnitude:	
LOW	
Visual Impact:	
LOW	

- Extent of Panorama
- Approximate Extent of Project

Aerial Source: ESRI, 2024

Existing Landscape Character Description:

This viewpoint is located on the sealed Big Valley Road, looking East toward the Project. The surrounding landscape is characterised by gently undulating topography.

The area to the has been largely cleared and modified, with roadside vegetation lining the road to the north, and remnant scattered vegetation to the south. Dense vegetation associated with Mundell State Forest is visible in the background to the southeast.

The predominant land use in the area is grazing native vegetation. The visual sensitivity of this viewpoint has been rated as **LOW**.

Potential Visual Impact:

The Project will be a new, non-dominant visual element in the landscape to the southeast, visible as part of the far background of this view. A large portion of the Project to the northeast will be screened or filtered due to a combination of topography and roadside vegetation.

The introduction of the Project does not alter the existing landscape features, which primarily consist of cleared agricultural pastures and roadside vegetation that define this view.

As a result, the visual magnitude of change is assessed as **LOW**, assessed as a **LOW** visual impact overall.

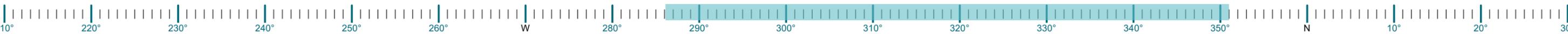
As shown in Section 7.0 - a photomontage has been prepared from this location to demonstrate this.



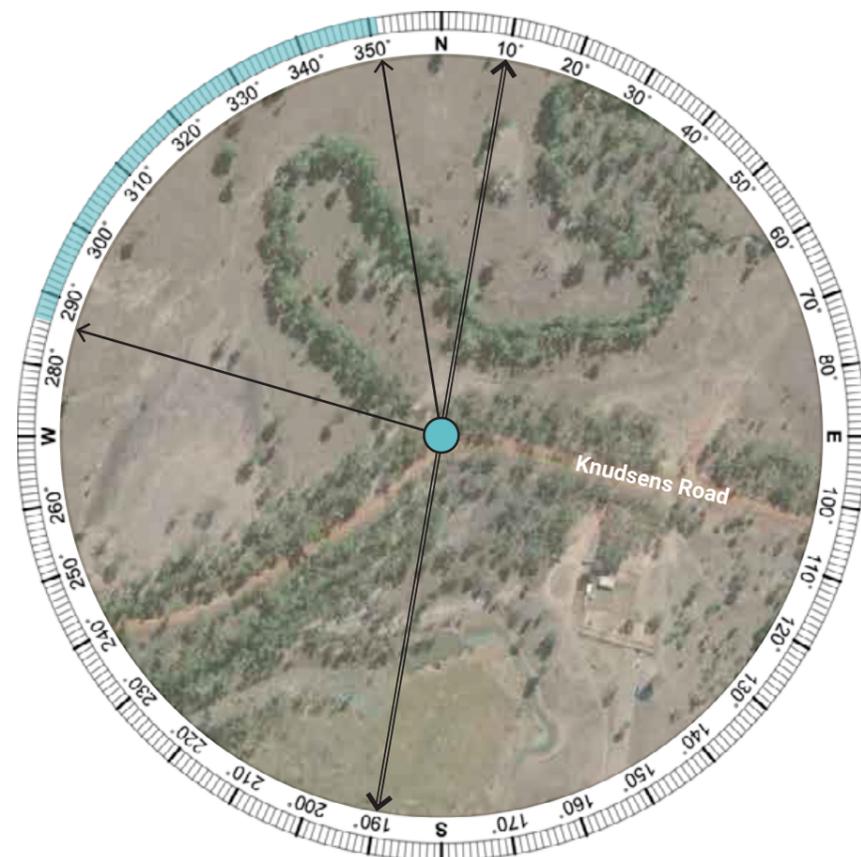
VP Location

Viewpoint:

VP05 Knudsens Road, Auburn



Extent of Potential Visibility



Viewpoint Summary:

Location: Knudsens Road, Auburn
Elevation: 293 m

Coordinates: 26° 3'14.80"S, 150°31'52.62"E
Distance to Project: 9.53 km

Viewing Direction: Northwest

Visual Sensitivity: LOW

Visual Magnitude: NEGLIGIBLE

Visual Impact: **NEGLIGIBLE**

- Extent of Panorama
- Approximate Extent of Project

Aerial Source: ESRI, 2024

Existing Landscape Character Description:

This viewpoint is located on the unsealed Knudsens Road, looking northwest toward the Project.

The surrounding landscape is characterised by gently undulating topography and dense native vegetation associated with Johnson Creek.

The predominant land use in the area is grazing native vegetation and production forestry.

The visual sensitivity of this viewpoint has been rated as **LOW**.

Potential Visual Impact:

Due to the combined factors of distance and intervening vegetation in the foreground, the magnitude of change is assessed as **NEGLIGIBLE**, resulting in an overall **NEGLIGIBLE** visual impact for this viewpoint along Knudsens Road.



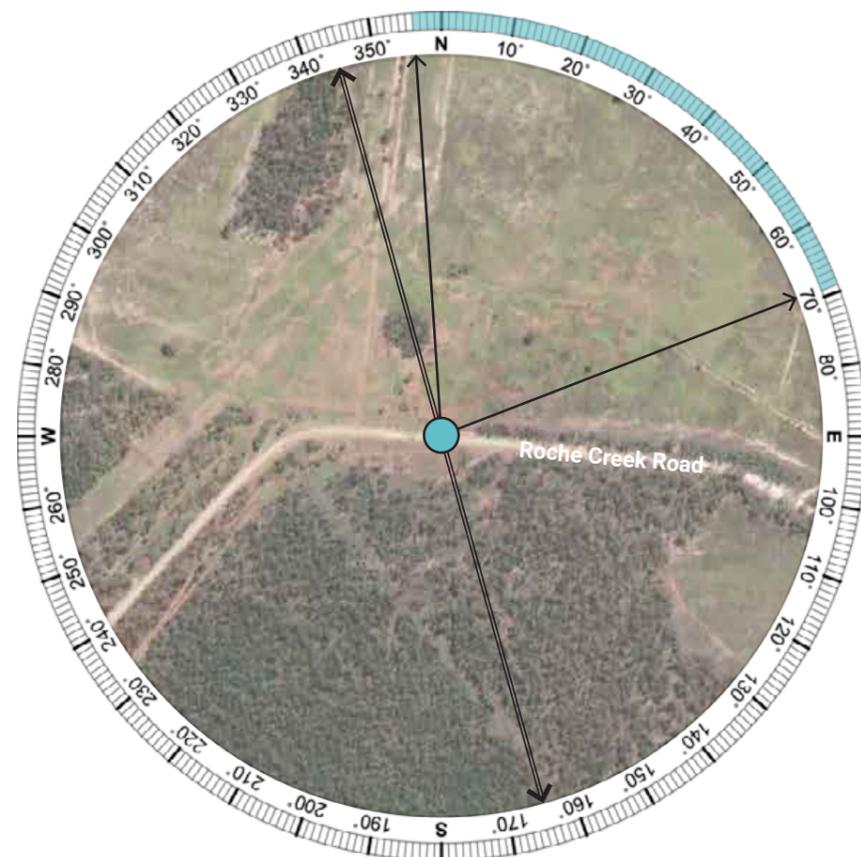
VP Location

Viewpoint:

VP06 Roche Creek Road, Roche Creek



Extent of Potential Visibility



Viewpoint Summary:

Location:	Elevation:
Roche Creek Road, Roche Creek	364 m
Coordinates:	Distance to Project:
26° 5'2.80"S, 150°17'24.69"E	10.23 km
Viewing Direction:	
Northeast	
Visual Sensitivity:	
LOW	
Visual Magnitude:	
LOW	
Visual Impact:	
LOW	

- Extent of Panorama
- Approximate Extent of Project

Aerial Source: ESRI, 2024

Existing Landscape Character Description:

This viewpoint is located on the unsealed Roche Creek Road, looking northeast toward the Project.

The surrounding landscape is characterised by gently undulating topography with scattered foreground vegetation and dense vegetation in the background of the view, associated with Barakula State Forest.

The predominant land use in the area is production forestry, suggested that this area may be logged intermittently.

The visual sensitivity of this viewpoint has been rated as **LOW**.

Potential Visual Impact:

The Project will be a new, non-dominant visual element in the landscape to the northeast, visible as part of the far background of this view.

The introduction of the Project does not alter the existing landscape features, which primarily consist of cleared agricultural pastures and roadside vegetation that define this view.

As a result, the visual magnitude of change is assessed as **LOW**, assessed as a **LOW** visual impact overall.

As shown in Section 7.0 - a photomontage has been prepared from this location to demonstrate this.

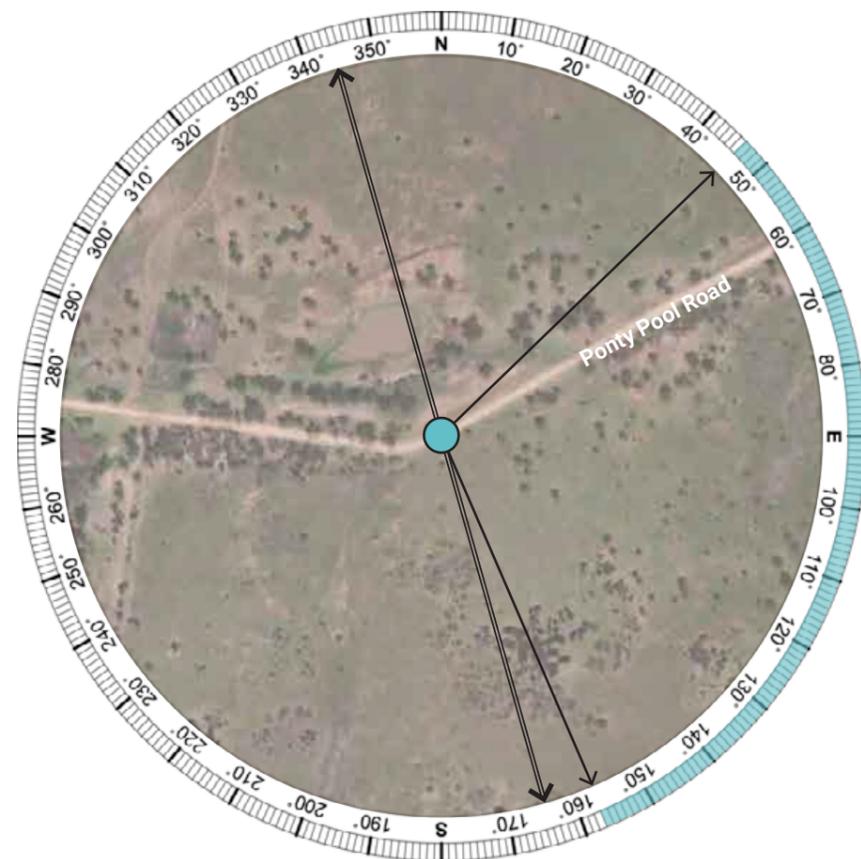


Viewpoint:

VP07 Ponty Pool Road, Bungaban



Extent of Potential Visibility



Viewpoint Summary:

Location:	Elevation:
Ponty Pool Road, Bungaban	272 m
Coordinates:	Distance to Project:
25°49'43.12"S, 150°13'37.51"E	6.72 km
Viewing Direction:	
East	
Visual Sensitivity:	
LOW	
Visual Magnitude:	
LOW	
Visual Impact:	
LOW	

- Extent of Panorama
- Approximate Extent of Project

Aerial Source: ESRI, 2024

Existing Landscape Character Description:

This viewpoint is located on the unsealed Ponty Pool Road, looking east toward the Project.

The surrounding landscape is characterised by gently undulating topography, and native pastures with scattered remnant vegetation. Native vegetation intermittently lines the roadsides.

The predominant land use in the area is grazing native vegetation.

The visual sensitivity of this viewpoint has been rated as **LOW**.

Potential Visual Impact:

The Project will be a new visual element in the landscape to the southeast, visible as part of the far background of this view. A portion of the Project to the east will be screened or filtered due to a combination of topography and roadside vegetation.

The introduction of the Project does not alter the existing landscape features, which primarily consist of cleared agricultural pastures and roadside vegetation that define this view.

As a result, the visual magnitude of change is assessed as **LOW**, assessed as a **LOW** visual impact overall.

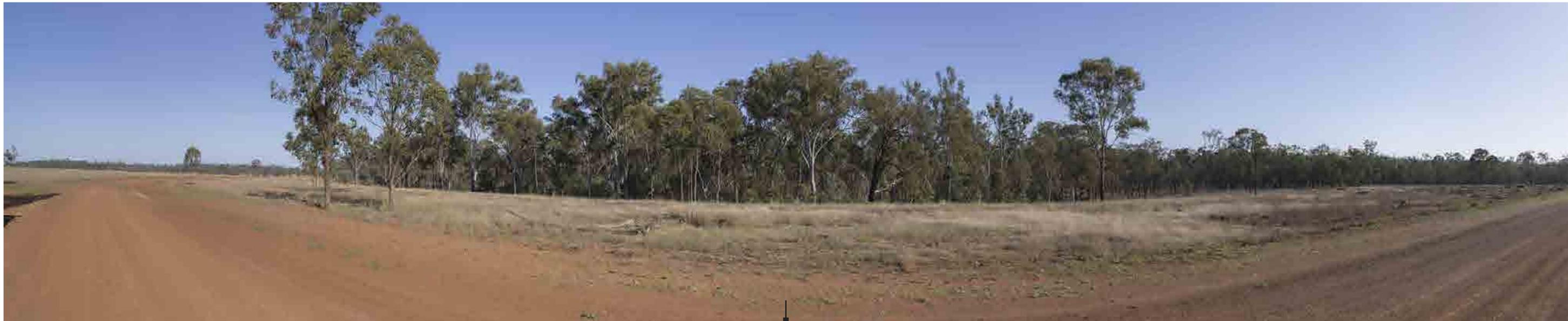
As shown in Section 7.0 - a photomontage has been prepared from this location to demonstrate this.



