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Proposed Development of  
**Crudine Ridge Wind Farm**  
Central New South Wales



**Environmental Assessment**

**Volume 4**

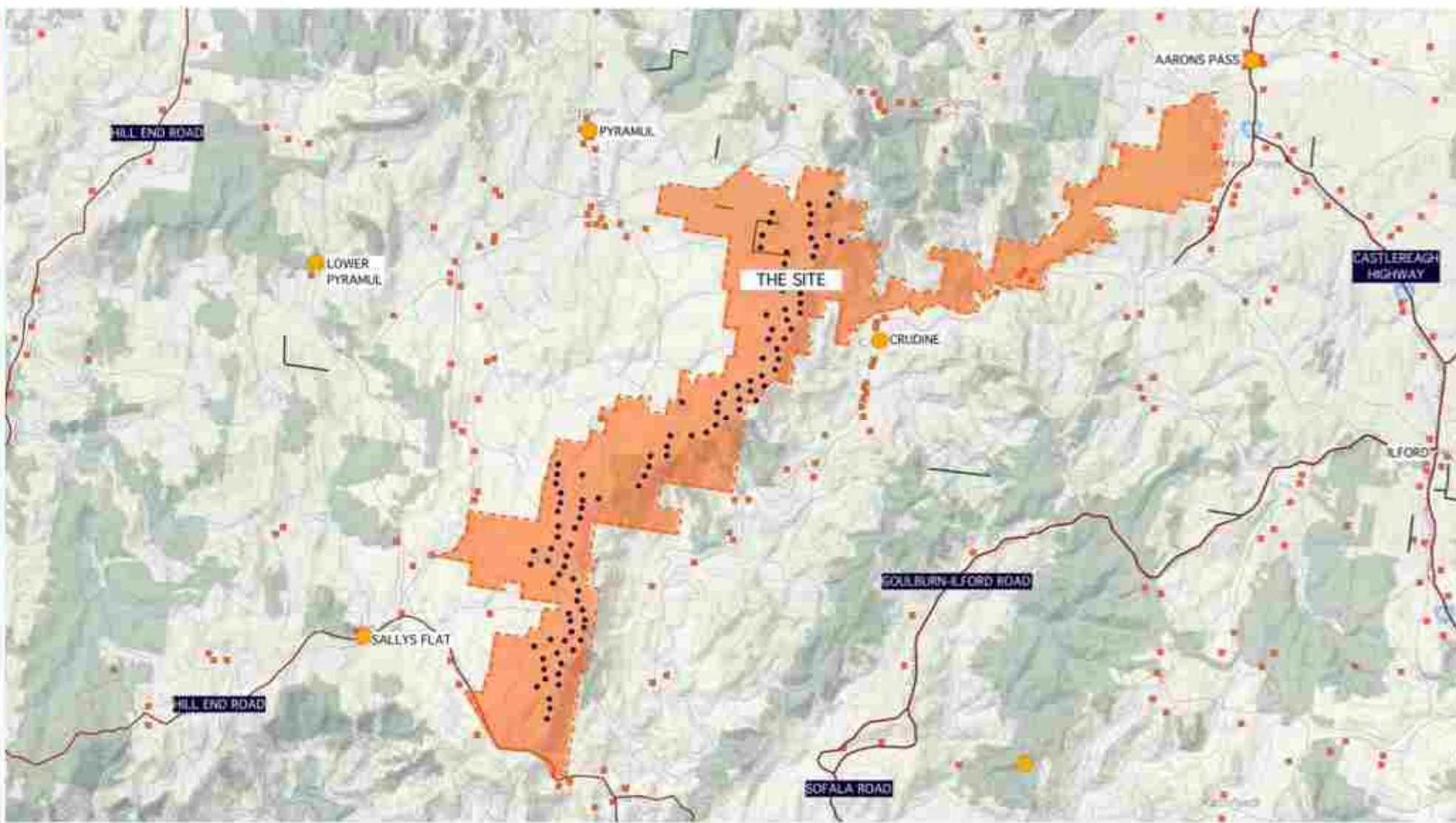
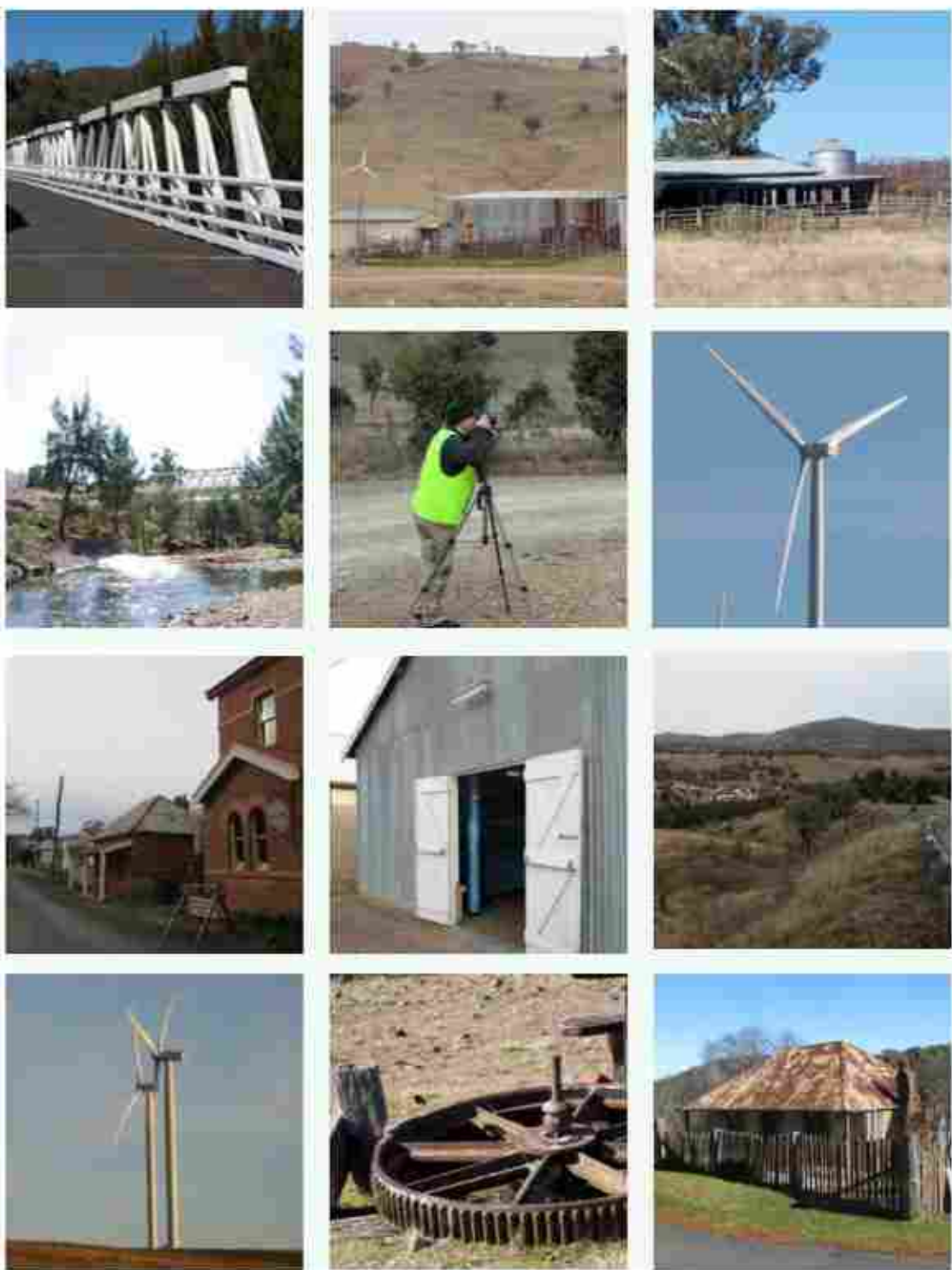
**Landscape and Visual Impact Assessment – Moir Landscape Architecture**

December 2012



# LANDSCAPE & VISUAL IMPACT ASSESSMENT

## CRUDINE RIDGE WIND FARM



PREPARED FOR: WIND PROSPECT CWP

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# 1.0 INTRODUCTION

## 1.1 BACKGROUND

Moir Landscape Architecture have been commissioned by Wind Prospect CWP to prepare a Landscape and Visual Impact Assessment (LVIA) for the proposed Crudine Ridge Wind Farm, between Mudgee and Bathurst in NSW (See Figure 1). This LVIA will support the Environmental Assessment (EA) document prepared for the proposal and lodged with the Department of Planning and Infrastructure (DOP) for assessment under Part 3A of the Environmental Planning and Assessment Act, 1979.

The purpose of this report is to provide an assessment of visibility and potential visual impacts and information to assist the community and the DOP to understand and assess the likely impacts.

As cadastral information has little influence in defining visual catchments this assessment aims to identify the landscape character, and dominant features of the relevant visual catchments that the Study Site lies within.

Survey work for the study was undertaken during July 2011 using key viewpoints and locations with potential views towards the Study Site. The report details the results of the field work, documents the assessment of the landscape character and visual setting, and makes recommendations to assist in the mitigation of any potential impacts resulting from the proposed development.

## 1.2 PROJECT OVERVIEW

The Crudine Ridge Wind Farm is situated 45 km south of Mudgee and 45 km north of Bathurst, New South Wales (NSW). The ridge line is of moderate-to-high elevation (890 m to 1,000 m above sea level, Australian Height Datum (AHD)). The nearest locality is Pyramul, which is located approximately 5 km to the north west along Aarons Pass and Pyramul roads.

The project consists of the construction and operation of a wind farm with up to 106 wind turbines, each with a capacity of between 1.5 and 3.4 Megawatts. The Project comprises a wind farm with two potential turbine layouts; one consisting of up to 106 wind turbines (Layout Option A) and the other up to 77 wind turbines (Layout Option B), together with ancillary structures spread over 17 different properties (the Project site).

In order to represent a worst case scenario, Layout A, with up to 106 turbines, has been used for the bulk of the analyses. Even though focus has been placed on Layout A, the assessments have taken Layout B, with up to 77 turbines, into consideration and comparisons have been made (see Appendix B).

In addition to the wind turbines, the associated ancillary works will be assessed. These include the construction of a facilities building, a 132 kV power line connecting to existing transmission lines, main collector substation, secondary collector substation, switching station, temporary batching plants and access tracks.