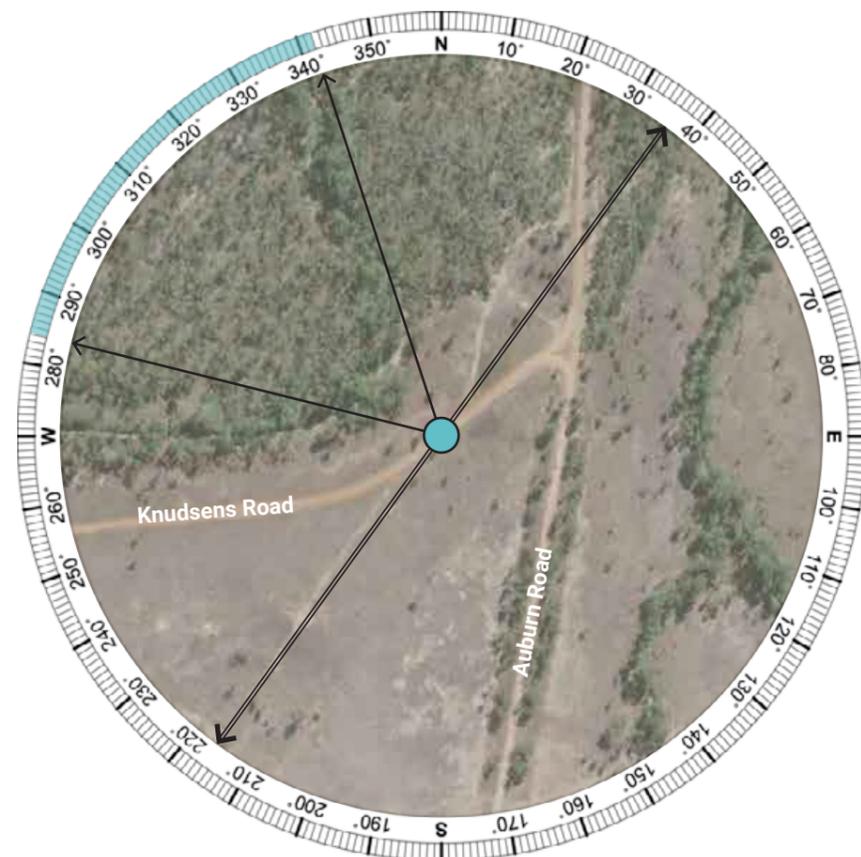
VP Location

Viewpoint:

VP08 Knudsens Road, Auburn



Extent of Potential Visibility



Viewpoint Summary:

Location: Knudsens Road, Auburn
Elevation: 301 m

Coordinates: 26° 3'44.61"S, 150°34'49.22"E
Distance to Project: 14.50 km

Viewing Direction: Northwest

Visual Sensitivity: LOW

Visual Magnitude: NEGLIGIBLE

Visual Impact: **NEGLIGIBLE**

→ Extent of Panorama
→ Approximate Extent of Project

Aerial Source: ESRI, 2024

Existing Landscape Character Description:

This viewpoint is located on the unsealed Knudsens Road, 150 m from the intersection with Auburn Road, looking northwest toward the Project.

The surrounding landscape is characterised by gently undulating topography, and dense native vegetation in the foreground and background of the view.

The predominant land use in the area is native grazing vegetation.

The visual sensitivity of this viewpoint has been rated as **LOW**.

Potential Visual Impact:

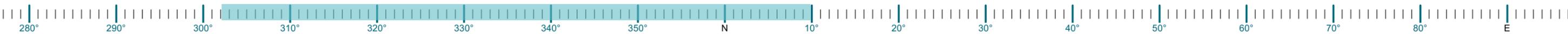
Due to the combined factors of distance and intervening vegetation in the foreground, the magnitude of change is assessed as **NEGLIGIBLE**, resulting in an overall **NEGLIGIBLE** visual impact.



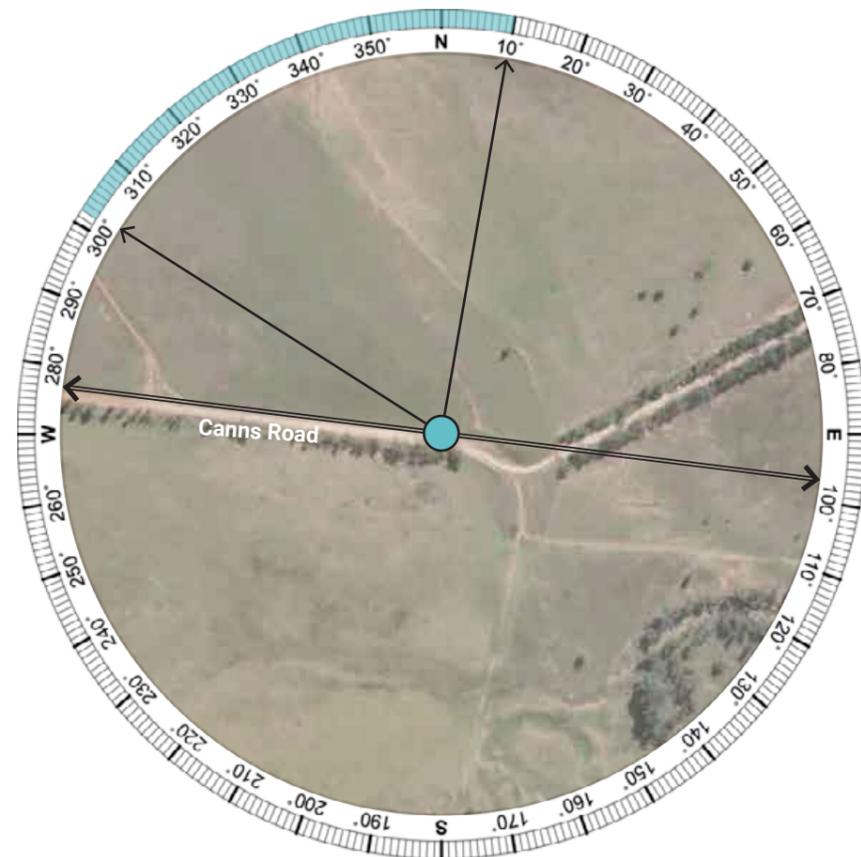
VP Location

Viewpoint:

VP09 Canns Road, Auburn



Extent of Potential Visibility



Viewpoint Summary:

Location: Canns Road, Auburn
Elevation: 316 m

Coordinates: 25°43'22.16"S, 150°30'27.81"E
Distance to Project: 3.97 km

Viewing Direction: North

Visual Sensitivity: LOW

Visual Magnitude: MODERATE

Visual Impact: **MODERATE-LOW**

- Extent of Panorama
- Approximate Extent of Project

Aerial Source: ESRI, 2024

Existing Landscape Character Description:

This viewpoint is located on the unsealed Canns Road, 100 m from the intersection with Greaves Road, looking north toward the Project.

The surrounding landscape is characterised by flat terrain, with gently undulating topography in the background. The land has been cleared for agricultural purposes

The predominant land use in the area is grazing native vegetation.

The visual sensitivity of this viewpoint has been rated as **LOW**.

Potential Visual Impact:

From this unsealed road, the Project will a new visual element in the landscape.

The magnitude of the viewpoint is assessed as **MODERATE**, reflecting the alteration of landscape character in the immediate area. It is important to note that this viewpoint is situated along a low-use unsealed road, characterised by low sensitivity and a modified landscape in the foreground, resulting in an overall low scenic quality.

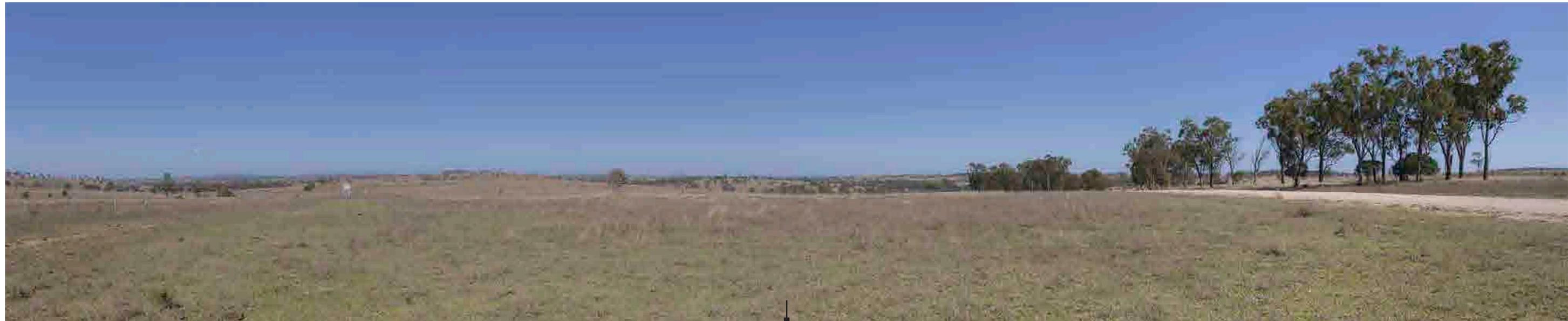
As a result, the combined results lead to a **MODERATE-LOW** visual impact overall.



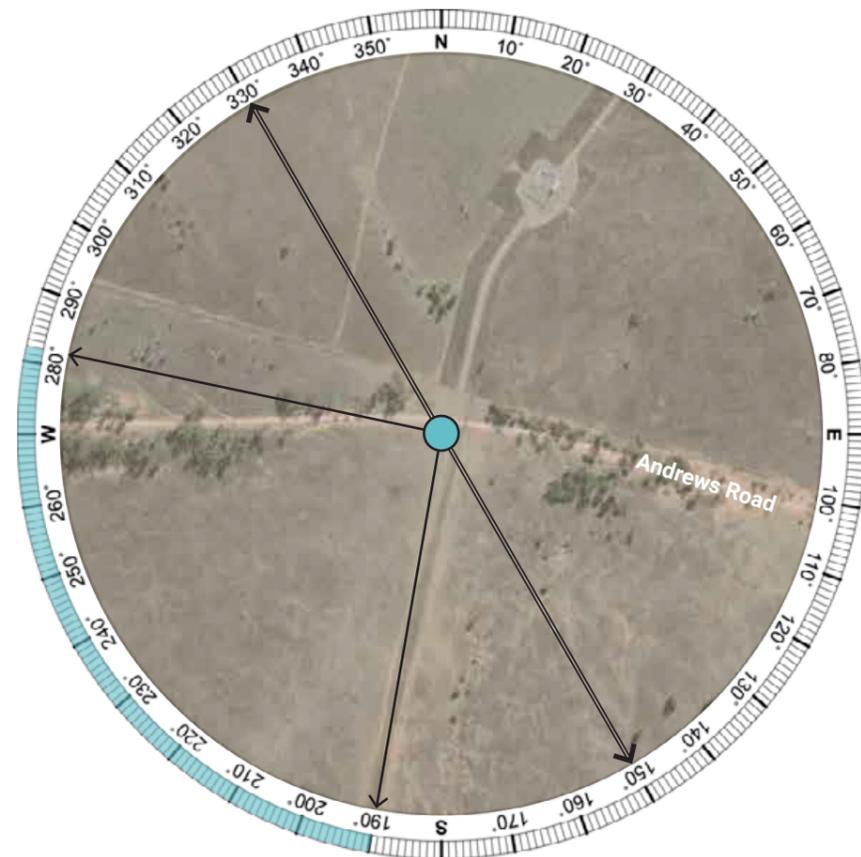
VP Location

Viewpoint:

VP10 Andrews Road, Sujeewong



Extent of Potential Visibility



Viewpoint Summary:

Location:	Elevation:
Andrews Road, Sujeewong	342 m
Coordinates:	Distance to Project:
26° 3'54.16"S 150°25'57.79"E	8.04 km
Viewing Direction:	
Southwest	
Visual Sensitivity:	
LOW	
Visual Magnitude:	
LOW	
Visual Impact:	
LOW	

- Extent of Panorama
- Approximate Extent of Project

Aerial Source: ESRI, 2024

Existing Landscape Character Description:

This viewpoint is located on the unsealed Andrews Road looking southwest toward the Project.

The surrounding landscape is characterised by flat gently undulating topography, cleared land for agricultural purposes and scattered native vegetation.

The predominant land use in the area is grazing native vegetation.

The visual sensitivity of this viewpoint has been rated as **LOW**.

Potential Visual Impact:

The Project will introduce a new, non-dominant visual element to the southwest, appearing in the far background of the view. It does not modify existing landscape features, which mainly include cleared agricultural pastures and roadside vegetation that characterise this view.

Given the small proportion of the Project within this context, the visual magnitude of change is assessed as **LOW**, resulting in an overall **LOW** visual impact.



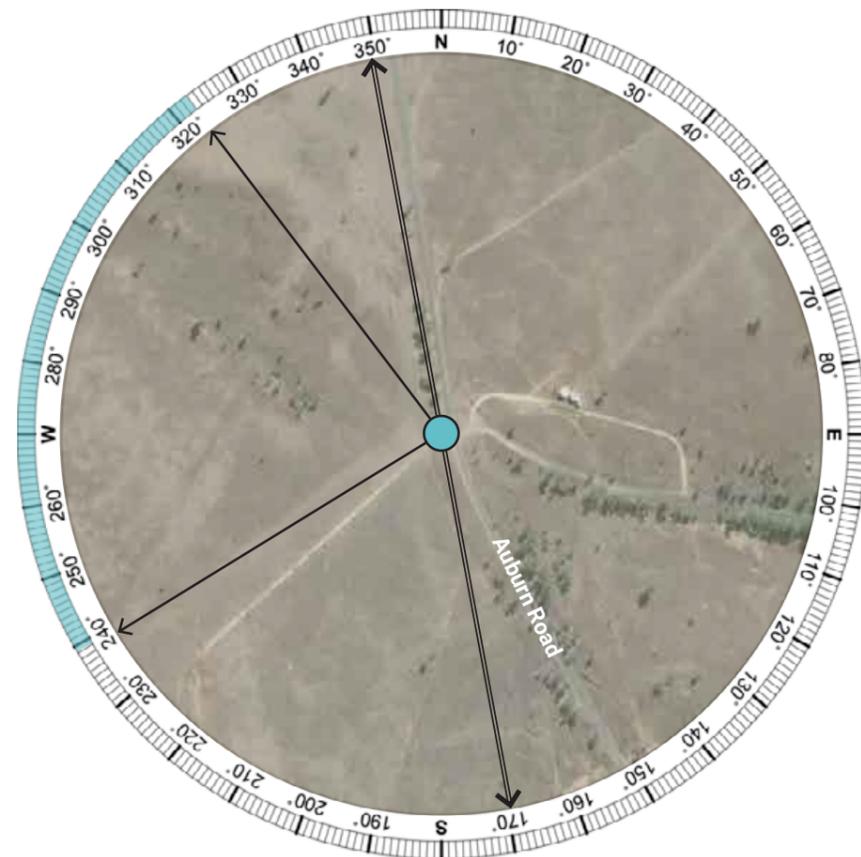
VP Location

Viewpoint:

VP11 Auburn Road, Auburn



Extent of Potential Visibility



Viewpoint Summary:

Location: Auburn Road, Auburn
Elevation: 323 m

Coordinates: 25°56'15.97"S, 150°36'44.74"E
Distance to Project: 15.4 km

Viewing Direction: West

Visual Sensitivity: LOW

Visual Magnitude: LOW

Visual Impact: **LOW**

- Extent of Panorama
- Approximate Extent of Project

Aerial Source: ESRI, 2024

Existing Landscape Character Description:

This viewpoint is located on Auburn Road looking west toward the Project.

The surrounding landscape is characterised by flat gently undulating topography, cleared land for agricultural purposes and scattered native vegetation.

The predominant land use in the area is grazing native vegetation.

The visual sensitivity of this viewpoint has been rated as **LOW**.

Potential Visual Impact:

The Project will introduce a new, non-dominant visual element to the southwest, appearing in the far background of the view along distant ridgelines. Due to the scale of the distant ridgelines, the Project is unlikely to disrupt the visual dominance of this ridgeline or the foreground landscape features, which are characterised by agricultural pastures and scattered vegetation.

Given the small proportion of the Project within this context, the visual magnitude of change is assessed as **LOW**, resulting in an overall **LOW** visual impact.



VP Location

6.5 Overview of Visual Impacts on LCUs

LCU	Scenic Quality Rating	Overview of Visual Impacts	Landscape Character Impact Rating
LCU01 - Agricultural Pastures	LOW	LCU01 comprises agricultural pastures primarily used for grazing and cropping. The majority of the Project is located in this LCU. The Project will be a new visual element in this landscape type; however, it is highly modified within the regional context, with very few areas undisturbed from production and farming practices. Intervening elements such as existing stands of vegetation fragment some views when travelling along key low-use unsealed roads within the region, with most nearby rural properties surrounded by vegetation. The Project is unlikely to take away from the key existing features of this LCU.	LOW
LCU02 - Watercourse Corridors	MODERATE	The Project's visibility from the watercourses within LCU02 is minimal due to intervening riparian vegetation that screens clear views. While the Project may be intermittently visible from LCU02 and be a new visual element, its visual impact is reduced because the area is not widely accessible and the vegetation provides adequate screening. Consequently, the Project's effect on the landscape character of LCU02 is considered low.	LOW
LCU03 - State Forests & Vegetated Hills	LOW	The Project is partially sited within LCU03, which is characterised by state forests and modified landscapes. Views from this LCU are heavily fragmented due to the vegetation character when travelling through these state forests and vegetated hills. Although some intermittent views may be possible through vegetation breaks or nearby pastures, the Project's visual impact on the overall landscape remains low and does not significantly alter the area's character.	LOW

Table 12 Overview of Visual Impacts on LCUs

6.6 Performance Objectives

Performance Objectives	Assessment
<p>PO1</p> <p>Development within High Landscape Value Areas identified on the Scenic amenity overlay maps (OM-011):</p> <p>(a) maintains and enhances the landscape character, scenic amenity and tourism values of the locality and the Western Downs region;</p>	<p>A landscape character assessment was undertaken using the Scenic Quality 'Frame of Reference' (as shown in Section 5.0) to determine the level of visual significance and quality of the landscape within the Study Area. The assessment determined that there were three (3) LCUs evident within the Study Area which returned two (2) LOW scenic quality ratings and one (1) MODERATE rating. The identified HLV Area formed part of the LCU03 State Forests and Vegetated Hills which returned a LOW scenic quality rating. This was determined due to the following factors:</p> <ul style="list-style-type: none"> - Slightly undulating topography - Absence of waterforms - Modified plantation forestry of both native and exotic species - Degraded and cleared sections reflecting the forestry land use <p>Although the Project will be a new introduced feature in the landscape, it is compatible with the existing agricultural land use of the area and does not compete with views towards any significant ridgelines or features. As a result, the Project does not reduce the landscape character values identified in the 8.2.9 Scenic Amenity Code PO01.</p>
<p>(b) mitigates the scenic amenity impacts of buildings or structures visible at the skyline or positioned on a ridgeline when viewed from a highway, main road or Scenic Route;</p>	<p>Within the Study Area there are no nominated scenic routes, highways or major roads - only low use local roads (both sealed and unsealed). The high landscape value area where the Project intersects is Knudsens Road.</p> <p>Knudsens Road is a low-use unsealed road servicing nearby rural properties and is not a main road, highway or scenic route. As shown in PM05, the photomontage indicates that the proposed WTGs are heavily fragmented by intervening vegetation associated with this State Forest.</p> <p>The Project does not interfere with key ridgelines within the immediate region, as no ridgelines are present in this area of high landscape value.</p>
<p>(c) is fully screened by an existing natural landform or native vegetation, or will be fully screened by native vegetation within 5 years of construction when viewed from a Scenic Route unless development supports tourism;</p>	<p>N/A (not identified as a Scenic Road - Knudsens Road is a low use unsealed road)</p>
<p>(d) retains existing vegetation and incorporates landscaping to visually soften built form elements;</p>	<p>It is recommended that the Proponent minimises the vegetation clearing for WTGs to the immediate north of Knudsens Road as a mitigation measure to ensure that the Project remains heavily filtered when travelling through the adjoining State Forests.</p>
<p>(e) incorporates building materials and external finishes that are compatible with the visual amenity and the landscape character of the locality; and</p>	<p>Developer to consider the material and colour finishes of WTGs and associated infrastructure during the detailed design and construction phases of the Project - in addition to minimising vegetation loss during these phases.</p>
<p>(f) minimises visual impacts on the High Landscape Values area in terms of:</p> <p>(i) the scale, height and setback of buildings;</p> <p>(ii) the extent of earthworks and impacts on the landform including the location and configuration of access roads and driveways; and</p> <p>(i) the scale, extent and visual prominence of advertising devices.</p>	<p>As outlined in the viewpoint analysis & associated infrastructure sections.</p>

Table 13 Performance Objectives (Western Downs - HLV Area)

07 Photomontages



7.0 Photomontages

7.1 Overview of Photomontages

7.1.1 Photomontages

The NWFD define a photomontage as a composite image made by combining elements of real imagery with 3D digitalisation (*Environment Protection and Heritage Council 2010*).

A photomontage combines a photograph of an existing view with a computer-rendered image of a proposed development. It illustrates the likely view of a proposed development as it would be seen in a photograph (not as it would appear to the human eye in the field).

Although photomontages are based on photographs of the existing landscape, they are not a substitute for visiting a viewpoint in the field. They are only one tool to aid visual assessments. They provide a two-dimensional image that can be compared with an actual view of the landscape to provide information, such as the scale and potential appearance of a proposed development.

7.1.2 Wireframe Diagrams

A wireframe is a computed image generated based on a digital terrain model that indicates the 3D shape of the landscape in combination with additional elements. It is a valuable tool in the wind farm LVIA process as it allows the assessor to compare the turbines' position and scale to the existing landscape view (*Scottish Natural Heritage 2017*). Wireframe images are a worst-case scenario as they do not consider factors such as vegetation or building structures.

Wireframe diagrams are utilised in this LVIA to verify photomontage accuracy.

7.1.3 Photomontage Limitations

Visualisations can never provide the complete picture of potential visual impacts as they only inform the assessment process by which judgements are made. Visualisations of wind farms and the Project have several limitations that should be considered when using them to form a decision on a Project.

As noted in the Visual Representation of Wind Farms Guidance (VRWFG) published by the Scottish Natural Heritage (SNH) - these include:

- A visualisation can never show precisely what the wind farm will look like in reality due to factors such as different lighting, weather and seasonal conditions, which vary through time and the resolution of the image;
- The images provided give a reasonable impression of the scale of the turbines and the distance to the turbines, but can never be 100% accurate;
- A static image cannot convey turbine movement, flicker, or the sun's reflection on the blades as they move. (*Scottish Natural Heritage 2017*)

7.2 Photomontage Selection Process

Six (6) viewpoints have been selected to prepare photomontages that best illustrate the potential appearance of the Project from varying distances and locations with differing views (refer to **Figure 19**).

Exact photomontage locations were selected following detailed analysis to represent the views with the highest magnitude of change in combination with the varying distances mentioned above. Localised screening factors such as vegetation were avoided (where possible) to ensure maximum exposure to the Project.

7.3 Photomontage Development Methodology

The process for generating the photomontages involves computer generation of a wire-frame perspective view of the Project and the topography from each viewpoint. **Figure 18** demonstrates the process of photomontage development.

The photomontages are based on Project parameters outlined in **Section 3.0**. Moir Studio has prepared the photomontages using the most current available version of Wind Pro software using the following process:

Step 1

Develop 3D Model

In Wind Pro, a detailed 3D Model of the Site is developed. The WTGs, PV Array, BESS and associated infrastructure (substations, transmission lines, wind masts, etc.) are modelled and sited in the 3D Model to scale.

Step 2

Align Photograph and Model

The digital panorama is imported into Wind Pro, and the EXIF properties of the file are inserted automatically, defining all relevant visualisation information, such as the type of camera lens used, the field of view for panoramas, and the position and direction. Topography, control points, obstacle objects, and existing wind masts can be used as references to calibrate the camera model very precisely.

Step 3

Render Photomontage

The software calculates the sun's position based on the photograph's time and date and renders the wind turbines according to the specific weather conditions and the sun's position. Once rendered, detailed removal of intervening elements (such as vegetation) is undertaken to provide an accurate representation of the Project.

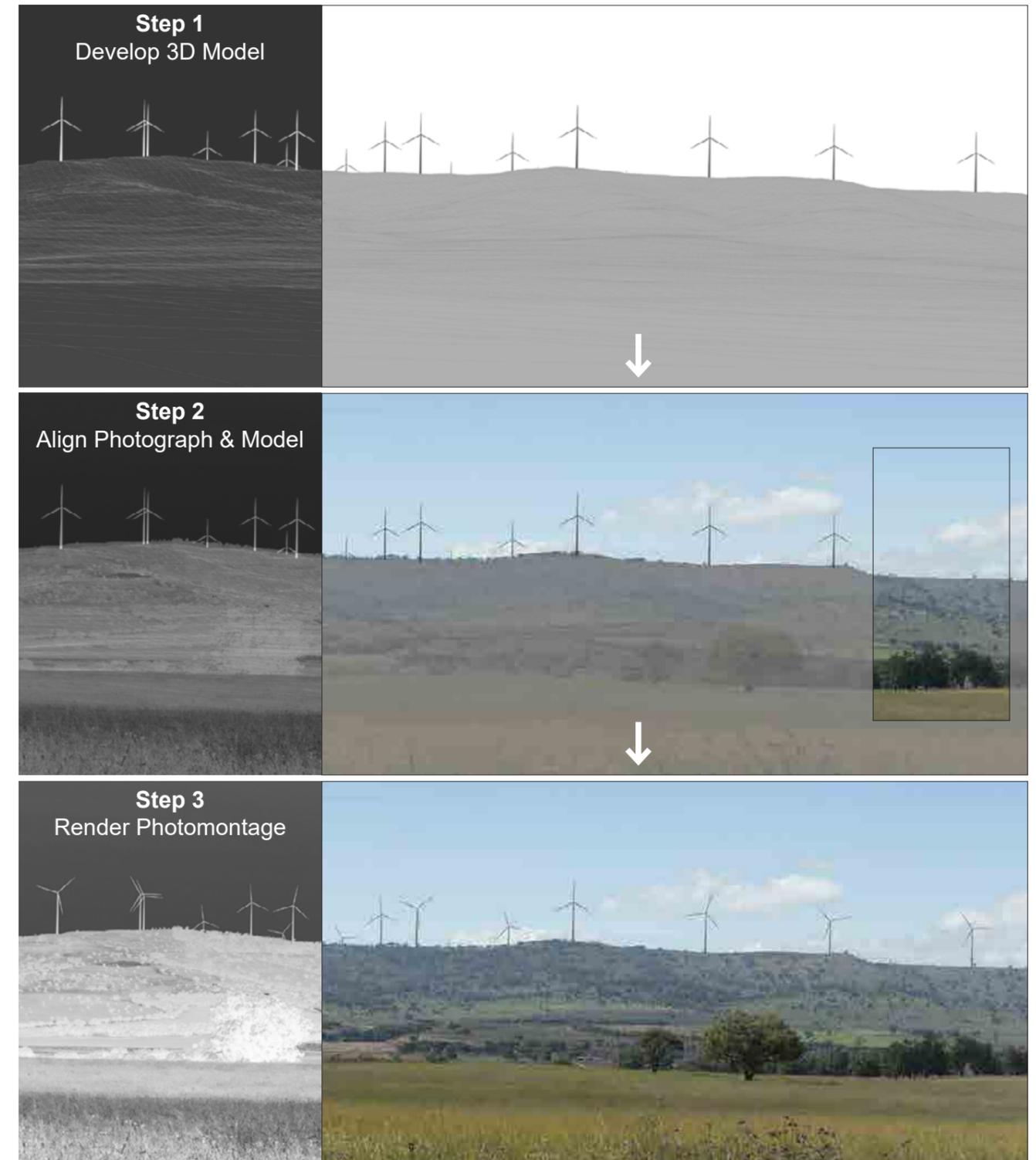
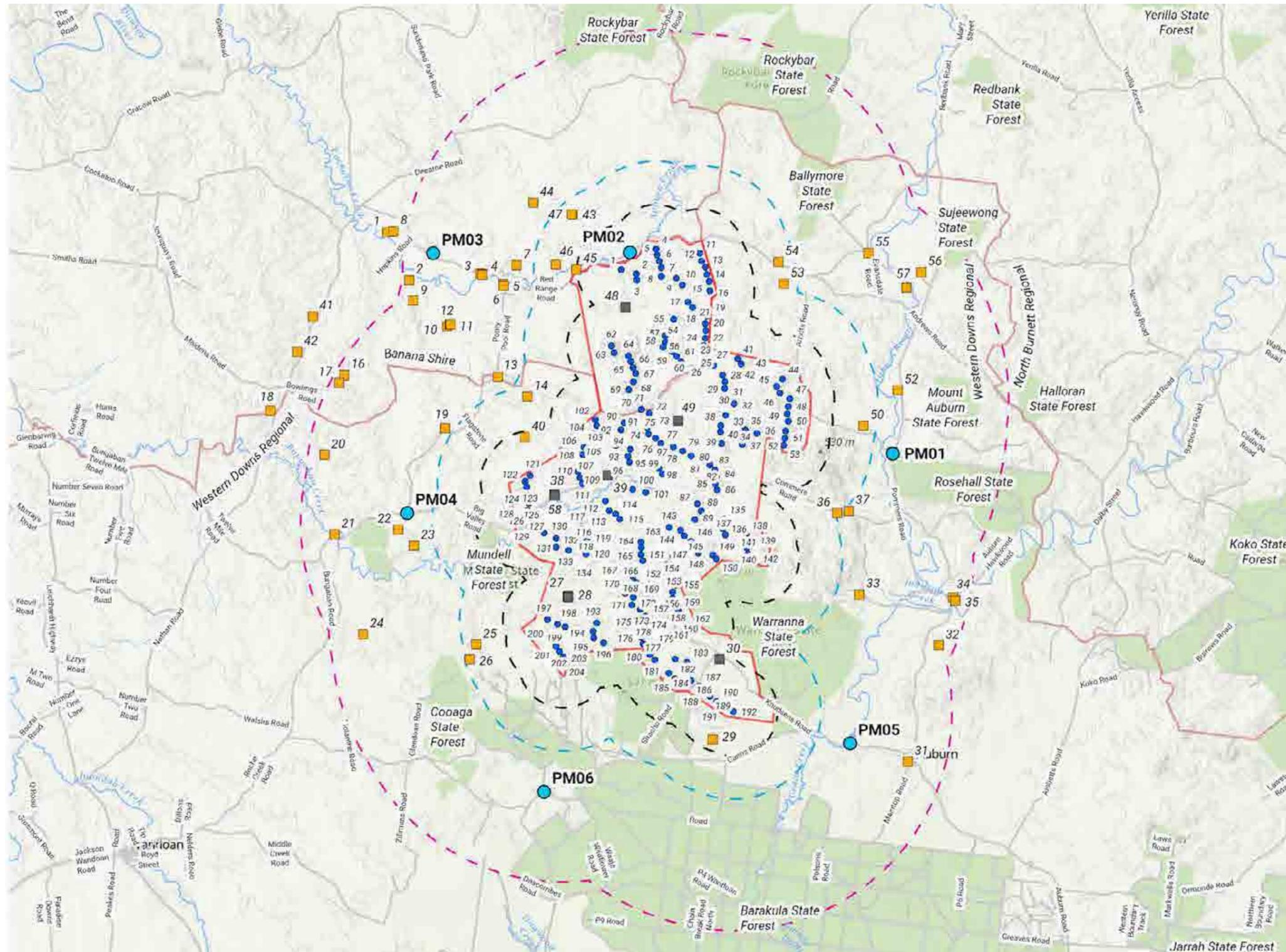