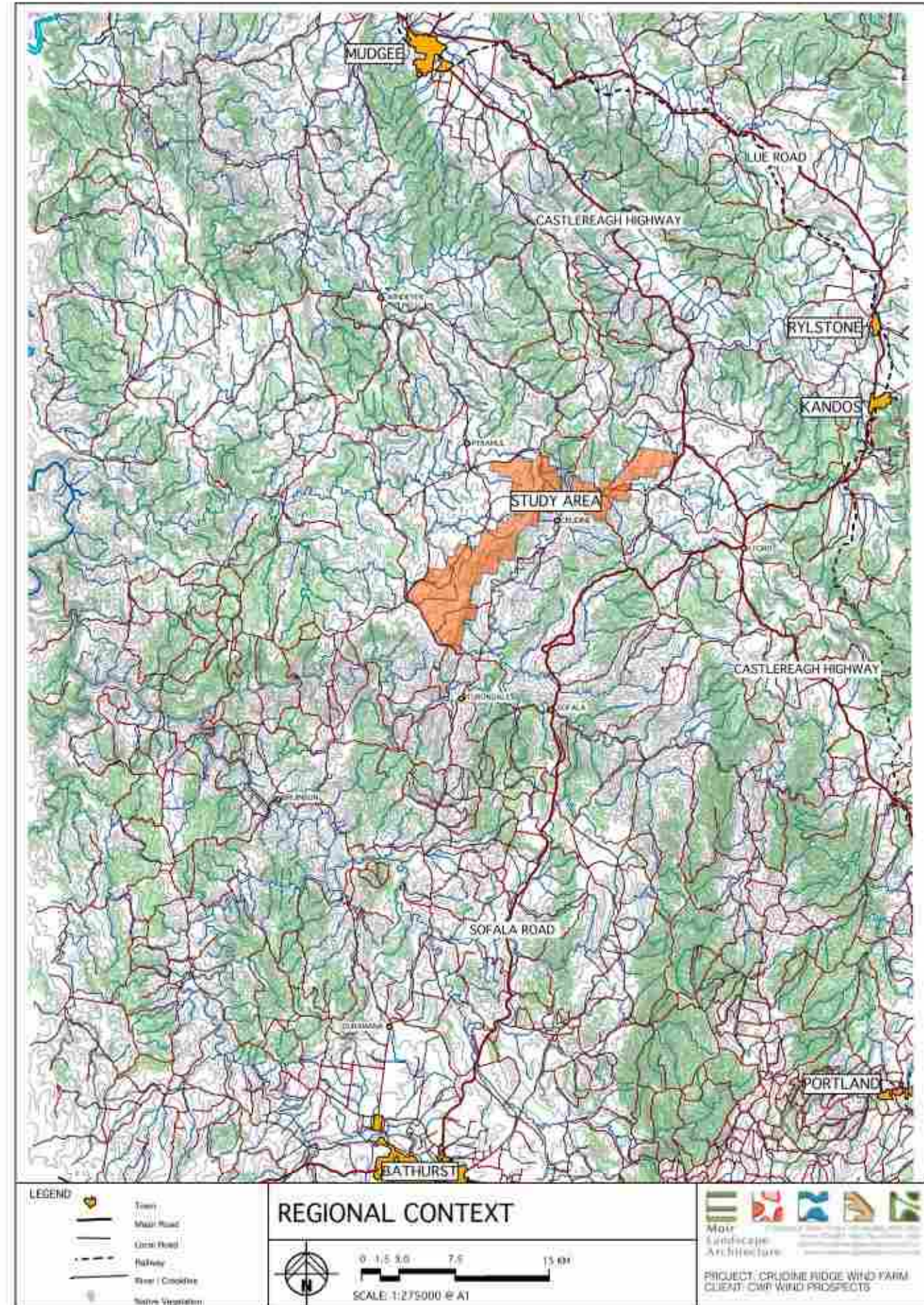


FIGURE 1: Regional Context

## 2.0 STATUTORY FRAMEWORK

### 2.1 PART 3A PROJECT PROCESS

The proposed development is a large scale, major infrastructure project of both regional and State environmental significance. Applications of this scale are determined by the Minister for Planning under Part 3A of the Environmental Planning and Assessment Act 1979.

The preparation of an Environmental Assessment (EA) forms the first step of the Part 3A Project Assessment. The Director-General requirements for the preparation of the EA are outlined in Section 2.2.

### 2.2 DIRECTOR GENERAL REQUIREMENTS

As part of the proposal the Director General has set a number of requirements which need to be addressed as part of the preparation of the EA. The requirements for assessment of visual impact include:

- provide a comprehensive assessment of the landscape character and values and any scenic or significant vistas of the area potentially affected by the project, including an assessment of the significance of landscape values and character in a local and regional context. This should describe community and stakeholder values of the local and regional visual amenity and quality, and perceptions of the project based on surveys and consultation;
- assess the impact of shadow "flicker", blade "glint" and night lighting from the wind farm;
- identify the zone of visual influence of the wind farm including consideration to night lighting (no less than 10 kilometres) and assess the visual impact of all project components on this landscape;
- include an assessment of any cumulative visual impacts from transmission line infrastructure;
- include photomontages of the project taken from potentially affected residences (including approved but not yet developed dwellings or subdivisions with residential rights), settlements and significant public view points, and provide a clear description of proposed visual amenity mitigation and management measures for both the wind farm and the transmission line. The photomontages must include representative views of turbine night lighting if proposed; and
- provide an assessment of the feasibility, effectiveness and reliability of proposed mitigation measures and any residual impacts after these measures have been implemented.

### 2.3 POLICY CONSIDERATIONS

There is not yet guidelines for the development of wind farms in NSW. The following provides an overview of the guidelines, relevant frameworks and considerations of authorities utilised to form the methodology for this visual impact assessment.

In addition to these guidelines and frameworks, Wind Farm related literature and previous Visual Impact Assessments of relevance have been utilised through the Visual Impact Assessment process.

#### Best Practice Guidelines for Wind Energy Development

The Best Practice Guidelines for Wind Energy Development were developed in November 1994 by the British National Wind Energy Association to assist the development of appropriate wind energy projects in the UK.

#### Wind Farms and Landscape Values National Assessment Framework

The Australian Council of National Trusts (ACNT) and the Australian Wind Energy Association have prepared a report entitled: 'Wind Farms and Landscape Values'. The purpose of the report is to develop a mutually agreed methodology for assessing landscape values for wind farm proposals. The National Assessment Framework, Stage 2 of the document, provides a rigorous and transparent method for assessing, evaluating and managing the impact of wind farms on landscape values. The step by step approach entails describing and modelling wind farms proposals in the landscape, assessing the positive and negative impacts on landscape values and finally managing those impacts.

The National Assessment Framework has four steps as follows:

- Step 1: Assess the Landscape Value,
  - Preliminary Landscape Assessment.
  - Full Landscape Assessment.
- Step 2: Describe and model the wind farm in the landscape.
- Step 3: Assess the impacts of the wind farm on landscape values.
- Step 4: Respond to impacts.

#### National Wind Farm Development Guidelines

The Environment Protection and Heritage Council have developed a draft guideline (July 2010) to provide consistent framework and methods for assessing issues unique to wind farm developments. References to these guidelines have been made throughout the report.

#### Mid-Western Regional Council & Bathurst Regional Council

The majority of the proposed development is located within the Mid-Western Regional Council and a small portion of the Site is located within the Bathurst Regional Council. No relevant policies of landscape or scenic quality guidelines apply to the area within these councils.

#### Road and Traffic Authority

The assessment of shadow flicker, blade glint and reflectivity is to include an assessment of the impact on road users.

#### Civil Aviation Safety Authority

The LVIA includes an assessment of night lighting in accordance with the Civil Aviation Safety Authority (CASA).

# 3.0 STUDY METHOD

## 3.1 LANDSCAPE AND VISUAL IMPACT ASSESSMENT

A Landscape Assessment and Visual Impact Assessment is used to identify and determine the value, significance and sensitivity of a landscape. The method applied to this study involved systematically evaluating the visual environment pertaining to the site and using value judgements based on community responses to scenery. The assessment was undertaken in stages as noted below:

### SITE & REGIONAL CONTEXT

- Overview of the regional and site context including both natural and cultural features.

### LANDSCAPE CHARACTER

- Description of the regional landscape character and significant features.
- Classification of the local landscape into different character types and a description (Referred to as Landscape Character Units). A determination of the landscapes ability to absorb different types of development based on the physical and environmental character of the landscape.

### THE PROPOSAL

- Overview of the proposed wind farm development and associated infrastructure.

### VISUAL IMPACTS

- Computer modelling to determine the Zone of Visual Influence (ZVI) based on topography alone to represent worst case scenario.
- The undertaking of a viewpoint analysis to identify sites likely to be affected by development of the site and a photographic survey using a digital camera and a handheld GPS unit to record position and altitude.
- Visual modelling of the wind farm from key viewpoints in the form of photomontages to depict the potential visual change. (AUS WEA 2007 or 2005)

### VISUAL EFFECTS

- Overview of potential Visual effects including Shadow Flicker, Blade Glint and Reflectivity and Night Lighting.

### CUMULATIVE VISUAL IMPACTS

- Assess the cumulative visual impacts based on existing and proposed development in the area.

### VISUAL IMPACT SUMMARY

- Assessment of the overall visual impact, summary of visual impact on residents and public receptors.

### COMMUNITY PERCEPTIONS

- Overview of the community perception and consultation process and outcomes.

### MITIGATION METHODS

- Preparation of recommendations for impact mitigation and suggestions for suitable development to maintain the areas visual quality.

## 3.2 DEFINITIONS

Definitions for terms used throughout the LVIA have been included in this section of the report.

### 3.2.1 Landscape Values

Landscape values are the cultural attributes (social, indigenous, artistic and environmental) as well as the aesthetics of a place, as shown in Figure 2.



FIGURE 2: Landscape Values

### 3.2.2 Visual Quality

Visual quality of an area is essentially an assessment of how viewers may respond to designated scenery. Scenes of high visual quality are those which are valued by a community for the enjoyment and improved amenity they can create. Conversely, scenes of low visual quality are of little value to the community with a preference that they be changed and improved, often through the introduction of landscape treatments.

As visual quality relates to aesthetics its assessment is largely subjective. There is evidence to suggest that certain landscapes are constantly preferred over others with preferences related to the presence or absence of certain elements. The rating of visual quality for this study has been based on scenic quality ratings and on the following generally accepted assumptions arising from scientific research (DOP, 1988):

- Visual quality increases as relative relief and topographic ruggedness increases;
- visual quality increases as vegetation pattern variations increase;
- visual quality increases due to the presence of natural and/or agricultural landscapes;
- visual quality increases owing to the presence of waterforms (without becoming too common) and related to water quality and associated activity; and
- visual quality increases with increases in land use compatibility.

In addition to the above, cultural items may also endow a distinct character to an area and therefore contribute to its visual quality due to nostalgic associations and the desire to preserve items of heritage significance.

# 3.0 STUDY METHOD

## 3.2.3 Visual Sensitivity

Visual sensitivity is a measure of how critically a change to the existing landscape is viewed by people from different areas. The assessment is based on the number of people affected, land use, and the distance of the viewer from the proposal. (EDAW, 2000).

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

- Visual sensitivity decreases as the viewer distance increases.
- Visual sensitivity decreases as the viewing time 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).

Sensitivity ratings are defined as high, moderate or low and are shown in the table below (URBIS, 2009).

VISUAL SENSITIVITY					
VISUAL USE AREA	FOREGROUND		MIDDLEGROUND		BACKGROUND
	Local setting		Sub-Regional setting		Regional setting
Distance in Kms	0-1	1-2	2-4.5	4.5-7	> 7
Townships	High	High	High	Mod	Low
Rural residences	High	High	High	Mod	Low
Main Highway	Mod	Mod	Low	Low	Low
Local Roads	Mod	Mod	Low	Low	Low
Railway Line (Freight)	Low	Low	Low	Low	Low
Agricultural Land	Low	Low	Low	Low	Low

TABLE 1: Visual Sensitivity Table

## 3.2.4 Visual Effect

Visual effect is the interaction between a proposal and the existing visual environment. It is often expressed as the level of visual contrast of the proposal against its setting or background in which it is viewed.

**Low visual effect:** occurs when a proposal blends in with its existing viewed landscape due to a high level of integration of one or several of the following: form, shape, pattern, line, texture or colour. It can also result from the use of effective screening often using a combination of landform and landscaping.

**Moderate visual effect:** occurs where a proposal is visible and contrasts with its viewed landscape, however, there has been some degree of integration (e.g. good siting principles employed, retention of significant existing vegetation, provision of screen landscaping, appropriate colour selection and/or suitably scaled development).

**High visual effect:** results when a proposal has a high visual contrast to the surrounding landscape with little or no natural screening or integration created by vegetation or topography.

## 3.2.5 Visual Impact

Visual impact refers to the change in appearance of the landscape as a result of development. (EPHC, 2010). Visual impact is the combined effect of visual sensitivity and visual effect. Various combinations of visual sensitivity and visual effect will result in high, moderate and low overall visual impacts as suggested in the below table (URBIS, 2009):

VISUAL IMPACT				
		VISUAL EFFECT ZONES		
		HIGH	MODERATE	LOW
VISUAL SENSITIVITY LEVELS	HIGH	High Impact	High Impact	Moderate Impact
	MODERATE	High Impact	Moderate Impact	Low Impact
	LOW	Moderate Impact	Low Impact	Low Impact

TABLE 2: Visual Impact Table

## 3.2.6 Zone of Visual Influence (ZVI)

The Zone of Visual Influence (ZVI) represents the area over which a development can theoretically be seen, and is based on a Digital Terrain Model (DTM). The ZVI usually presents a bare ground scenario - ie a landscape without screening, structures or vegetation, and is usually presented on a base map. It is also referred to as a zone of theoretical visibility. (Horner and MacIennan et al, 2006).

## 3.2.7 Photomontage

A photomontage is a visualisation based on the superimposition of an image (ie turbine, building, road, landscape addition etc) onto a photograph for the purpose of creating a realistic representation of proposed or potential changes to a view. (Horner and MacIennan et al, 2006).

Photomontages have been utilised in this Visual Impact Assessment to assist in the impact assessment of the proposal. Refer to section 9.0.



# 3.0 STUDY METHOD

## 3.3 VISIBILITY ASSESSMENT CRITERIA

In order to facilitate objective assessment of visibility, a set of key assessment criteria was developed. The key criteria against which the visibility of the proposed development was assessed from each viewpoint are:

- the distance from the wind farm
- the potential visual prominence (in relation to the view field angle)
- the potential number of visible turbines
- the context in which the turbines are viewed

These methods of assessment have been summarised from each viewpoint, forming part of the Visual Impact section of this report (refer to section 7.0).

### 3.3.1 Distance from the wind farm

The distance of each viewpoint to the closest turbine was a significant determining factor in ranking the visual prominence of the development. The visual impact decreases or increases in direct relation to the distance.

- Local setting: Up to 2km from the development
- Sub regional setting: between 2km and 10km from the development
- Regional setting: beyond 10km of the development

These distances have been established based on previous studies undertaken in association with Wind Farm development and by the requirements outlined by the Director General. The distance to the nearest proposed wind turbine has been measured for each viewpoint. Table 5 outlines the potential visual prominence of the development in relation to the distance from the object.

DISTANCE FROM WIND TURBINE	POTENTIAL VISUAL PROMINENCE
> 12 km	<b>VISUALLY INSIGNIFICANT</b> <i>A very small element in the landscape. Although difficult to discern and not to be seen in some strong weather conditions, Road Block equipment can often be seen on a clear day.</i>
6-12 km	<b>POTENTIALLY NOTICEABLE BUT WILL NOT DOMINATE THE LANDSCAPE</b> <i>The development will be noticeable. The degree that it intrudes on the view will depend on distance, direction.</i>
2.5-6 km	<b>POTENTIALLY NOTICEABLE AND CAN DOMINATE THE LANDSCAPE</b> <i>The development may be highly noticeable.</i>
1-2.5 km	<b>HIGHLY VISIBLE AND WILL USUALLY DOMINATE THE LANDSCAPE</b> <i>The development may be highly noticeable.</i>
<1 km	<b>WILL ALWAYS BE VISUALLY DOMINANT IN THE LANDSCAPE</b> <i>The development may be highly noticeable.</i>

TABLE 3: Visual prominence in relation to distance and viewshed (URBIS, 2009)

### 3.3.2 View field angle

The view field angle is the angle subtended by the wind farm at the observers location (see Figures 2 & 3). This angle varies for differing viewpoints based on the distance from the wind turbines, the number of turbines, the layout and its orientation relative to the viewer and intervening topography. A person normally sees approximately 100° at any point and can easily see a much broader field by scanning from side to side (Connel Wagner).

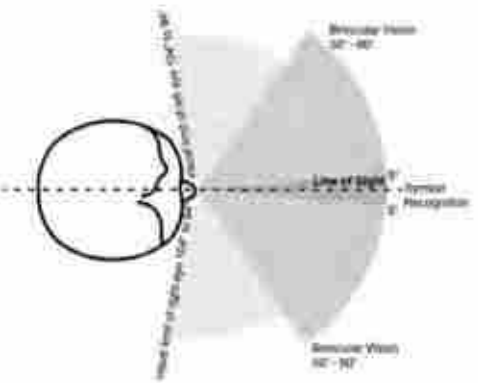


FIGURE 3: Horizontal Line of Sight

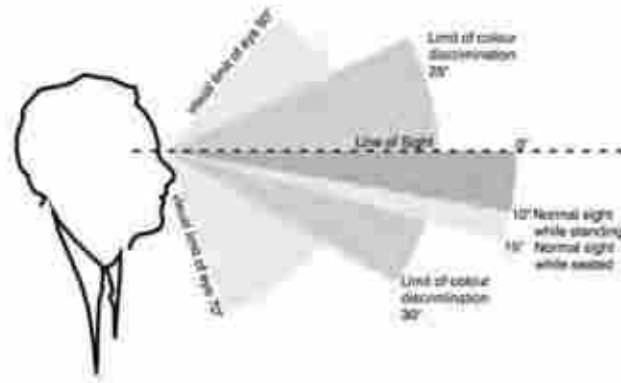


FIGURE 4: Vertical Line of Sight

The field of angle can be measured by both the horizontal and vertical line of sight (refer to Figures 3 and 4). However due to the unique spatial arrangement of the proposed wind farm development, this LVIA will focus on the vertical angle of view.

In this case the vertical line of sight is used to assess the visual prominence of the proposed development from each viewpoint. The field of view is based merely on the theoretical angle between the viewer and the wind turbine and does not take into account topography, vegetation or buildings which may lessen the visual prominence and is therefore based on worst case scenario. Table 4 outlines the potential visual prominence of the development based on the vertical field of view.

DEGREES OF FIELD OF VIEW OCCUPIED	POTENTIAL VISUAL PROMINENCE - VISUAL FIELD OF VIEW
Less than 0.5°	<b>INSIGNIFICANT</b> <i>A small thin line in the landscape</i>
0.5°-2.5°	<b>POTENTIALLY NOTICEABLE</b> <i>The development may be noticeable. The degree that it intrudes on the view will be dependent on how well it integrates with the landscape setting.</i>
Greater than 2.5°	<b>POTENTIALLY DOMINANT</b> <i>The development will be highly noticeable, although the degree of visual intrusion will depend on the landscape setting and the width/spread of the object.</i>

TABLE 4: Vertical line of sight- Visual impact/ visual prominence (URBIS, 2009)

# 3.0 STUDY METHOD

## 3.3.3 Number of visible turbines

The potential number of visible turbines was determined from each viewpoint, based on topographic mapping and review of the wind farm layout in relation to the viewpoint. The number of turbines visible to the viewer is likely to contribute to the overall visibility ranking.

Wind Farm Layout A has a total of up to 106 proposed wind turbines.

NUMBER OF TURBINES VISIBLE	PERCENTAGE OF DEVELOPMENT
81-106	100%
61-80	80%
41-60	60%
21-40	40%
1-20	20%

TABLE 5: Percentage of visible turbines

## 3.3.4 Viewing context

A number of factors existing on a local level can influence the visibility of the proposed wind farm development as viewed. These include but are not limited to:

- Visual backdrop of the proposal
- Local influences
- Visual desensitisation

### VISUAL BACKDROP

The backdrop upon which the wind turbines are viewed can be a relevant factor in the assessment of the visual impact. For example most views of the wind turbines will have a backdrop against the sky. In clear weather, the wind turbines will appear prominent contrasting against the blue sky, whereas on overcast days the wind turbines may be less noticeable with an overcast or cloudy background reducing the level of visual contrast. For each photomontage developed for the proposed wind turbines, a comparative photomontage has been developed with a blue sky back drop to assist in demonstrating the worst case scenario of the proposed wind turbines.



Turbines against a cloudy backdrop.



Turbines against a blue sky backdrop.

### LOCAL INFLUENCES

A variety of influences on a local level can directly impact the visibility of the proposed development. For example, wind break planting around homesteads and retained vegetation along roadsides are a characteristic of the existing landscape which effectively contain views from within surrounding properties. In effect this screens views to the distance and influences the visual impact from each viewpoint.



Roadside screen planting.



Homestead screen planting.

### VISUAL DESENSITISATION

Another visual influence is the desensitisation of viewers to visual modification due to existing land use in the area. For example the presence of agricultural equipment surrounding homesteads and the presence of storage areas, farm equipment and sheds through the landscape can have a greater visual influence from viewpoints than the proposed development in the distance. Examples of this within the local context of the Site include farming equipment, transmission lines and the Ilford substation.



Ilford Substation.



Agricultural building.

# 4.0 REGIONAL AND SITE CONTEXT

## 4.1 REGIONAL CONTEXT

### 4.1.1 Mudgee

Mudgee is located approximately 45 km north west of the study area within the Cudgegong River Valley. Mudgee was settled in 1821 and developed during the gold rush after the discovery of gold in the nearby towns including Hargraves, Windeyer, Gulgong and Hill End. As the gold mining industry gradually faded, Mudgee was sustained by its wool and wine industry. Presently, Mudgee is a wine producing region with a strong economy from rural produce including cattle, sheep, wheat, lucerne, olives, fruit, corn and dairy products. The Ulan coal mines are located 35km to the north east of Mudgee employing approximately 920 people. (Source: Wikipedia)



Mudgee Character Shots

### 4.1.2 Bathurst

Bathurst is a regional city and the oldest inland settlement in Australia, located on the Macquarie River plain west of the Great dividing range. Bathurst was the location of a gold rush in NSW with the first gold being discovered in 1823. Bathurst is today sustained by a strong manufacturing, education and government service sectors. Sheep, wool and cattle are the main industries in the region. A large number of softwood plantations also occur in the region. (Source: Wikipedia)



Bathurst Character Shots

### 4.1.3 Hill End

Hill End is a former gold mining town which was the first reef mining area in Australia and one of the richest in NSW. Hawkins Hill was heavily mined to depths of up to 240 metres with 12.4 tonnes of gold mined. It is estimated that in the early 1870s at its pinnacle, the population of Hill End and Tambaroora reached approximately 8000. A total production of over 50 tonnes of gold was recorded for the district. Post 1874 mines closed and by 1945 Hill End had a population of 700. Today Hill End has been classified as a historic site by the National Parks and Wildlife Services who manage the remaining buildings. (Source: DPI)



Hill End Character Shots

### 4.1.4 Sofala

Sofala is a small village located off the Bathurst - Ilford Road on the Turon River. Sofala was established during the gold rush when gold was discovered in the Turon River. The township developed along the river for approximately 16km with many local businesses including schools, hotels and churches built to service the local residents. Sofala is considered one of Australia's oldest surviving gold mining towns. (Source: Wikipedia)



Sofala Character Shots

# 4.0 REGIONAL AND SITE CONTEXT

## 4.1.5 Major Roads

Within the local region Hill End Road and the Sofala / Peel Road are the main travel corridors. Hill End Road is a travel corridor connecting Sofala to Hill End and Tambaroora. For the most part, Hill End Road is sealed and utilised mostly by local residents and tourists. Hill End Road follows the Turon River and a number of isolated homesteads are located along the road. The Sofala / Peel Road runs in a generally north east direction from Bathurst to the town Ilford located off the Castlereagh Highway. The Sofala / Peel Road is used frequently by local residents, tourists and heavy vehicles.

The Castlereagh Highway is the nearest major regional road located over 12km east of the study area. The Castlereagh Highway is a state highway which starts at Lithgow running in a north west direction through Ilford and continuing to Queensland.



Hill End Road



Sofala / Peel Road



Castlereagh Highway

## 4.1.6 Land use

A number of isolated homesteads are located throughout the study area generally servicing agricultural industry. The main industries of the region include grazing of sheep and cattle for meat and dairy. Other rural produce including crops, fruit, wheat and wineries occur in the region. The tourism industry based around Mudgee and Bathurst extends to smaller towns including Hill End and Sofala due to the extensive cultural heritage of the region.



Grazing Land



Isolated Homestead

## 4.1.7 Cultural Significance

### PRE EUROPEAN SETTLEMENT

The district was traditionally Wiradjuri country, the largest Aboriginal language group in NSW. The Wiradjuri country stretches from the eastern boundary of the Great Dividing Range to as far west as Nyngan. The Wiradjuri people were known as the people of three rivers; the Macquarie River, Lachlan River and Murrumbidgee River.