Figure 18 Photomontage Development

Photomontage Locations

Refer to Section 7.1



LEGEND

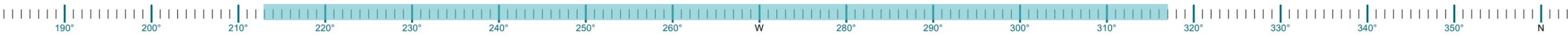
- Project Area
- Proposed WTGs
- Non-Associated Dwellings
- Associated Dwellings
- Photomontage Locations
- Study Area (17.2 km from WTGs)
- Visual Catchment (6.9 km from WTGs)
- Visual Catchment (3.5 km from WTGs)
- LGA Boundary
- Roads
- State Forests
- Contours
- Watercourse



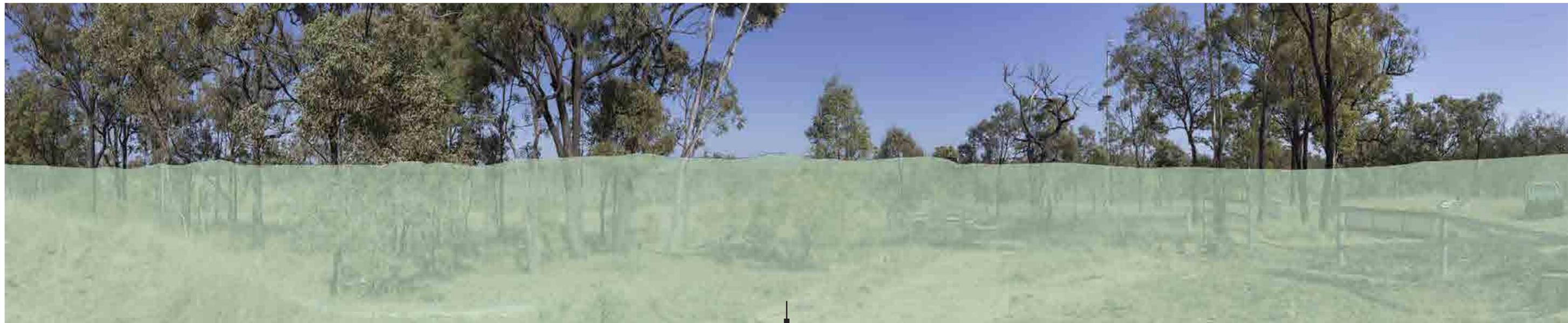
Figure 19 Photomontage Locations
Basemap Source - ESRI, 2024

Photomontage:

PM01 Near Auburn River State School, Auburn Road, Auburn



180° Existing View

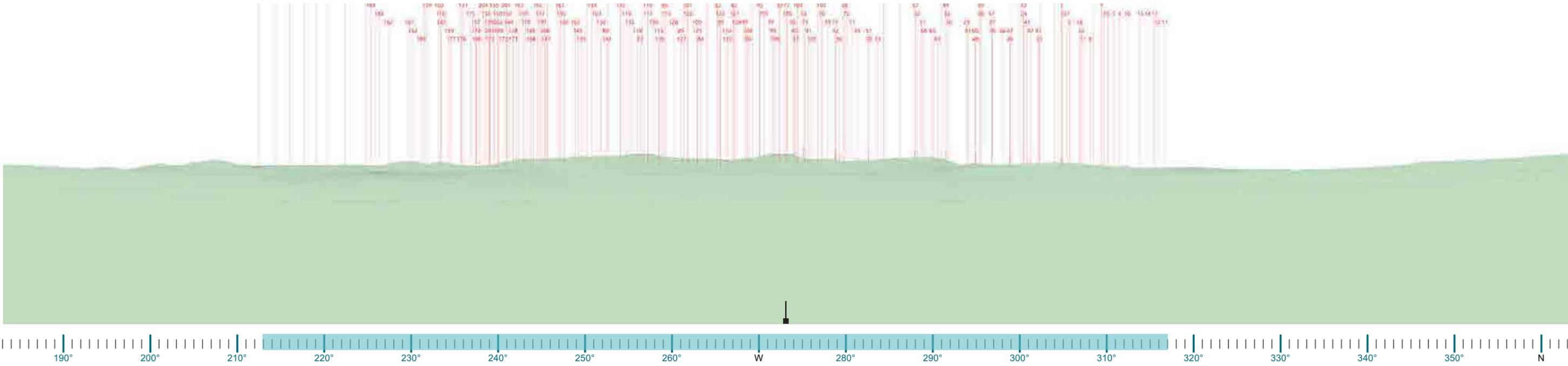


180° Proposed Overlay

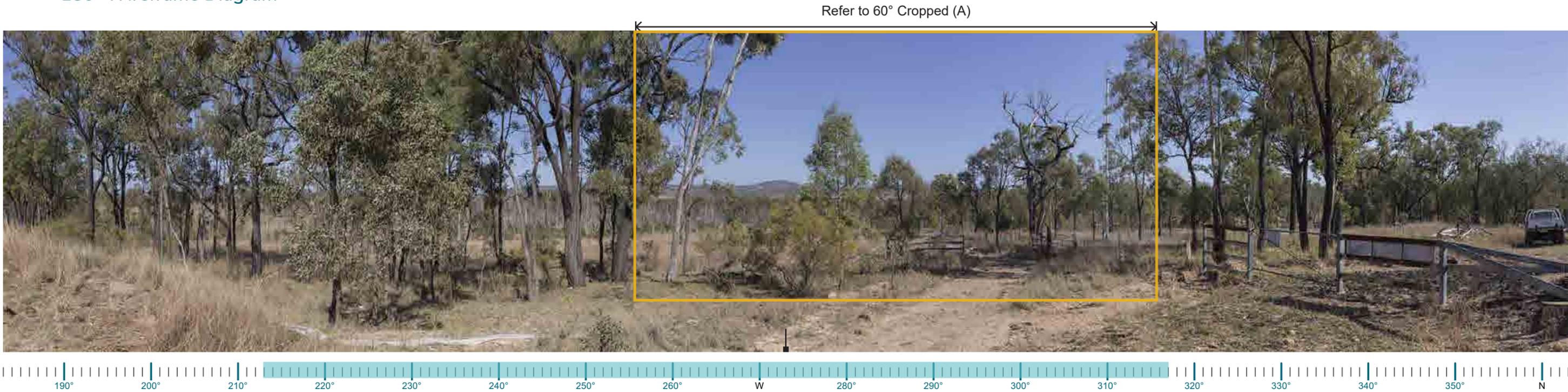
Extent of Potential Visibility

Photomontage:

PM01 Near Auburn River State School, Auburn Road, Auburn



180° Wireframe Diagram



180° Proposed View

Extent of Potential Visibility

Photomontage:

PM01 Near Auburn River State School, Auburn Road, Auburn

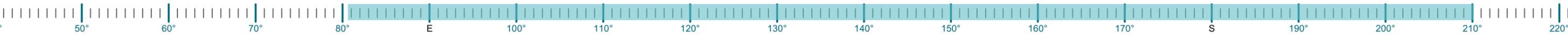


Proposed View | 60° Cropped (A)

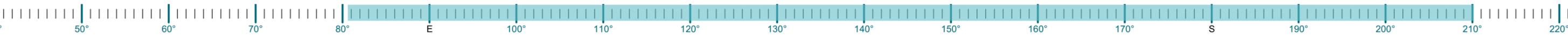
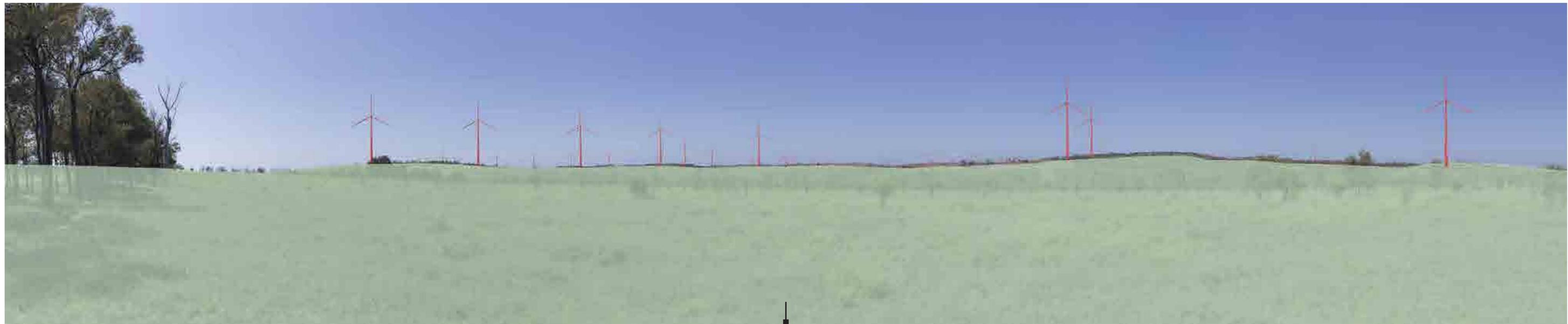
Extent of Potential Visibility

Photomontage:

PM02 Red Range Road, Cockatoo



180° Existing View

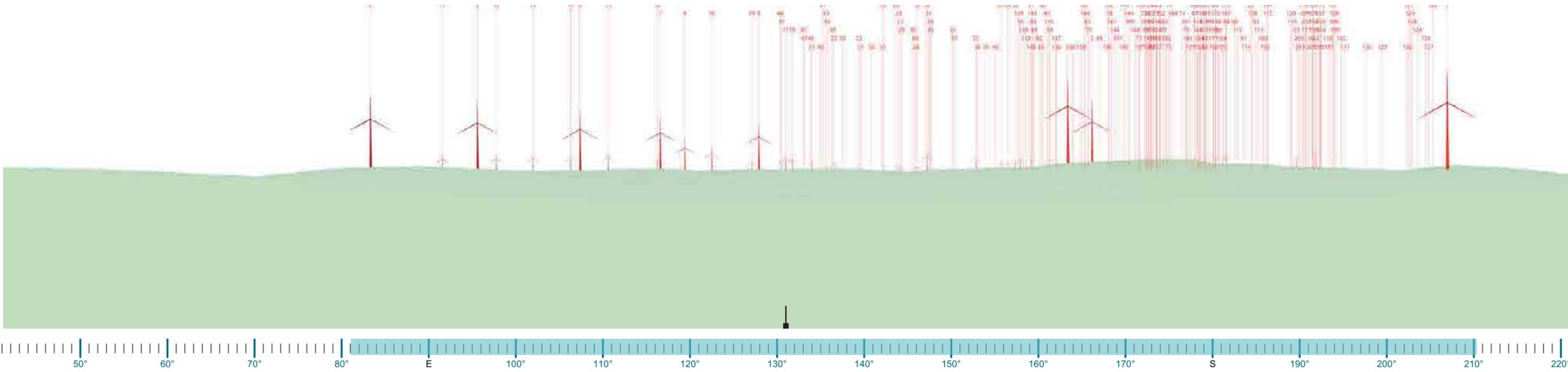


180° Proposed Overlay

 Extent of Potential Visibility

Photomontage:

PM02 Red Range Road, Cockatoo

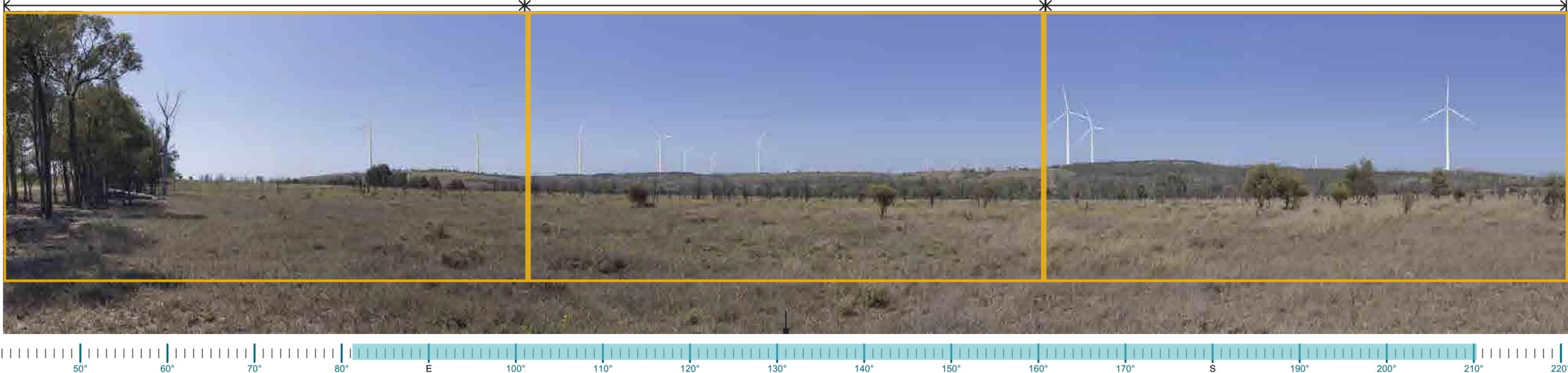


180° Wireframe Diagram

Refer to 60° Cropped (A)

Refer to 60° Cropped (B)

Refer to 60° Cropped (C)



180° Proposed View

Extent of Potential Visibility

Photomontage:

PM02 Red Range Road, Cockatoo



Proposed View | 60° Cropped (A)

Extent of Potential Visibility

Photomontage:

PM02 Red Range Road, Cockatoo

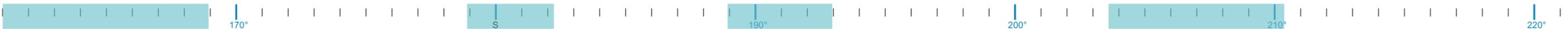


Proposed View | 60° Cropped (B)

Extent of Potential Visibility

Photomontage:

PM02 Red Range Road, Cockatoo

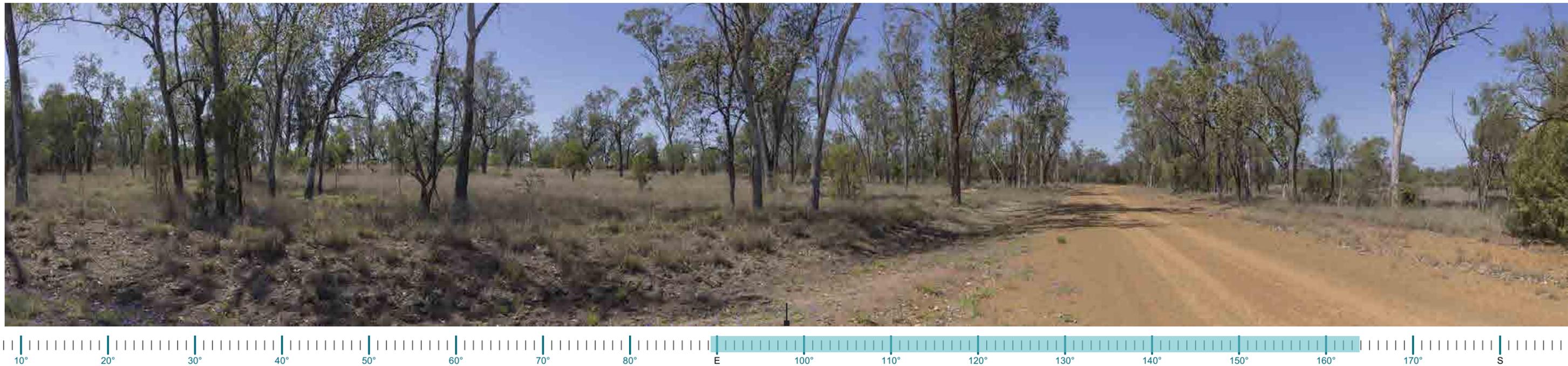


Proposed View | 60° Cropped (C)

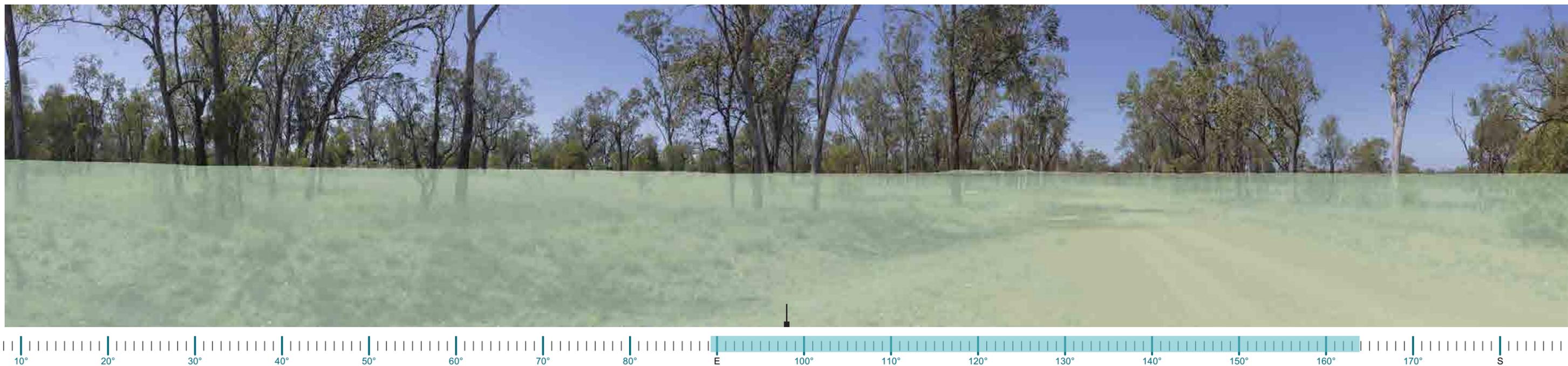
Extent of Potential Visibility

Photomontage:

PM03 Red Range Road, Cockatoo



180° Existing View

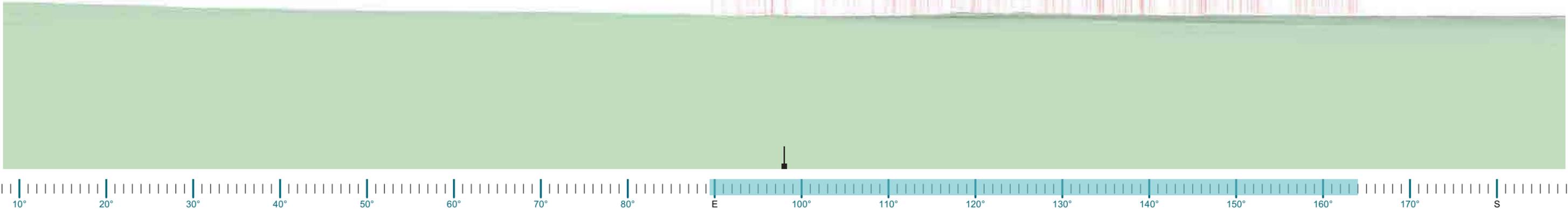
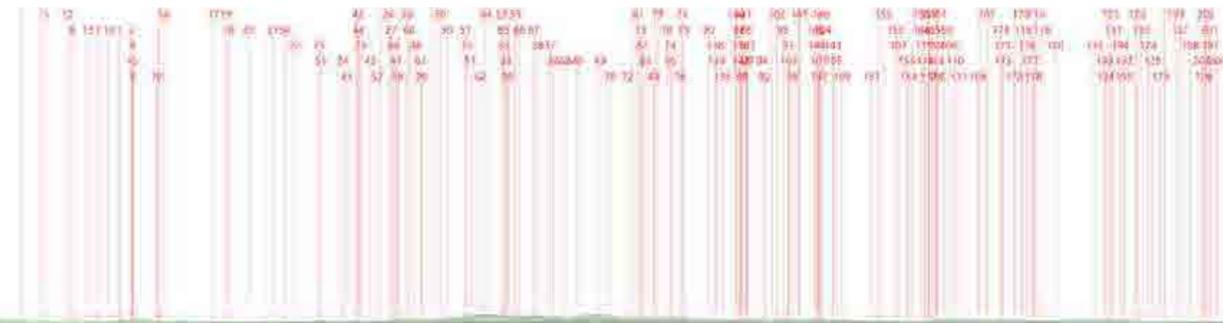


180° Proposed Overlay

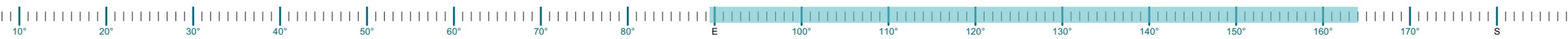
Extent of Potential Visibility

Photomontage:

PM03 Red Range Road, Cockatoo



180° Wireframe Diagram



180° Proposed View

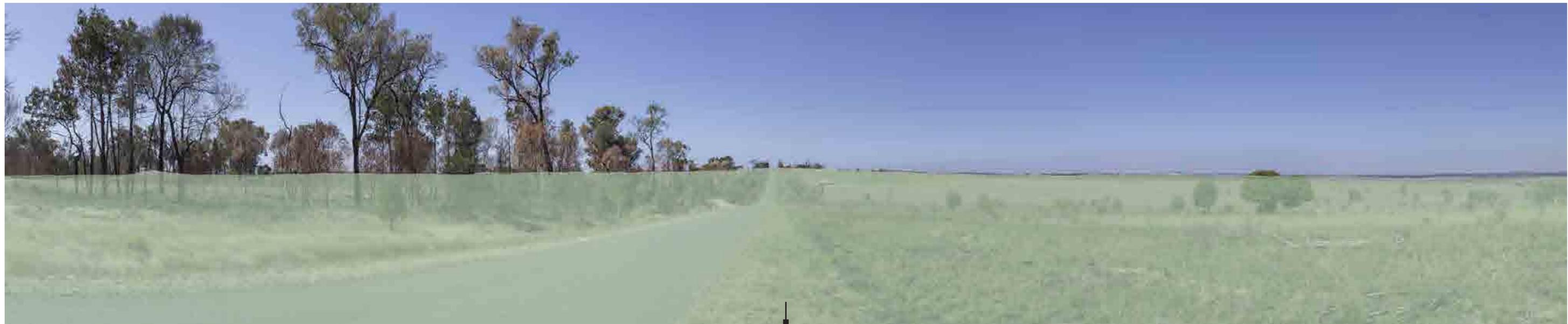
Extent of Potential Visibility

Photomontage:

PM04 Big Valley Road, Bungaban



180° Existing View

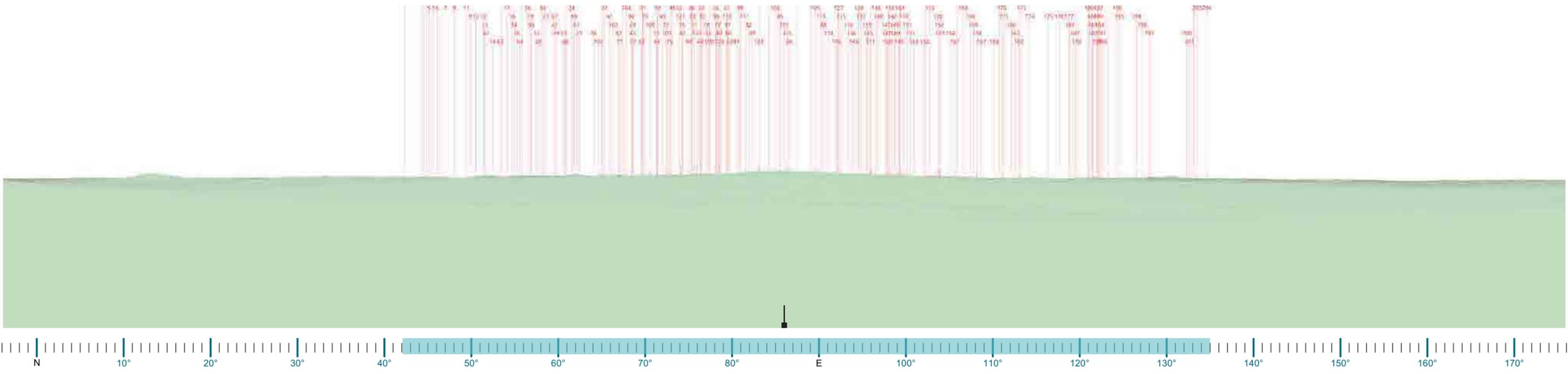


180° Proposed Overlay

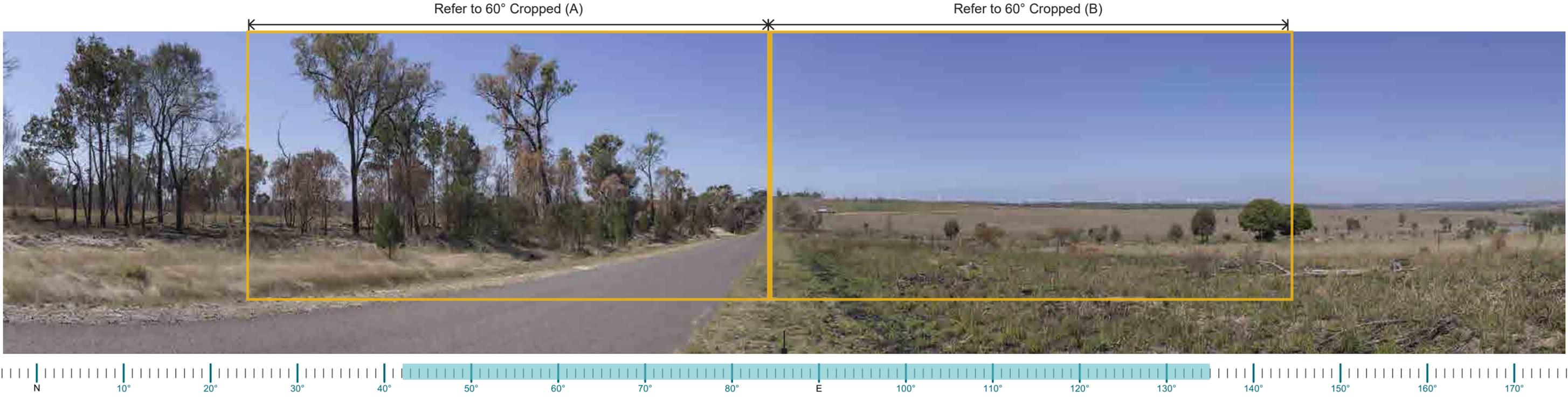
Extent of Potential Visibility

Photomontage:

PM04 Big Valley Road, Bungaban



180° Wireframe Diagram



180° Proposed View

Extent of Potential Visibility

Photomontage:

PM04 Big Valley Road, Bungaban



Proposed View | 60° Cropped (A)

Extent of Potential Visibility

Photomontage:

PM04 Big Valley Road, Bungaban



Proposed View | 60° Cropped (B)

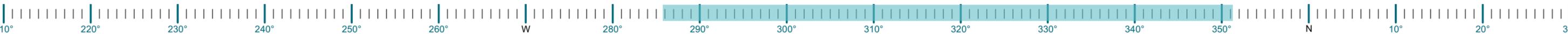
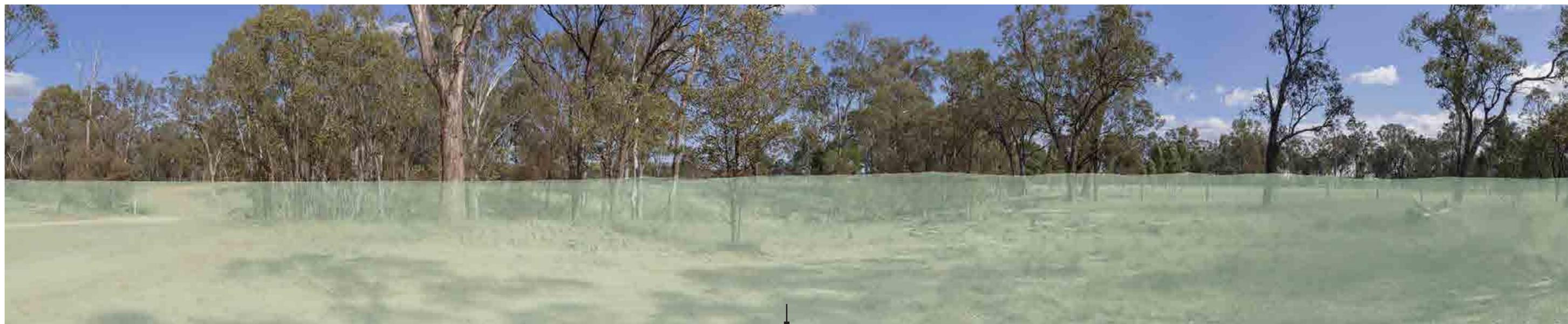
 Extent of Potential Visibility

Photomontage:

PM05 Knudsens Road, Auburn



180° Existing View

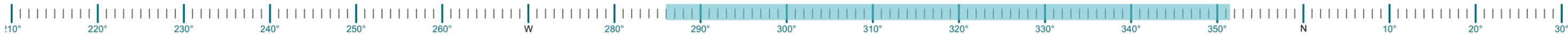
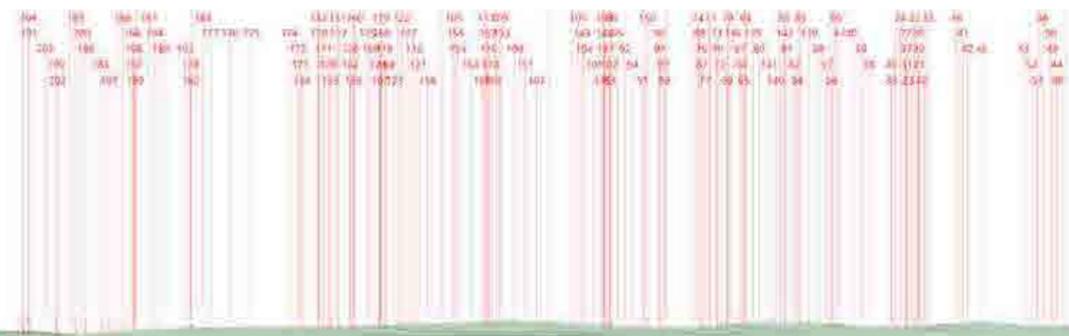


180° Proposed Overlay

Extent of Potential Visibility

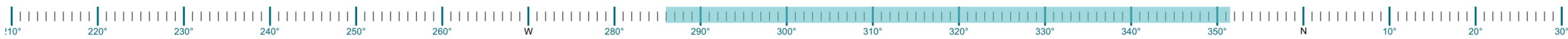
Photomontage:

PM05 Knudsens Road, Auburn



180° Wireframe Diagram

Refer to 60° Cropped (A)



180° Proposed View

Extent of Potential Visibility

Photomontage:

PM05 Knudsens Road, Auburn



Proposed View | 60° Cropped (A)

 Extent of Potential Visibility

Photomontage:

PM06 Roche Creek Road, Roche Creek



180° Existing View

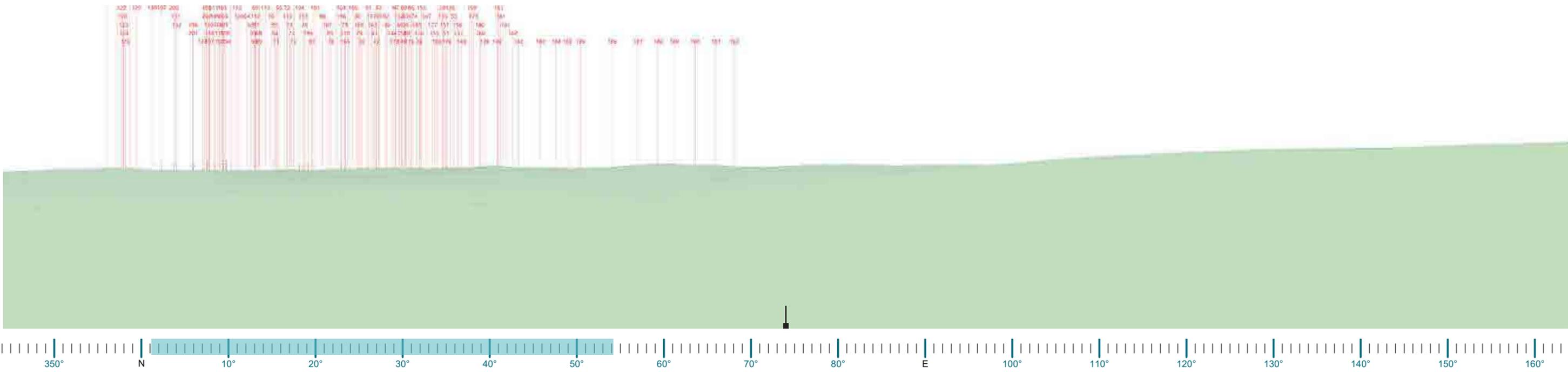


180° Proposed Overlay

Extent of Potential Visibility

Photomontage:

PM06 Roche Creek Road, Roche Creek



180° Wireframe Diagram



180° Proposed View

Extent of Potential Visibility

Photomontage:

PM06 Roche Creek Road, Roche Creek



Proposed View | 60° Cropped (A)

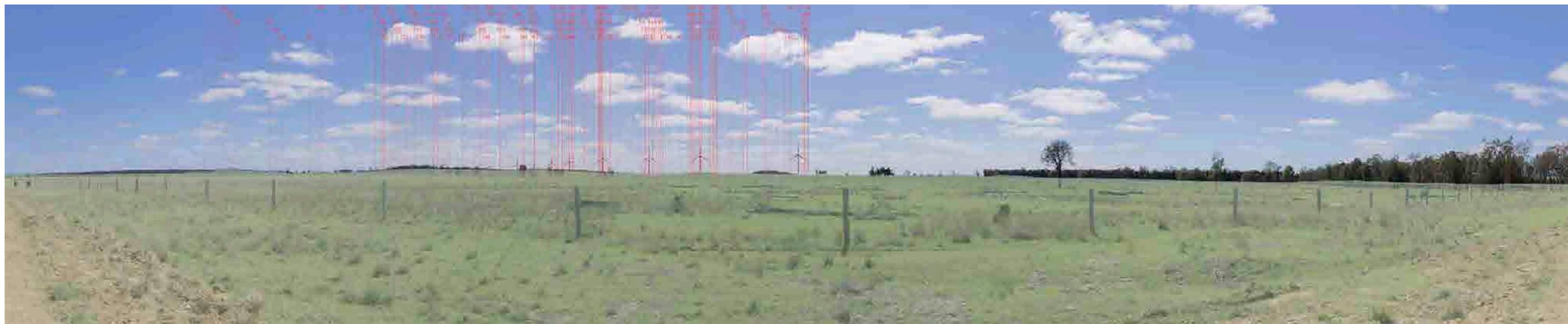
Extent of Potential Visibility

Photomontage:

PM07 Canns Road, Auburn



180° Existing View

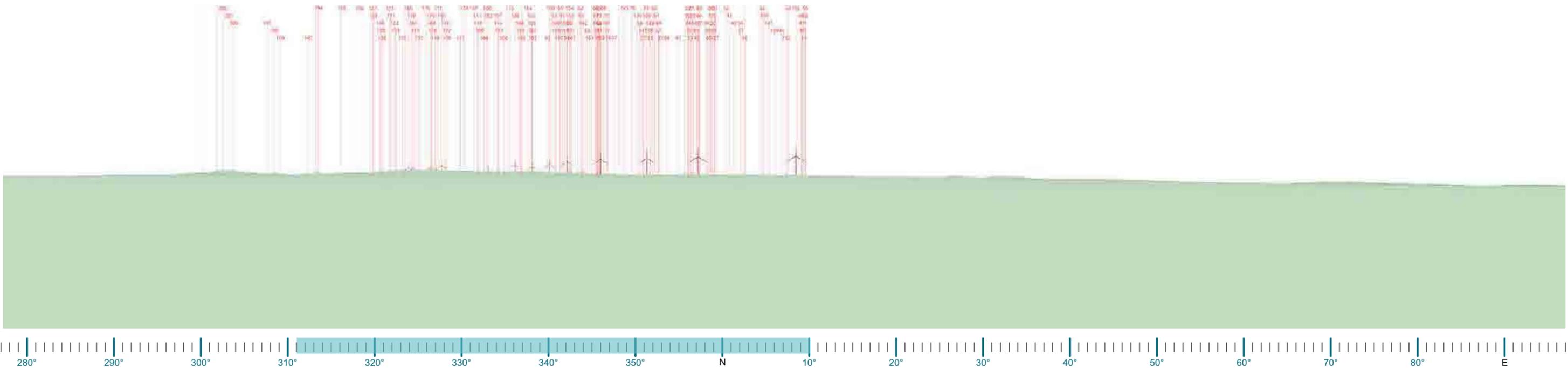


180° Proposed Overlay

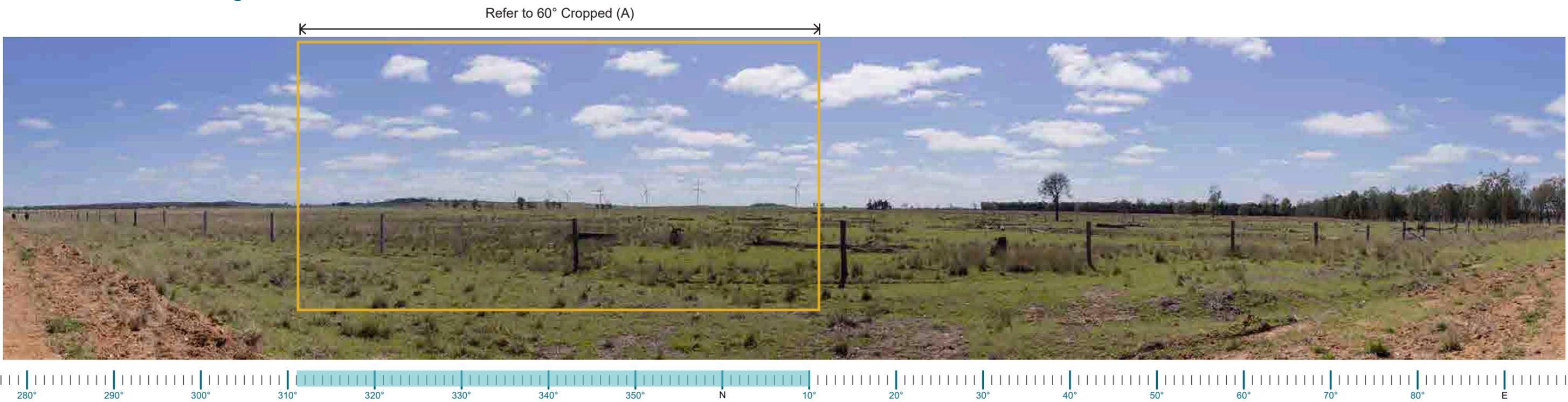
Extent of Potential Visibility

Photomontage:

PM07 Canns Road, Auburn



180° Wireframe Diagram



180° Proposed View

Extent of Potential Visibility

Photomontage:

PM07 Canns Road, Auburn



Proposed View | 60° Cropped (A)

 Extent of Potential Visibility

08 Shadow Flicker Assessment



8.0 Shadow Flicker Assessment

8.1 Overview of Shadow Flicker

Shadow flicker is defined as the visual effect that occurs when rotating turbines cause moving shadows as the blades pass in front of the sun. The effect will occur under circumstances where the turbine is located such that at certain times of day the sun's rays pass through the swept area of the rotating blades, potentially affecting the viewpoint. The effect is diminished by the distance of the viewpoint from the turbine. Shadowing is also influenced by increased cloud cover, and is dependent on the angle of the sun's rays (Draft National Wind Farm Development Guidelines, 2016).