### GOLD MINING

In 1852 payable gold was discovered at Ophir, near Bathurst. The gold fields brought an estimated 340,000 migrants to Australia Between 1852 and 1861 resulting in a major alteration in the social and economic culture of New South Wales. Major settlements resulting from the gold rush are located within the regional context of the proposed study area. The main towns settled as a result of the gold rush included Hill End, Sofala, Windeyer and Gulgong. The towns expanded as new settlers benefited the local economy bringing with them new trades and skills.



Sofala / Turon River  
(Source: <http://users.tpg.com.au/dtdan/softown>)



Gold Miners in Hill End  
(Source: About NSW)

# 4.0 REGIONAL AND SITE CONTEXT

## 4.2 SITE CONTEXT

The Study Area is located approximately 10km north west of Sofala and 5km south east of Pyramul along the Crudine Ridge (Refer to Figure 5).

### 4.2.1 Landform

The proposed wind farm runs along Crudine Ridge at a moderate to high elevation of 890 to 1000m above sea level, Australian Height Datum. The landscape surrounding the ridge line ranges from sloping to slightly undulating and steeply undulating.

### 4.2.2 Water Bodies

The Study Area is located within the Macquarie River Catchment area. A number of creek lines and intermittent watercourses run through the study area draining into tributaries of the Macquarie River including Cudgegong River to the north and the Turon River to the south. The Crudine River runs to the east of the Crudine Ridge.

### 4.2.3 Vegetation

The extent and type of vegetation varies through the study area. Each Landscape Character Unit (refer to section 5.2 of this report) has a variety of vegetation types.

### 4.2.4 Roads

A number of unsealed local roads run through the study area. These minor roads are generally used intermittently to service the isolated homesteads located throughout the study area.

### 4.2.5 Land use

Fertile land within the study area has been extensively cleared and is utilised for grazing purposes. Homesteads through the area are generally isolated and associated with the agricultural land use.

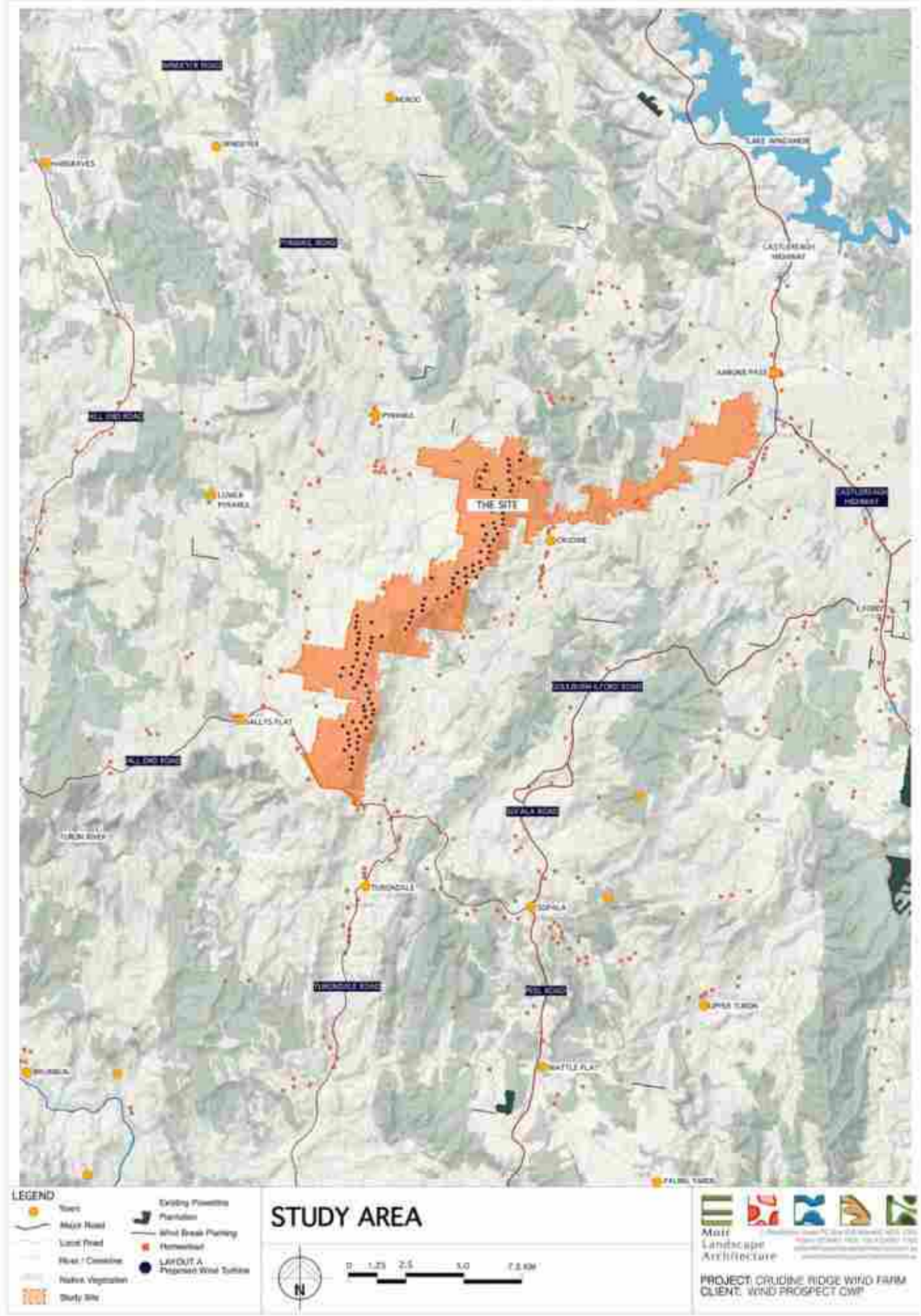


FIGURE 5: Study Area

# 5.0 LANDSCAPE CHARACTER

## 5.1 REGIONAL LANDSCAPE CHARACTER

### 5.1.1 South Western Slopes Bioregion

The Study Area is located within the south eastern pocket of the South Western Slopes Bioregion which is bounded to the northeast by the Sydney Basin bioregion and the South by the South Eastern Highlands bioregion. (OEH 2011)

The South Western Slopes Bioregion covers approximately 10% of New South Wales. The geology soils and vegetation are a complex and diverse but typified granites and meta-sediments. The Study Area is located within the Upper Slopes of the NSW South Western Slopes bioregion.

### 5.1.2 Landform

The South Western Slopes Bioregion is a large area of foothills and ranges comprising the western fall of the Great Dividing Range. The landscape is typically gently undulating to undulating. The study area and surrounds are undulating reaching elevations of approximately 1100 metres. The Crudine Ridge is a dominant landscape feature within the study area ranging in elevation from 700 - 1000 metres. Bald Hill Lookout is located east of Hill End and is a local high point at an elevation of 912 metres.

### 5.1.3 Water bodies

Lake Windamere is the most prominent water body of the region, fed by the Cudgegong River and Carwell Creek. The Study Area is located within the Macquarie River catchment. Macquarie River is one of the main inland rivers of NSW and runs south east past Dubbo and through Wellington valley before reaching Lake Burrendong. A number of smaller tributaries of the Macquarie River run through the landscape.

### 5.1.4 Vegetation

Vegetation in the NSW south western slopes bio region consists of open forests and woodlands. Vegetation within the NSW South Wester Slopes Bioregion upper slopes is generally black cypress pine, kurrajong, red ironbark white gum, yellow box and Blakely's red gum on the lower slopes. Also present are rough-barker apple on flats with river oak on upper tributaries and river red gum on lower and larger streams. (OEH 2011)

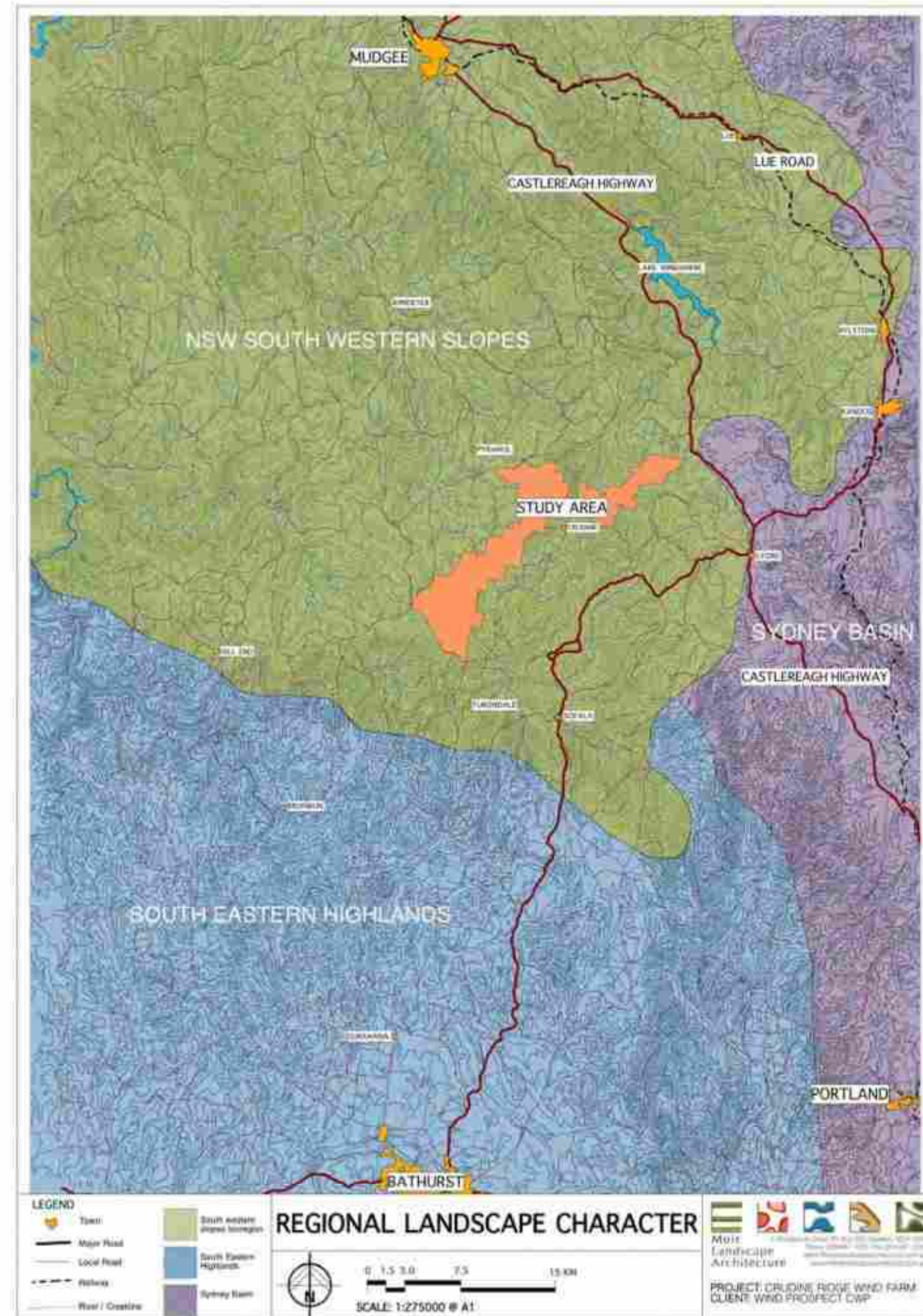


FIGURE 6: Regional Landscape Character

# 5.0 LANDSCAPE CHARACTER

## 5.2 LANDSCAPE CHARACTER UNITS

Generally one of the first steps in carrying out a landscape and visual assessment is to identify and map the Landscape Character of the surrounding area.

The landscape character of a site refers to the distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and how this is perceived by people. It reflects a particular combination of geology, landform, soils, vegetation, land use and human settlement and creates a particular sense of place for different areas within the landscape. (Horner and MacLennan et al, 2006).

The existing landscape context of the site and its surrounding environment are classified into distinct and relatively homogenous units of landscape character. As the landscape encompassing and surrounding the study area varies greatly, landscape character units (LCU) have been defined using a combination of aerial maps, topographic maps, soil landscape maps and site photographs. A landscape quality rating has been applied to each LCU based on an assessment on the factors which form the visual landscape. The landscape quality ranking assists in assessing the visual impact from the LCUs.

These LCUs are summarised below and form the elements of the local visual context, hence their quality also reflects to a degree its visual amenity.

The LCUs for the purpose of this report have been defined as:

-  LCU 1 - Pyramul
-  LCU 2 - Aarons Pass
-  LCU 3 - Sallys Flat
-  LCU 4 - Crudine Valley
-  LCU 5 - Sofala
-  LCU 6 - Turon River
-  LCU 7 - Turondale

The LCUs have been identified in Figure 7 and are described in detail in the following pages of this report.

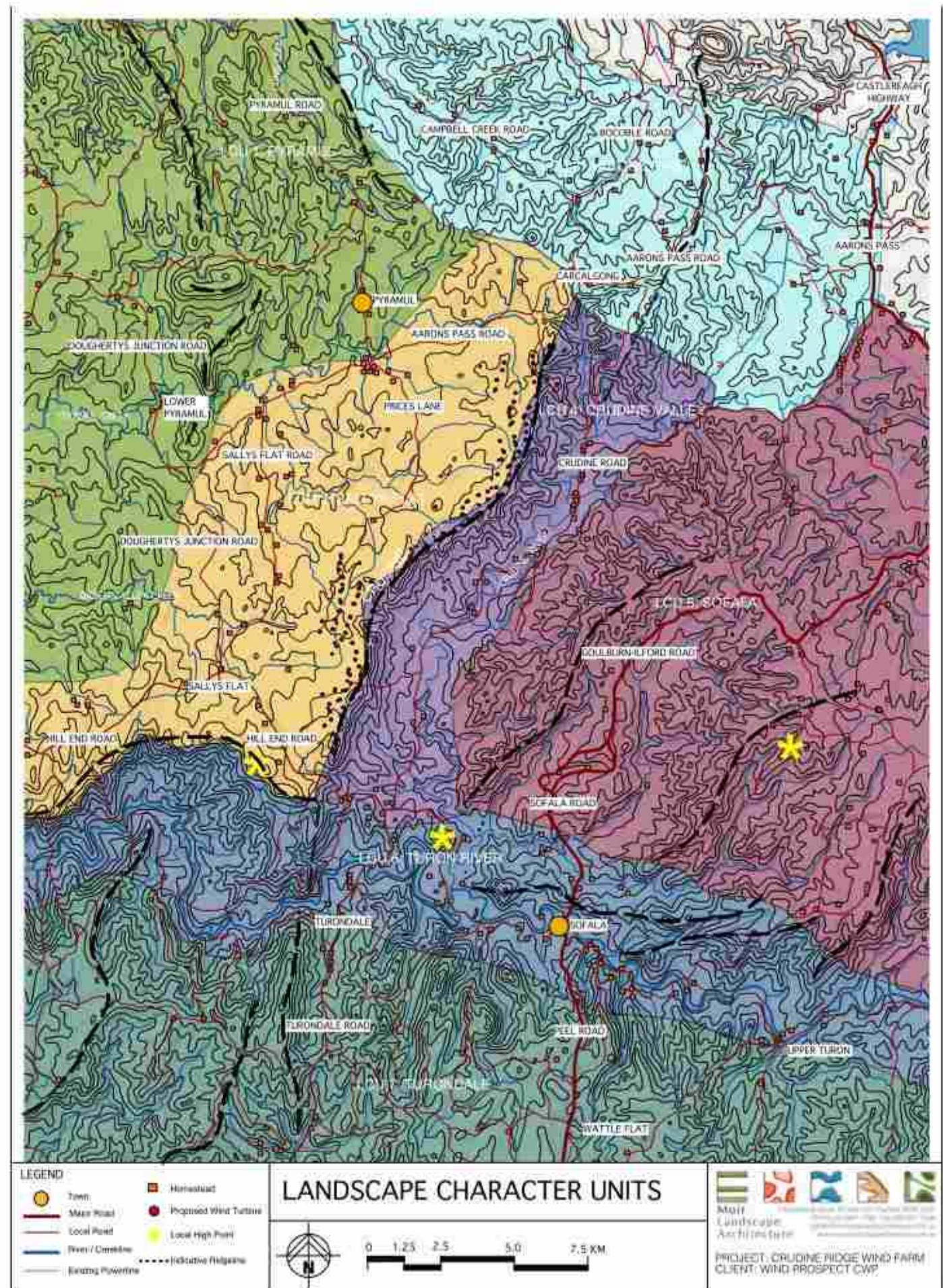


FIGURE 7: Landscape Character Units

# 5.0 LANDSCAPE CHARACTER

## 5.2.1 LCU 1: PYRAMUL

The Pyramul LCU incorporated the generally vegetated, undulating hills and valleys to the north east of Crudine Ridge. The area incorporates Pyramul, Lower Pyramul, Pyramul Creek and associated local roads and watercourses. Typically the LCU is undulating to steeply sloping with a low to moderate coverage of vegetation. Some flat to gently sloping areas at the base of valleys along the creek line are utilised for grazing purposes. The landscape quality rating for the Pyramul LCU has been assessed as medium to high.

CHARACTER	LANDSCAPE QUALITY RATING		
	LOW	MEDIUM	HIGH
LANDFORM & SCALE	[Progress bar: ~75%]		
LANDCOVER	[Progress bar: ~55%]		
SETTLEMENT & HUMAN INFLUENCE	[Progress bar: ~35%]		
MOVEMENT	[Progress bar: ~35%]		
RARITY	[Progress bar: ~75%]		
INTERVISIBILITY WITH ADJACENT LANDSCAPES	[Progress bar: ~35%]		

TABLE 6: LCU 1: Pyramul Landscape Quality Rating



Pyramul Road



Pyramul Road



Dohertys Junction Road

### IEWS:

Views from within the LCU towards the Study Area vary from different points within the LCU, however views are generally contained by topography and vegetation.

### TOPOGRAPHY:

The Pyramul LCU is characterised by rolling to steep hills with rocky slopes. Elevations range from approximately 680 - 970 metres. Slopes range from approximately 20 - 50% and vary in length from 200 - 800 metres.

### ROADS / INFRASTRUCTURE:

A small number of local roads run through the LCU. Pyramul Road is a partly sealed road which runs in a generally north to south direction from Windeyer to Pyramul. Doughertys Junction Road is an unsealed minor road servicing isolated homesteads and connecting Sallys Flat Road to Hill End Road through Lower Pyramul. Both Doughertys Junction Road and Pyramul Road have a moderate coverage of intermittent roadside vegetation containing views in some areas.

### VEGETATION:

There is a dense coverage of vegetation in the west of the LCU, associated with the sloping landscape which is unsuitable for agricultural use. Vegetation in the LCU is dominated by dry sclerophyll forest surrounding Lower Pyramul with a broad-leaved peppermint and scribbly gum community. Tumbledown red gum, grey box and yellow box grow on upper slopes. Areas towards Pyramul and along creek lines have been extensively cleared for agricultural purposes.

### LAND USE:

Due to the predominately shallow soils, the LCU has a low fertility and therefore some grazing occurs on native pasture and uncleared land. Towards Pyramul and lower lying areas, land has been cleared and there are some areas of improved pasture. A small number of isolated homesteads are located though the LCU mostly along Doughertys Junction Road.

### WATERCOURSES:

The LCU is located within the Macquarie River catchment with Pyramul Creek, Long Creek and Green Valley Creek running through it. A number of fixed drainage lines run through the LCU from these creeks and are located approximately 250 - 800 metres apart.



# 5.0 LANDSCAPE CHARACTER

## 5.2.3 LCU 2: AARONS PASS

The Aarons Pass LCU encompasses land to the north east of the Study Area. The LCU incorporates land to the west of the Castlereagh Highway including Aarons Pass, Aarons Pass Road, Bocoble, Green Gully Road and Campbells Creek Road. The LCU extends to the west to a ridgeline between Pyramul Road and Campbell Creek Road. The area is characterised by undulating land with a moderate to dense coverage of native vegetation. The landscape quality rating for Aarons Pass LCU has been assessed as medium.

CHARACTER	LANDSCAPE QUALITY RATING		
	LOW	MEDIUM	HIGH
LANDFORM & SCALE	[Progress bar: ~75%]		
LANDCOVER	[Progress bar: ~65%]		
SETTLEMENT & HUMAN INFLUENCE	[Progress bar: ~20%]		
MOVEMENT	[Progress bar: ~25%]		
RARITY	[Progress bar: ~85%]		
INTERVISIBILITY WITH ADJACENT LANDSCAPES	[Progress bar: ~45%]		

TABLE 7: LCU 2 Aarons Pass Landscape Quality Rating



Aarons Pass Road



Aarons Pass Road



Aarons Pass Character Shot

### VIEWS:

From this LCU views to the Study Area are broadly contained by dense vegetation and localised variations in topography. It is unlikely that the Study Area would be visible from most parts of this LCU.

### TOPOGRAPHY:

The topography comprises a combination of rolling low hills with broad crests to steep slopes with rocky outcrops. Elevations range from 660 to 1000 metres with average slopes of approximately 20 - 25% with some steeper at 30 - 50%.

### ROADS / INFRASTRUCTURE:

Aarons Pass Road is an unsealed local road which runs from the Castlereagh Highway to Pyramul connecting with Sallys Flat Road. A small number of unsealed minor roads run off Aarons Pass Road to the north including Bocoble Road, Campbells Creek Road and Green Gully Road. These roads are minor roads utilised for servicing a small number of isolated homesteads. High voltage power lines run across the north eastern edge of the LCU.

### VEGETATION:

Dense vegetation occurs for the most part through the LCU in the form of dry sclerophyll woodland with a shrub understorey. A variety of Eucalyptus species occur through the LCU. A white box - red stringy bark community occurs on the slopes and ridges with yellow box and apple box in the mid-slopes and in valleys.

### LAND USE:

Due to the topography, a large percentage of the LCU remains uncleared. Sloping to undulating land to the east and valleys to the north have been extensively cleared and utilised for grazing purposes with both native and improved pasture. Some occasional pockets of cultivation occurs on fertile land on lower slopes within the LCU. A number of isolated homesteads associated with the agricultural industry are located along Bocoble and Campbells Creek Roads and a few homesteads are sited along Aarons Pass Road.

### WATERCOURSES:

Lake Windamere is located to the north east of the LCU and a number of small creek lines run through it from the Lake. Cambells Creek and Bombandi Creek run through the LCU with a number of tributary drainage lines running from the creeks occurring between 300 - 800 metres apart. A number of smaller drainage lines occur in a trellis-like pattern through the LCU.

# 5.0 LANDSCAPE CHARACTER

## 5.2.3 LCU 3: SALLYS FLAT

Sallys Flat LCU encompasses a large portion of land located in an open valley to the west of Crudine Ridge. The LCU incorporates the western slopes of Crudine Ridge, including Sallys Flat Road, Prices Lane and the southern section of Doughertys Junction Road. The LCU is characterised by extensively cleared rolling low hills with some scattered vegetation. The landscape quality rating of Sallys Flat LCU has been assessed as medium.

CHARACTER	LANDSCAPE QUALITY RATING		
	LOW	MEDIUM	HIGH
LANDFORM & SCALE	[Bar chart showing a rating between Low and High]		
LANDCOVER	[Bar chart showing a rating between Low and High]		
SETTLEMENT & HUMAN INFLUENCE	[Bar chart showing a rating between Low and High]		
MOVEMENT	[Bar chart showing a rating between Low and High]		
RARITY	[Bar chart showing a rating between Low and High]		
INTERVISIBILITY WITH ADJACENT LANDSCAPES	[Bar chart showing a rating between Low and High]		

TABLE 8: LCU 3 Sallys Flat Landscape Quality Rating



Property on Sallys Flat Road



Sallys Flat Character Shot



Sallys Flat Road

### IEWS:

It is likely that the proposed wind farm will be visible from some raised viewpoints within the LCU. Localised rises and retained pockets of vegetation contain views in most areas of the LCU. Roadside vegetation along Sallys Flat Road generally screen views.