8.2 Shadow Flicker Assessment Methodology

Moir Studio have referred to the State Code 23: Wind Farm Development Planning Guideline P014 Shadow flicker to determine the parameters for the assessment of Shadow Flicker.

Modelling of the shadow flicker was conducted using specialist industry software (Wind Pro), assessing the largest turbine (based on a 300 m maximum tip height) proposed for the Project to represent the worst case impact scenario.

The parameters used for the Shadow Flicker Assessment are as follows:

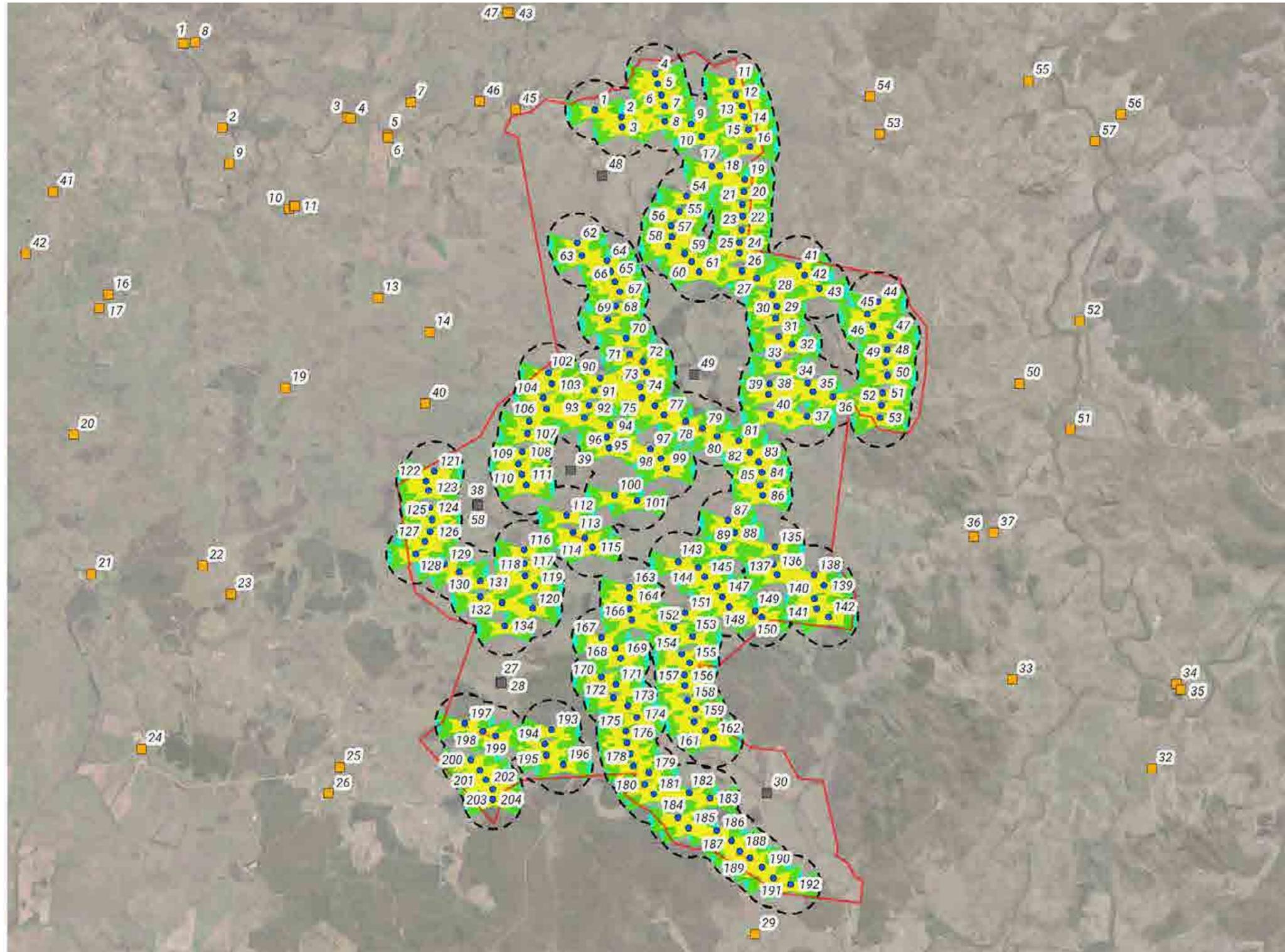
Model Parameter	Setting Used:
Zone of Visual Influence of Shadows	265 x Maximum blade chord
Minimum angle of sun	3 degrees
Shape of the sun	Disk
Time and duration of modelling	One full year
Orientation of the rotor	The rotor plane is always perpendicular to the line from the WTG to the sun
Time step	1 minute
Effects of topography	Included
Receptor Height	1.7 metres
Grid size	1 metre

It is important to note the shadow flicker modelling undertaken for the Project is based on topography alone and therefore the extent of impact may be decreased by a number of variables including:

- The aspect of the residence relative to the turbine(s) (window locations, living area locations etc);
- The extent of natural or screening vegetation between the turbine(s) and the receptor;
- The existence of other screening elements (buildings, structures etc) between the turbine(s) and the receptor;
- The time of year;
- The proportion of daylight hours in which the turbines operate;
- The frequency of bright sunshine and cloudless skies (particularly at low elevations above the horizon).



Image 21 Example of shadow flicker at base of a WTG



Shadow Flicker Assessment

Refer to Section 8.2

LEGEND

- Project Area
- Proposed WTGs
- Non-Associated Dwellings
- Associated Dwellings
- Shadows 265 x Maximum Blade
- Chord Length 265 x 5m = 1,325m

Number of hours per year:

- 0.1-10 Hours
- 10 - 30 Hours
- 30 - < 100 Hours
- 100 - < 500 Hours
- 500 - < 1,000 Hours
- 1,000 - <=2,000 Hours

Assumptions for Shadow Calculations:

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset.
- The rotor plane is always perpendicular to the line from the WTG to the sun.
- The WTG is always operating.



Figure 20 Shadow Flicker Assessment
Basemap Source - ESRI, 2024

8.3 Results of Shadow Flicker Assessment on Dwellings

The Code states that the Proponent must undertake a shadow flicker assessment that identifies the potential impacts and how these may be mitigated or managed. This assessment should consider the potential impacts on existing or approved sensitive land uses and ensure that any modelled blade shadow flicker impacts affecting sensitive land use do not exceed 30 hours per annum and 30 minutes per day. The extent of shadows from turbines based on a distance of 265 m x maximum blade chord (in this case, 5 metres) is determined to be 1,325 metres. Appendix 5 of the State Code 23 (SC23) Guidelines states that no assessment is necessary for dwellings beyond 1,325 metres.

No potential shadow flicker hours were identified at all non-associated dwellings as the distance between the nearest associated dwellings exceeds the maximum extent of shadows from the turbines, i.e. 1,325 m. Therefore, no further assessment is required.

Similarly, the associated dwellings are identified to not experience potential shadow flicker hours as the distance between the nearest associated dwellings exceeds the maximum extent of shadows from the turbines, i.e., 1,325 m. Therefore, no further assessment is required. The assessment is based on a worst-case scenario considering topography alone.

8.4 Results of Shadow Flicker Assessment on Road Users

Although the SC23 Code does not provide guidelines for an acceptable level of shadow flicker on road users, shadow flicker can disrupt road users.

No major roads or highways were identified near the Project. However, a few local unsealed roads serve as a mode of transportation for the local landowners.

Of these roads, portions of the Big Valley Road, situated to the west of the Project, are identified to potentially experience shadow flicker from WTGs 125, 126, 127, 128, 129 and 111 for approximately 5 km, ranging from 30 - 500 hours. This is due to the proximity of the nearest turbines to the road. However, Big Valley Road is a low-use road that caters to 4 associated dwellings within the Project Area and appears to not connect to other local roads to the east.

Red Range Road, to the north, is another unsealed local road that may experience shadow flicker hours of up to 10 - 100 hours for a small fragment of the road, approximately 1.64 km.

As there are no guidelines for shadow flicker impacts on road users, the Project complies with PO14.

09 Associated Infrastructure



9.0 Associated Infrastructure

9.1 Overview of Associated Infrastructure

In addition to the proposed turbines, the associated infrastructure (as described in Section 3.6 of this report) has the potential to contrast with the existing visual landscape. Due to the large scale of the Project, access roads, transmission lines and other ancillary structures have the potential to alter the existing visual landscape. An overview of the potential visual impact resulting from associated infrastructure and Project components is provided below.

9.1.1 Access Roads

Access roads are proposed on site between the turbines and connecting to existing arterial roads. Access to the Project Site is proposed via Big Valley Road and Red Range Road. It is likely some improvements to surrounding roads would be completed to accommodate the Project.

The construction and maintenance of the Project will require construction of private access roads to provide access to turbines. Where possible, the internal road network will be aligned on the route of existing farm or other access roads. The internal roads will be up to approximately 7.5 m wide, at this time drainage requirements have not been identified, with localised widening where required (maximum buffer of 25m) to support transportation of the turbine components.

Generally, the internal roads have been sited to reduce potential vegetation loss and limit earth work requirements. Due to the existing agricultural land use of the Study Area, farm roads traversing the landscape form a significant part of the existing landscape character. The proposed access roads are likely to be viewed as part of the existing character of the landscape and therefore visual impact would be low.

Additional measures for reducing visual impact resulting from the construction of access roads have been considered. These include:

- Where possible utilise or upgrade existing roads, trails or tracks to provide access to the proposed turbines to reduce the need for new roads;
- Allow for the provision for down sizing roads or restoring roads to existing condition following construction where possible;
- Any new roads must minimise cut and fill and avoid the loss of vegetation; and
- Utilise local materials where possible and practical.

9.1.2 Transmission Lines

Each of the turbines will be connected to on-site substations via a system comprising a network of underground and overhead electrical cables. The proposed transmission infrastructure design is in keeping with the scale and appearance of existing power lines which are an existing element in the landscape.

Proposed mitigation methods to be considered during detailed design phase include:

- Where possible underground cabling is to be used to connect wind turbines to the electricity grid.
- Align or co-locate new transmission lines with existing transmission lines where possible.
- The route for any proposed overhead transmission lines should be chosen to reduce visibility from surrounding areas.
- Plan route to minimise vegetation loss.
- Use of subtle colours and a low reflectivity surface treatment on power poles to ensure that glint is minimised.

Currently, the potential visual impact resulting from the transmission lines is anticipated to be low due to the existing character of the immediate visual catchment.

9.1.3 Substations & BESS

Typically, the on-site substations would take up an area up to 550 m x 450 m. If deemed necessary during the detailed design phase, mitigation methods such as screen planting could be employed to reduce any potential visual impacts. BESS's will be constructed within the Project Area to store the produced electricity. The model and design specifications will be determined during detailed design.

There are no non-associated dwellings within 2.5 km of the substation or BESS locations. Therefore, the magnitude of these infrastructure elements will have a negative visual impact overall.

9.1.4 Site Operations and Maintenance Facilities (O&M)

Permanent site operations and maintenance (O&M) facilities will be constructed to provide for all operations and maintenance activities associated with the Project. It is unlikely the O&M facilities would be visible from any nearby dwellings.

The proposed O&M facility has the ability to be screened by existing vegetation or proposed screening vegetation. The following mitigation measures would assist in reducing any residual visual impacts:

- Siting to ensure minimal vegetation loss.
- Consideration should be given to controlling the type and colour of building materials used. Where possible a recessive colour palette is to be used which blends into the existing landscape (see example provided in Image 28).
- Avoidance of unnecessary lighting, signage on fences, logos etc.
- Any proposed buildings to be sympathetic to existing architectural elements in the landscape.
- Minimise cut and fill and loss of existing vegetation throughout the construction process.
- Boundary screen planting is an effective mitigation method which could be utilised to ameliorate potential visual impacts resulting from the construction of ancillary structures with a small vertical scale such as collector substations, switching stations and the operations facilities building.

9.1.5 Meteorological Monitoring Masts

Up to 17 permanent meteorological monitoring masts are proposed to be located within the Project Area to record wind speed and other meteorological data. The wind monitoring masts will be fitted with various instruments such as anemometers, wind vanes, temperature gauges and other electrical equipment.

The meteorological masts are located within the development footprint of the Project, and are smaller in height (up to 200 m high) than the proposed WTGs (up to 300 m tip height). Therefore the masts will not add any additional visual impact beyond the WTG impacts as discussed in **Section 6.0.** & **Section 7.0.**

9.1.6 Other temporary Infrastructure

In addition, temporary infrastructure elements such as:

- Construction compounds and laydown areas; and
- Concrete batching plants.

The visual impacts associated with these facilities will be temporary and will occur during the construction phase. No nominated scenic amenity area or associated views will be impacted by the construction activity.

10 Nightlighting Assessment



10.0 Nightlighting Assessment

10.1 Overview of Aviation Hazard Lighting

The following section of the report assesses the visual impacts of the Project's potential night lighting. Night lighting has the potential to alter the night-time landscape of the region. Potential light sources include:

- Aviation Hazard Lighting (AHL) on nacelle of wind turbines
- Night lighting for safety and security on ancillary structures.