### TOPOGRAPHY:

The landscape is generally undulating to rolling low hills. Local relief is between 50 - 140 metres and slopes are generally less than 15% and between 500 - 1500 metres in length. The landscape slopes towards Crudine Ridge which forms the eastern extent of the LCU.

### ROADS / INFRASTRUCTURE:

Sallys Flat Road is a minor unsealed road which runs from Hill End Road to Pyramul. The road services a number of isolated homesteads. Sallys Flat Road is characterised by dense roadside vegetation for the most part. Prices Lane continues from Pyramul Road to the north of the LCU. Prices Lane is an unsealed minor road which services a small number of properties south of Pyramul. The southern section of Doughertys Junction road connects from Hill End Road to Lower Pyramul and is an unsealed minor road used intermittently.

### VEGETATION:

The landscape is extensively cleared with scattered groups of retained vegetation. Dense roadside vegetation occurs along Sallys Flat Road. Vegetation is generally dry sclerophyll woodland with a grass / shrub understorey. Eucalypt species include white box, yellow box, Blakelys red gum, red stringy bark, broad-leaved peppermint, red box and black cypress pine.

### LAND USE:

Land in this LCU is generally utilised for grazing on both native and small areas of improved pasture. Some occasional cropping is evident through the LCU including fodder. Isolated homesteads associated with the agricultural industry are located though the LCU mostly along Sallys Flat Road.

### WATERCOURSES:

Tributaries of Green Valley Creek and Pyramul Creek run through the LCU. A number of small intermittent drainage lines occur through the LCU varying from 200 metres to 3000 metres apart. Little to no riparian vegetation is evident along these creek and drainage lines.

# 5.0 LANDSCAPE CHARACTER

## 5.2.4 LCU 4: CRUDINE VALLEY

The Crudine Valley LCU comprises the valley to the east of Crudine Ridge. The LCU includes the eastern slopes to Crudine Ridge, the Crudine River, Crudine Road and associated properties. The landscape is characterised by mostly cleared undulating to low rolling hills. The landscape quality rating of the Crudine Valley LCU has been rated as medium to high.

CHARACTER	LANDSCAPE QUALITY RATING		
	LOW	MEDIUM	HIGH
LANDFORM & SCALE	[Progress bar: ~75%]		
LANDCOVER	[Progress bar: ~50%]		
SETTLEMENT & HUMAN INFLUENCE	[Progress bar: ~75%]		
MOVEMENT	[Progress bar: ~60%]		
RARITY	[Progress bar: ~75%]		
INTERVISIBILITY WITH ADJACENT LANDSCAPES	[Progress bar: ~30%]		

TABLE 9: LCU 4 Crudine Valley Landscape Quality Rating



Crudine Ridge viewed from Crudine Road



Crudine Road



Crudine River

### VIEWS:

Views from this LCU are generally contained to the west by Crudine Ridge and to the west by a vegetated ridge line. Views are contained in some parts along Crudine Road by intermittent retained roadside vegetation. It is likely the proposed wind farm will be visible from most points through the LCU.

### TOPOGRAPHY:

Topography through the LCU varies from steep sloping land to the west associated with the Crudine Ridge and to the east by vegetated sloping hills. Crudine Ridge has a moderate to high elevation of 890 m to 1,000 m above sea level. The landscape surrounding Crudine Road and Crudine River occurs on generally undulating to rolling low hills. Local relief is between 50 - 140 metres and slopes are generally less than 15% and between 500 - 1500 metres in length.

### ROADS / INFRASTRUCTURE:

Crudine Road runs through the LCU in a north east direction from Hill End Road to Aarons Pass Road. Crudine Road is a minor unsealed road which services a number of isolated homesteads. A few smaller unsealed roads run off Crudine Road.

### VEGETATION:

The landscape is extensively cleared with scattered groups of retained vegetation. Intermittent roadside vegetation occurs along Crudine Road. Vegetation is generally dry sclerophyll woodland with a grass / shrub understorey. Eucalypt species include white box, yellow box, Blakelys red gum, red stringy bark, broad-leaved peppermint, red box and black cypress pine. A moderate coverage of riparian vegetation is associated with Crudine River.

### LAND USE:

Land use through the LCU is extensively cleared grazing pasture utilised broadly for sheep grazing. Some areas of small areas of improved pasture. A number of isolated homesteads are located along Crudine Road generally associated with the agricultural industry.

### WATERCOURSES:

Crudine river is the main water body of the LCU running from Turon River to the north east through the valley adjacent Crudine Ridge. A number of tributary creek lines run from the Crudine River spaced at intervals ranging between 200 to 3000 metres.

# 5.0 LANDSCAPE CHARACTER

## 5.2.5 LCU 5: SOFALA

The Sofala LCU encompasses a large portion of undulating land to the north of Sofala. The LCU incorporates Peel Road, Goulburn - Ilford Road and the largely uninhabited land to the east and west of these roads. The landscape is characterised by a large area of undulating to rolling hills visible from Peel Road. The landscape quality rating of the Sofala LCU has been rated as medium.

### VIEWS:

For the most part, Peel Road runs through the LCU in a valley and therefore views are contained by slopes to the east and west. Towards the south Peel Road reaches an elevated ridge and views are vast to the east and west. It is unlikely the proposed wind farm will be visible from most of the LCU.

### TOPOGRAPHY:

The topography of the LCU is undulating with rolling to steep hills at an elevation of between 600 - 1000 metres. Slopes average between 30 - 50% with a relief of 140 - 220 metres and length of generally 400 - 700 metres. The LCU has three distinct ridge lines.

### ROADS / INFRASTRUCTURE:

Peel Road runs in a generally north east direction from Sofala to Ilford. Peel Road is a major travel corridor through the area utilised by local motorists, heavy vehicles and tourists. The roads is sealed with a few small unsealed roads running off to service isolated properties.

### VEGETATION:

Vegetation is typically contained to the ridges and slopes with valleys and rolling land cleared. Ridges and slopes are vegetated with a white box - red stringybark community with yellow box and apple box dominating middle slopes and valleys. Broad-leaved peppermint and scribbly gum communities are also common within the LCU.

### LAND USE:

The LCU is mostly uncleared with the land use characterised by grazing on native pasture and native timber. Some cleared areas on lower rolling hills include improved pasture. A number of isolated homesteads are located through the LCU along Peel Road, the Goulburn - Ilford Road and surrounding Razorback.

### WATERCOURSES:

There are many creek lines running through the LCU as tributaries of the Turon River. These creek lines generally run along the valleys. A number of fixed drainage lines run through the landscape draining into the Turon River to the south and Lake Windamere to the north.

CHARACTER	LANDSCAPE QUALITY RATING		
	LOW	MEDIUM	HIGH
LANDFORM & SCALE	[Bar chart showing rating between Low and High]		
LANDCOVER	[Bar chart showing rating between Low and High]		
SETTLEMENT & HUMAN INFLUENCE	[Bar chart showing rating between Low and High]		
MOVEMENT	[Bar chart showing rating between Low and High]		
RARITY	[Bar chart showing rating between Low and High]		
INTERVISIBILITY WITH ADJACENT LANDSCAPES	[Bar chart showing rating between Low and High]		

TABLE 10: LCU 5 Sofala Landscape Quality Rating



View from Peel Road to the west



Sofala LCU Character Shot



View from Peel Road to Sofala

# 5.0 LANDSCAPE CHARACTER

## 5.2.6 LCU 6: TURON RIVER

The Turon River LCU includes land within the valley surrounding the Turon River and Hill End Road. The LCU is characterised by undulating to steep land which is densely vegetated. The LCU incorporates the Sofala Village, Turon River, Hill End Road and associated properties. The township of Sofala is a small village located on the Turon River and is one of the oldest surviving gold rush towns in Australia. The landscape quality of the Turon River LCU has been rated as high.

### VIEWS:

The LCU is located within a valley and views are generally contained by steep escarpments and dense vegetation. Views out of the LCU towards the proposed wind farm site are typically screened by vegetation and topography.

### TOPOGRAPHY:

The Turon River LCU is characterised by rolling to steep hill with rocky topography and escarpments which have prevented the clearing of land for agricultural use. Elevations range from approximately 680 - 970 metres. Slopes range from approximately 20 - 50% and vary in length from 200 - 800 metres.

### ROADS / INFRASTRUCTURE:

A section of Hill End Road between Sofala and Turondale Road follows the bank of the Turon River. A small number of unsealed minor roads run from Hill End Road in this LCU. Completed in 1897, the Turon Bridge crosses the Turon River.

### VEGETATION:

Vegetation through the Turondale LCU is generally dense. The topography is undulating to steep and rocky preventing clearing of land for agricultural use. Riparian vegetation associated with the Turon River is dense for the most part.

### LANDUSE:

There are a number of properties located along the Turon River. The area is frequently visited by tourists due to the history of the region. Some grazing land occurs within the LCU, however for the most part it is generally unsuitable for grazing due to the low fertility of the soils and steep topography.

### WATERCOURSES:

The LCU encompasses a large section of the Turon River and associated tributaries and intermittent creeklines. The Turon River is of high cultural significance as it was the site of one of Australia's first alluvial gold rushes. The river was utilised for mining operations through the region and some evidence of the Water Races built by Chinese Migrants is still evident along the river.

CHARACTER	LANDSCAPE QUALITY RATING		
	LOW	MEDIUM	HIGH
LANDFORM & SCALE	[Bar chart showing High rating]		
LANDCOVER	[Bar chart showing Medium-High rating]		
SETTLEMENT & HUMAN INFLUENCE	[Bar chart showing Low-Medium rating]		
MOVEMENT	[Bar chart showing Low-Medium rating]		
RARITY	[Bar chart showing High rating]		
INTERVISIBILITY WITH ADJACENT LANDSCAPES	[Bar chart showing Medium-High rating]		

TABLE 11: LCU 6 Turon River Landscape Quality Rating



Turon Bridge over Turon River - Hill End Road



Turon River



Turon River, near Turon Bridge

# 5.0 LANDSCAPE CHARACTER

## 5.2.7 LCU 7: TURONDALE

The Turondale LCU includes the undulating land to the south of Turon River. The LCU encompasses Turondale, Wattle Flat, Peel Road, Turondale Road, Box Ridge Road and a number of minor unsealed roads. The landscape is characterised by steeply undulating land that varies from moderately to densely vegetated. The Turondale LCU has been rated as having a medium landscape quality rating.

CHARACTER	LANDSCAPE QUALITY RATING		
	LOW	MEDIUM	HIGH
LANDFORM & SCALE	[Bar chart showing a rating of approximately 75% in the MEDIUM column]		
LANDCOVER	[Bar chart showing a rating of approximately 60% in the MEDIUM column]		
SETTLEMENT & HUMAN INFLUENCE	[Bar chart showing a rating of approximately 25% in the LOW column]		
MOVEMENT	[Bar chart showing a rating of approximately 25% in the LOW column]		
RARITY	[Bar chart showing a rating of approximately 75% in the MEDIUM column]		
INTERVISIBILITY WITH ADJACENT LANDSCAPES	[Bar chart showing a rating of approximately 60% in the MEDIUM column]		

TABLE 12: LCU 7 Turondale Landscape Quality Rating



View from Box Ridge Road



Turondale Character Shot



View across Turondale

### VIEWS:

Views vary between different points within the LCU. Views are expansive from high points within the LCU, however travelling along Turondale Road views are screened from the valley by topography. It is unlikely the proposed wind farm site would be visible from most areas within this LCU.

### TOPOGRAPHY:

Topography within this LCU is undulating with an elevations range from approximately 600 - 1000 metres. Slopes range from approximately 20 - 50% and vary in length from 200 - 800 metres. Turondale Road runs through a valley.