10.2 Aviation Hazard Lighting

The requirement of aviation hazard lighting (AHL) on wind turbines for the Project is subject to the advice of the Civil Aviation Safety Authority (CASA). CASA generally recommends nightlighting if an obstacle exceeds 160 metres above ground level, which the Project does exceed.

If determined to be required, potential CASA specifications for lighting could include the following:

- Two flashing red medium-intensity obstacle lights should be provided per turbine where required.
- The light fixtures should be mounted sufficiently above the surface of the nacelle so that the rotor hub does not obscure the lights and is at a horizontal separation to ensure an unobstructed view of at least one of the lights by a pilot approaching from any direction.
- Sufficient individual wind turbines should be lit to indicate the extent of the group of turbines.
- The interval between obstacle-lighted turbines should not exceed 900m, and the most prominent (highest for the terrain) turbine(s) should be lit. (*Civil Aviation Safety Authority 2022; Australian Government & Civil Aviation Safety Authority 2019*)

Representative images of aviation lighting (installed in August 2020) on turbines at Biala Wind Farm (BWF) NSW, have been included to best illustrate the potential visual appearance of aviation lighting.

This report includes photographs of aviation lighting at varying distances and times. **Image 22-Image 28** illustrate the appearance of night lighting on a dark rural landscape at intervals after sunset.

It is to be noted that the Aviation Impact Assessment for this Project has been prepared by others - refer to supporting environmental reports for detailed aviation impact results.



Image 22 2 km from WTG (30 minutes after sunset)



Image 23 1.75 km from WTG (45 minutes after sunset)



Image 24 1.85 km from WTG (60 minutes after sunset)



Image 25 View toward BWF - 3.5 km from WTG



Image 27 View toward BWF - 8.5 km from WTG



Image 26 View at night toward BWF - 3.5 km from WTG



Image 28 View at night toward BWF - 8.5 km from WTG

10.3 Nightlighting Impacts

Night lighting of turbines and associated infrastructure has the potential to extend the visual effect into the night. Aviation hazard lighting on WTGs can be visible from distances in excess of 20 kilometres (Scottish Natural Heritage 2017). However, the distance depends on a number of variables, including light intensity, topography, vegetation coverage, and climatic conditions.

Due to the Project's isolated location, minimal existing lighting sources are present in the night-time landscape of the Study Area outside the extent of mining activities and rural properties. Some existing lighting is associated with motor vehicles dispersed along roads and tracks within the Study Area. Isolated receptors within the Study Area experience a night sky with minimal light sources.

The most visual impact will likely be on people who experience the outdoor night landscape. Aviation lighting can impact receptors that view the landscape at night, particularly night sky enthusiasts, photographers, stargazers, campers, and some landowners with potential visibility of the WTG hub.

The visual impact of potential aviation lighting could be reduced by employing mitigation methods outlined in **Section 11.4**. Considering the high elevation of the turbines and the implementation of shields; the visible light will likely be reduced to ambient lighting instead of direct visibility of the light when viewed from proximity.

10.4 Mitigation Recommendations

To assist in the amelioration of the effect of Aviation Hazards Lighting on wind turbines the following should be applied:

- If used, air navigation lighting should be spaced around the outer edges of the wind farm. Lights are not required on every tower. Where possible, careful consideration should be given to the selection of turbines requiring lighting to avoid unnecessary impact upon residences;
- Treatment of the rear of blades with a non-reflective coating to reduce reflection off the rotating blade at night;
- Use of the lowest candela intensity allowed by CASA;
- According to the CASA requirements, shielding may be provided to restrict the downward spill of light to the ground plane by ensuring that no more than 5% of the nominal light intensity should be emitted at or below 5° below horizontal (Refer to Figure 21); and
- No light should be emitted at or below 10° below horizontal. (*Australian Government & Civil Aviation Safety Authority 2019*)

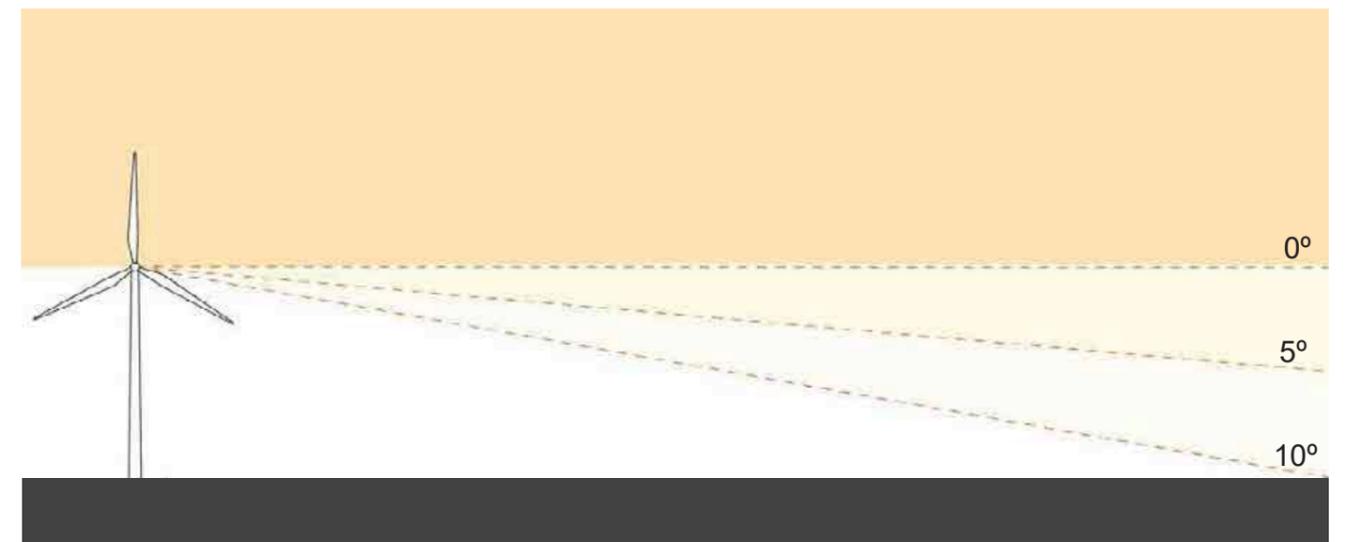


Figure 21 Recommended Light Shielding to reduce light spreading

11 Mitigation Measures



11.0 Mitigation Measures

11.1 Overview of Mitigation Methods

This section of the report provides recommendations which seek to achieve a better visual integration of the Project and the existing visual character at both local and regional scales. The mitigation measures attempt to lessen the visual impact of the Project whilst enhancing the visual character of the surrounding environment.

Mitigation measures are best considered as two separate phases. These include:

- Primary measures that form part of the development of the wind farm design through an interactive process; and
- Secondary measures designed to specifically address the remaining (residual) negative (adverse) effects of the final development proposals (The Landscape Institute et al 2013).

It is important to note that the mitigation methods proposed in this report are made notwithstanding issues raised by other consultants (eg. engineering, ecology, geology etc.). During the planning and design phase of a wind farm mitigation strategies should also be considered to lessen the visual impact of the Project. This is by no means an exhaustive list, however the adoption of these recommendations will assist considerably in ensuring the proposal contributes positively to the visual quality and character of the area.

11.2 Project Layout and Design

The design of the Project is a primary measure of mitigation. The general principles employed through the project design phase can significantly reduce the visual impact. These include siting, access, layout and other principles which directly impact the appearance of the Project. General guidelines for the design development of the Project have been outlined in **Section 11.2.1**.

11.2.1 Project Layout and Size

The layout and size of the Project is a significant factor in the visual impact on the landscape.

According to Stanton (1995) the intrusiveness of a wind farm is not directly proportional to the number of turbines in an array, and instead, more a factor of design. For example, large wind farms may appear less dominating than a smaller project when the large wind farm is subdivided into several visually comprehensible units.

It is suggested that fewer and more widely spaced turbines present a more pleasing appearance than tightly packed arrays (URBIS, 2009). The following principles should guide the design process of the Project:

- Controlling the location of different turbine types, densities and layout geometry to minimise the visual impacts.
- The lines of turbines should reflect the contours of the natural landscape as best as possible.
- Ensure the turbines are evenly spaced to give a regular pattern creating a better balance within the landscape.

It is important to note that as a result of community consultation during the development period, the Project has undergone many changes. The resulting layout has a smaller development footprint to those previously considered. The above design principles have been considered in the siting of the proposed turbines to provide a balanced appearance within the landscape.

11.2.2 Wind Turbine Design and Colouring

Turbine design and colouring are an important factor. The turbines will have a matte white finish and consist of three blades, this design assists in achieving visual consistency through the landscape.

Other important factors to achieve a visual consistency through the landscape include:

- Uniformity in the colour, design, rotational speed, height and rotor diameter.
- The use of simple muted colours and non-reflective materials to reduce distant visibility and avoid drawing the eye.
- Blades, nacelle and tower to appear as the same colour.
- Avoidance of unnecessary lighting, signage, logos etc.

11.3 Off-site Screen Planting

In circumstances where residences are subject to a moderate or high level of visual impact, off-site screen planting is an option proposed to assist in mitigating views of turbines from these properties. As the viewing location of the proposal would generally be fixed, there is opportunity to significantly reduce potential visual impact from the Project.

In order to achieve visual screening between the intrusive element and the dwelling, tree planting could be undertaken. This should be in consultation with the relevant landowners to ensure that desirable views are not inadvertently eroded or lost in the effort to mitigate views of the turbines.

11.3.1 Landscaping Principles

The existing character of the landscape allows for a variety of methods of landscaping and visual screening which will remain in keeping with the landscape character. General guidelines to adhere to when planning for landscaping and visual screening include:

- Planting is recommended post construction in consultation with the landowner.
- Planting should remain in keeping with existing landscape character.
- Species selection is to be typical of the area.
- Planting layout should avoid screening views of the broader landscape.
- Avoid the clearing of existing vegetation. Where appropriate reinstate any lost vegetation.
- Allow natural vegetation to regrow over any areas of disturbance.

Locally native plant species are preferred, as they help to preserve the landscape character and scenic quality of the area as well as building habitat for local fauna. Native species are also well-suited to local conditions (ie. soil, climate, etc.) and will build on the existing vegetation assemblages in the area.

12 Summary



12.0 Summary

12.1 Summary

The purpose of this LVIA is to provide a quantitative assessment of the visual impacts resulting from the Project and provide recommendations to assist in mitigating any potential impacts resulting from the Project.

The general character of the Study Area can be categorised as gently undulating plains with low hills, with some areas of prominent peaks. The general topography and geographical character form a network of creeks and gullies with dense vegetation corridors. These include Bungaban Creek, North Bungaban Creek, Cockatoo Creek, Johnsons Creek, Grant Creek, Spring Creek, Box Tree Gully, Red Range Creek and Auburn River.

With all visual impact assessments the objective is not to determine whether the Project is visible or not visible, but to determine how the Project will impact on the existing visual amenity, landscape character and scenic quality. It has been identified that although the Project will be a visually prominent element in the landscape, views to key scenic or landscape features will be not be impacted because the predominant character of the region is defined by highly modified lands of low scenic quality. Once operational, the Project will allow the continuation of existing agricultural activity and add another land use, i.e., wind energy production.

Although this LVIA quantifies the visual impact of the turbines, the overall visual impact of the Project will vary greatly depending on the individual viewer's sensitivity to and acceptance of change. The sensitivity towards change varies greatly depending on the user's connection with the landscape. For example, visitors to the area may perceive the wind farm as an interesting feature of the landscape which is otherwise defined by flat, large expanses that lack key features. This may contrast with a resident who passes the wind farm daily who may have a more critical perception of the visual presence of the Project.

The visual impact of the turbines are reduced as the distance of the vantage point from the Project is increased. This has been established through the preparation of photomontages from locations at varying distances. Although the area is characterised by undulating pastures that are generally cleared of vegetation, it is understood that the visibility decreases as one moves further away from the Project.

A detailed assessment of public viewpoint locations within the Study Area identified that the Project will impact the overall and broader landscape character in LCU01. Although the Project will be visually prominent in the landscape, the landscape has been determined to be of low scenic quality and devoid of significant landscape features within close proximity. The modification and clearing of the plains for agricultural use mean any contrasting addition, particularly one of the scale of a wind farm, is likely to become a defining character element. This however will not diminish the existing agricultural character.

The detailed assessment indicates that opportunities to view the Project in LCU02 and LCU03 are limited to areas in close proximity to the Project. Vegetated ridgelines, undulating topography, roadside vegetation and riparian vegetation associated with creeks, all assist in fragmenting views to the Project.

Of the 11 public viewpoints assessed;

- Two (2) viewpoints have a NEGLIGIBLE visual impact
- Seven (7) viewpoints have a LOW visual impact
- One (1) viewpoint has a MODERATE-LOW visual impact
- One (1) viewpoint has a MODERATE visual impact

An assessment of the potential affect of Shadow Flicker has been assessed in accordance with the State Code 23 : Wind Farm Planning Guidelines and Appendix 5 of the SC23 guidelines. No associated or non-associated dwellings were identified with the potential to experience a shadow flicker from the Project. Additionally, no non-associated dwellings are located within the assessable area (1,325 m). In accordance with the SC23, no further assessment is required.

Although no guidance relating to an acceptable level of shadow flicker on road users is available, a shadow flicker has the potential to cause annoyance to road users. Red Range Road was identified to experience potential shadow flicker. Existing vegetation will likely assist in reducing the amount of flicker experienced along this road. Alternative mitigation measures have been discussed in **Section 11.0** of this report.

Due to the large scale and elevated position of the Project, there is no doubt the Project will be visible from areas within the Study Area. However, due to the isolated location, and modified land, the existing landscape has the ability to incorporate the Project with a relatively low degree of visual impact. With implementation of the recommended mitigation measures where advised, the Project could be undertaken to maintain the landscape character of this area. In this regard, upon a detailed assessment the Project satisfies the performance objectives outlined under SC23 (PO14 and PO16).

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Maps and Figures

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