### ROADS / INFRASTRUCTURE:

Turondale Road runs through the LCU from Hill End Road to the north through Turondale to Duramana to the south. Turondale Road is a minor sealed road utilised by local residents and tourists. The southern section of Sofala / Peel Road also runs through the LCU connecting Sofala to Bathurst. A number of minor roads both sealed and unsealed run through the LCU off the Sofala / Peel and Turondale Roads. These minor roads service local residents and are used intermittently.

### VEGETATION:

The Turondale LCU is moderately to densely vegetated. Native vegetation in the form of a broad-leaved and scribbly gum community dominates the ridge lines and slopes. Other retained Eucalyptus species exist through the LCU. Land surrounding the Turondale Road within the Turondale Valley is broadly cleared with native pasture for isolated vegetation spotted through the landscape.

### LAND USE:

Land within the LCU is largely uninhabited along the vegetated ridge lines with some isolated homesteads along Turondale Road and Sofala Road. Cleared land within the Turondale Valley is broadly utilised for grazing with a small portion of improved pasture.

### WATERCOURSES:

Many tributaries of the Turon River run through the valleys to the north. These creeklines have a sparse to moderate coverage of riparian vegetation and are situated throughout the landscape between 800 - 3000 metres apart.

# 6.0 THE PROPOSAL

## 6.1 PROPOSED WIND FARM LAYOUT

The proposed wind farm has two layout options. For the purpose of this report, Layout Option A (consisting up to 106 wind turbines) has been assessed in order to represent the worst case scenario. Layout Option B has been included in Appendix B of this report. Layout Option B has up to 77 turbines, with the same ancillary structure options as Layout A (see Appendix B of this report).

The proposed wind farm is sited along the Crudine Ridge, and spread across 17 properties in an informal arrangement, with the capability to produce enough energy to supply over 80,000 average Australian households. Land within the cadastre boundaries of all properties subject to this proposal, comprises an area of approximately 5,700 hectares.

The proposed layout has two distinct groups or 'clusters'. The Pyramul cluster is situated to the north (up to 48 turbines) and to the south is the Sallys Flat Cluster (up to 58 turbines) (See Figure 8).

The wind turbines proposed for the development have an overall height of up to a total height of 160m above ground level. Supporting towers could taper from 4.5 metres diameter at the base to 2.5 metres at the tip. The three blades could be up to approximately 63m long from the hub to the tip and have a rotor diameter of between 74 and 126m (See Figure 8 and Table 13). Each wind turbine would require a generator transformer located at the base of the structure.

COMPONENT	NUMBER/SIZE
Total number of Turbines	Up to 106
Hub Height	A maximum of 101.5m
Blade Length	Up to 63m
Number of Blades	3
Rotor Diameter	Between 74 and 126m
Tower (Tapered tubular steel)	4.5m at base to 2.5m at tip
Overall height (to tip of blade)	Up to 160m
Nacelle	10m x 4m
Colour	Matte White
Swept Area	4,300 to 12,470 m <sup>2</sup>
Generator transformer	Located at the base of each turbine
Turbine Footings	Max footprint 20 x 20m
Main Collector Substation	150 x 150 m
Secondary Collector Substation	25 x 25 m
Site compound	150 x 200 m
Switching Station	75 x 100 m

TABLE 13: Proposed Wind Farm Details.

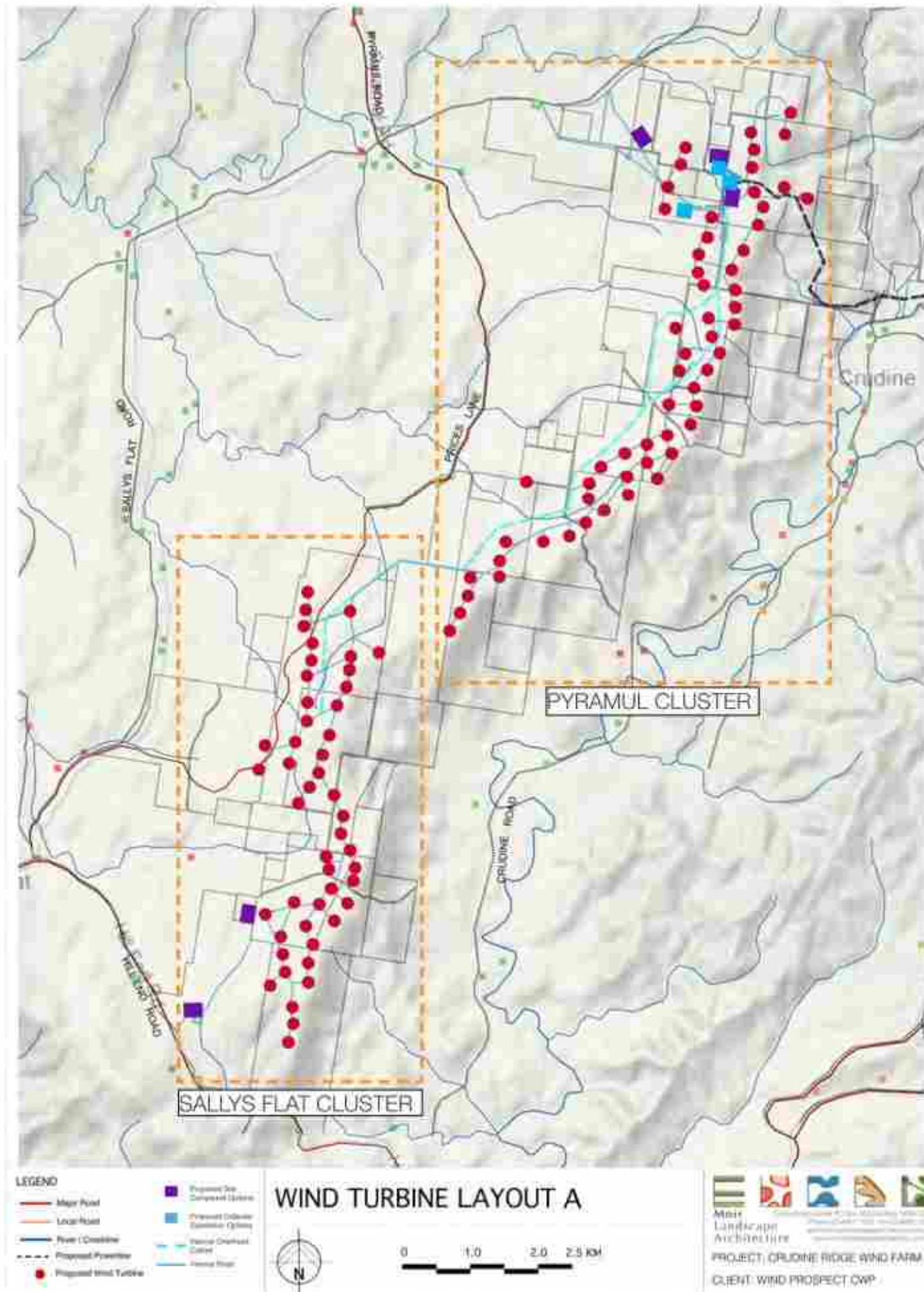


FIGURE 8: Proposed Wind Farm Layout A

# 6.0 THE PROPOSAL

## 6.2 WIND TURBINE DESIGN

### Turbine Rotor

The turbines that will potentially be used for the Project will be three-bladed, semi-variable speed, pitch regulated machines with rotor diameters between 74 and 126 m and a swept area of 4,300 to 12,470 square metres (m<sup>2</sup>). Typically, turbines of this magnitude begin to generate energy at wind speeds in the order of 3.5 metres per second (m/s) (12.6 kilometres per hour (kph)) and shut down (for safety reasons) in wind speeds greater than 25 m/s (90 kph). Wind turbine blades are typically made from glass fibre reinforced with epoxy or plastic attached to a steel hub, and include lightning rods for the entire length of the blade. The blades typically rotate at about 12 revolutions per minute (rpm) at low wind speeds and up to 18 rpm at higher wind speeds.

### Towers

The supporting structure is comprised of a reducing cylindrical steel tower fitted with an internal ladder or lift. The largest tower height under consideration is 101.5 m with an approximate diameter at the base of 4.5 m and 2.5 m at the top. However it is important to note that the rotor diameter suitable for this wind turbine is 101 m and therefore falls within the maximum proposed blade tip height of 160 m. Similarly, the longest blade length under consideration is 63 m, however it is important to note that the tower height suitable for this wind turbine is 94 m and therefore also falls within the maximum proposed blade tip height of 160 m. Alternative tower heights between 80 and 100 m are also under consideration however, this is not exhaustive since new models and certified designs are continually entering the market place. The tower will typically be manufactured and transported to site in three to five sections for on-site assembly.

### Blade Tip

The blade tip will comprise the highest point of the wind turbine when in a vertical position. Given the turbines under consideration, a blade tip height of 160 m is considered to be the maximum. As new turbine models are regularly appearing on the market, blade tip height may vary by up to 5 m to accommodate potential changes to tower heights and blade lengths of new machines.

### Nacelle

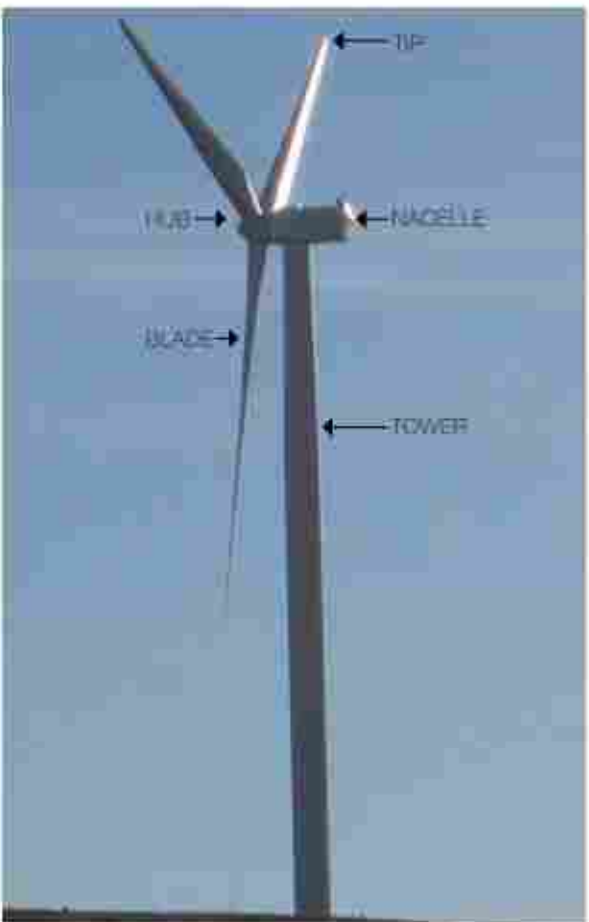
The nacelle is the housing constructed of steel and fibreglass that is mounted on top of the tower and can be 10 m long and 4 m high and 4 m wide. It encloses the gearbox, generator, transformers (model dependant), motors, brakes, electronic components, wiring and hydraulic and lubricating oil systems. Weather monitoring equipment located on top of the nacelle will provide data on wind speed and direction for the automatic operation of the wind turbine.

### Generator Transformer

The generator transformer is typically located in either the nacelle, the base of the tower or close to the base of the tower on a concrete pad. The output from each of the turbines will be directed via 33 kV (or greater) underground reticulation cables that link to the main or secondary collector substations.

### Footings

Three types of foundation for the turbines will be considered pending geotechnical investigation of the ground conditions at the Project site. These include slab (gravity) foundations, slab plus rock anchor foundations or rock anchor foundations.



Wind Turbine Components



Typical Hardstand Area.



Typical Generator Transformer.

## 6.3 ASSOCIATED INFRASTRUCTURE

The visual character of the associated components proposed for the development of Crudine Ridge Wind Farm which may have a visual effect are outlined in this section of the LVIA.

In addition to the proposed wind turbines the following electrical works will be incorporated into the design:

- Up to 106 wind turbine generator transformers;
- The establishment of a 150 by 150 m main collector substation with 132 kV step up transformers, circuit breakers and isolators;
- The establishment of a 25 by 25 m secondary collector substation with up to 66 kV transformers and isolators;
- Approximately 100 km of up to 33 kV entrenched underground cables;
- Approximately 100 km of underground control cables;
- Approximately 15 km of up to 66 kV double circuit overhead electrical interconnection lines;
- The establishment of a 75 by 100 m switching station with 132 kV circuit breakers, isolators, metering, protections and communications assets;
- Approximately 15 km of up to 132 kV double circuit overhead transmission lines; and,
- Establishment of a 6 by 30 m operation facilities building to house control and communications equipment.



# 6.0 THE PROPOSAL

## Access Roads

New on-site access roads will be created between external access points and turbines, and where possible will follow existing farm tracks that traverse the ridgelines and plateaus. These roads will also comprise hardstand and turning head areas. All roads leading from the arterial roads and all on-site access roads are likely to require a full or partial upgrade to accommodate the construction traffic loads, as well as for maintenance purposes during operation. The roads will be surfaced with compactable, engineered base material with suitable drainage. Materials will be sourced locally where possible and in consultation with the local Councils.

## Connection to the Grid

The Project will connect to the TransGrid 132 kV overhead transmission line 15 km east of the Crudine ridgeline. Connection will be through a series of underground and overhead powerlines.



Existing Powerlines- Castlereagh Highway



Typical Power Pole

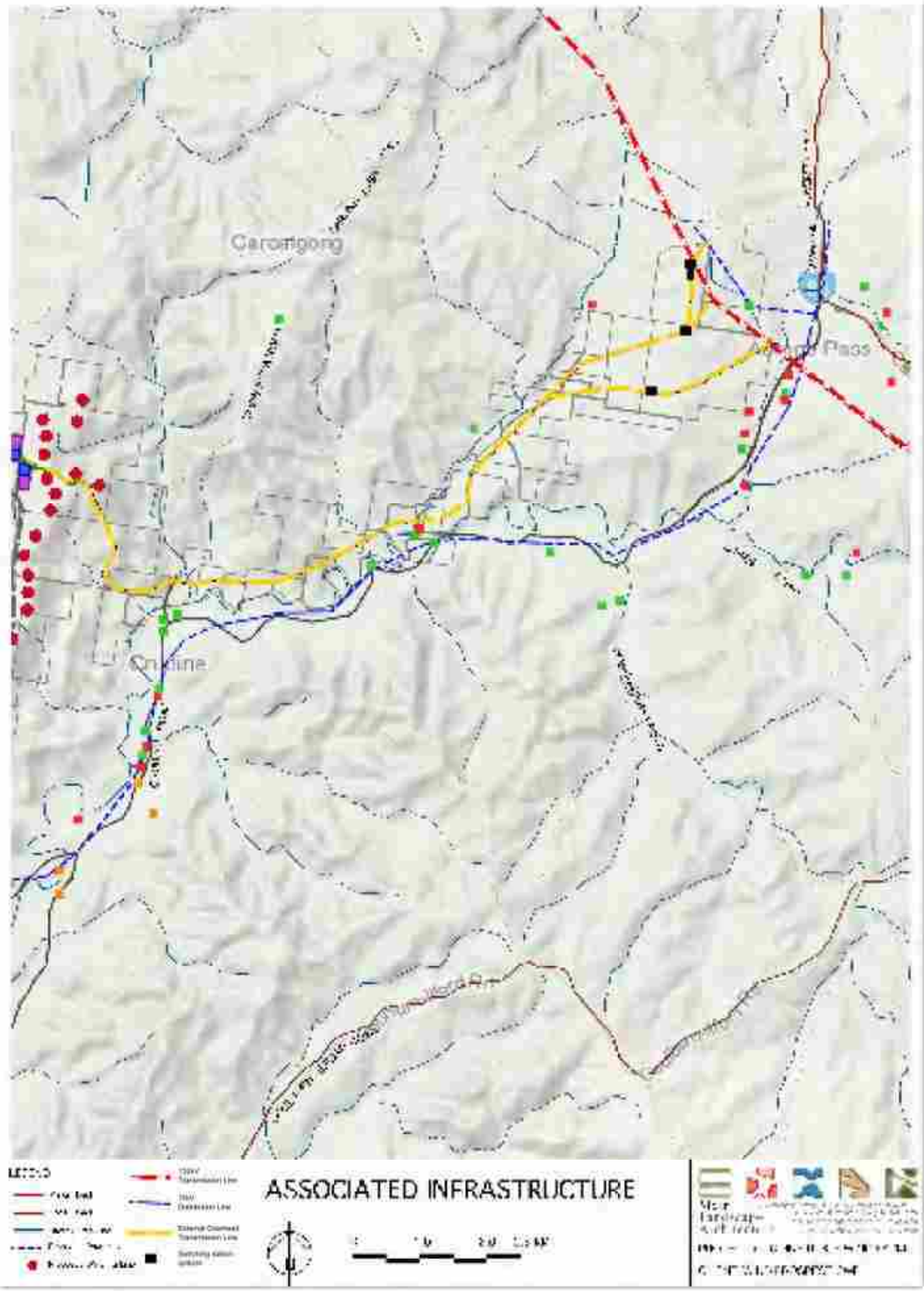


FIGURE 9: Proposed Infrastructure associated with the wind farm

# 7.0 ZONE OF VISUAL INFLUENCE

## 7.1 ZONE OF VISUAL INFLUENCE

### 7.1.1 Zone of Visual Influence Process

Wind Prospect CWP has undertaken an assessment of visibility and shadow flicker effects in the vicinity of the wind farm. The assessment of visibility or Zone of Visual Influence (ZVI) identifies the areas of surrounding land from which the proposed Layout A Wind Farm from which the proposed wind farm may be partially or completely visible. The ZVI has been determined through the use of digital topographic information and 3D modelling software.

As accurate information on the height and coverage of vegetation and buildings is unavailable, it is important to note the ZVI is based solely on topographic information. Therefore this form of mapping should be acknowledged as representing the worst case scenario. In reality the zone of visibility of the Crudine Ridge Wind Farm is far less than that shown in the following ZVI figures.

Although it is possible for the development to be visible from further than 10km away, distance limits visibility greatly. The ZVI has been assessed on a distance of up to 10km as per the Director Generals Requirements.

Following the development of the ZVI using a digital terrain model, detailed site investigations were undertaken to ground truth the findings and define a visual catchment for the proposal. The visual catchment essentially being the area of land which will have views to the wind turbines. It is from this analysis that viewpoint locations were selected for further investigation.

## 7.2 ZONE OF VISUAL INFLUENCE RESULTS

### 7.2.1 Zone of Visual Influence Results- Wind Turbines

Figure 10 illustrates worst case turbine visibility of Layout A, with a maximum height of 160m above ground level. It is important to note the ZVI is a representation of the worst case scenario and is based solely on topography. However, ZVI diagrams do not take into account screening influences such as vegetation, and must be considered conservative assessments.

Due to a combination of the elevation of the proposed wind turbines, and the undulating topography of the local context, the ZVI depicts a large percentage of land surrounding the proposed development where the proposed wind turbines will be visible.

Based on the ZVI, the highest visual impact of the turbines is likely to be within a 0-5km radius. In particular, Crudine Road, Sallys Flat Road, Hill End Rd and Prices Lane have the highest visual impact (Figure 10). Views to the proposed wind turbines from elevated ridge lines to the south, east and west appear unimpeded.

Views from within a number of valleys including those associated with Sofala Road, Turon River, Pyramul Road and minor creek lines are limited by the topography.

### 7.2.2 Zone of Visual Influence Results- Associated Infrastructure

The ZVI for the external transmission line was based on spacing of power poles up to 250 m apart, and 30m in height. These power poles would have transmission lines running between them. The transmission line runs east west, just north of Crudine Road and the Crudine River. A combination of the existing roadside vegetation and riparian vegetation associated with the Crudine River will assist in screening the proposed power lines. In addition to this, existing power lines run through the area and are viewed as part of the landscape. Overall the potential visual impact of the proposed power lines is low.

# 7.0 ZONE OF VISUAL INFLUENCE

## 7.3 ZVI WIND TURBINES

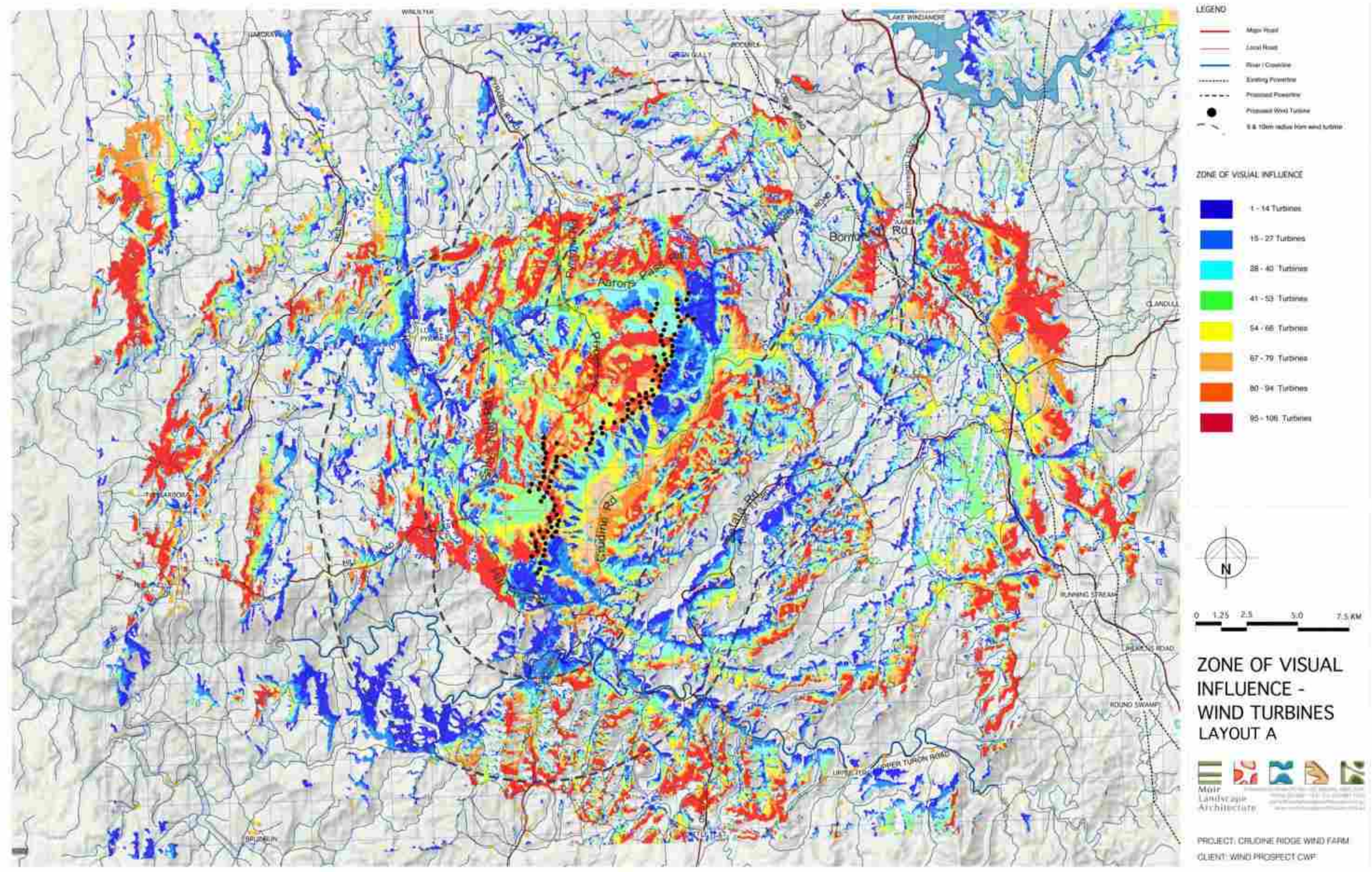


FIGURE 10: Zone of Visual Influence - Wind Turbines

# 7.0 ZONE OF VISUAL INFLUENCE

## 7.4 ZVI ASSOCIATED INFRASTRUCTURE

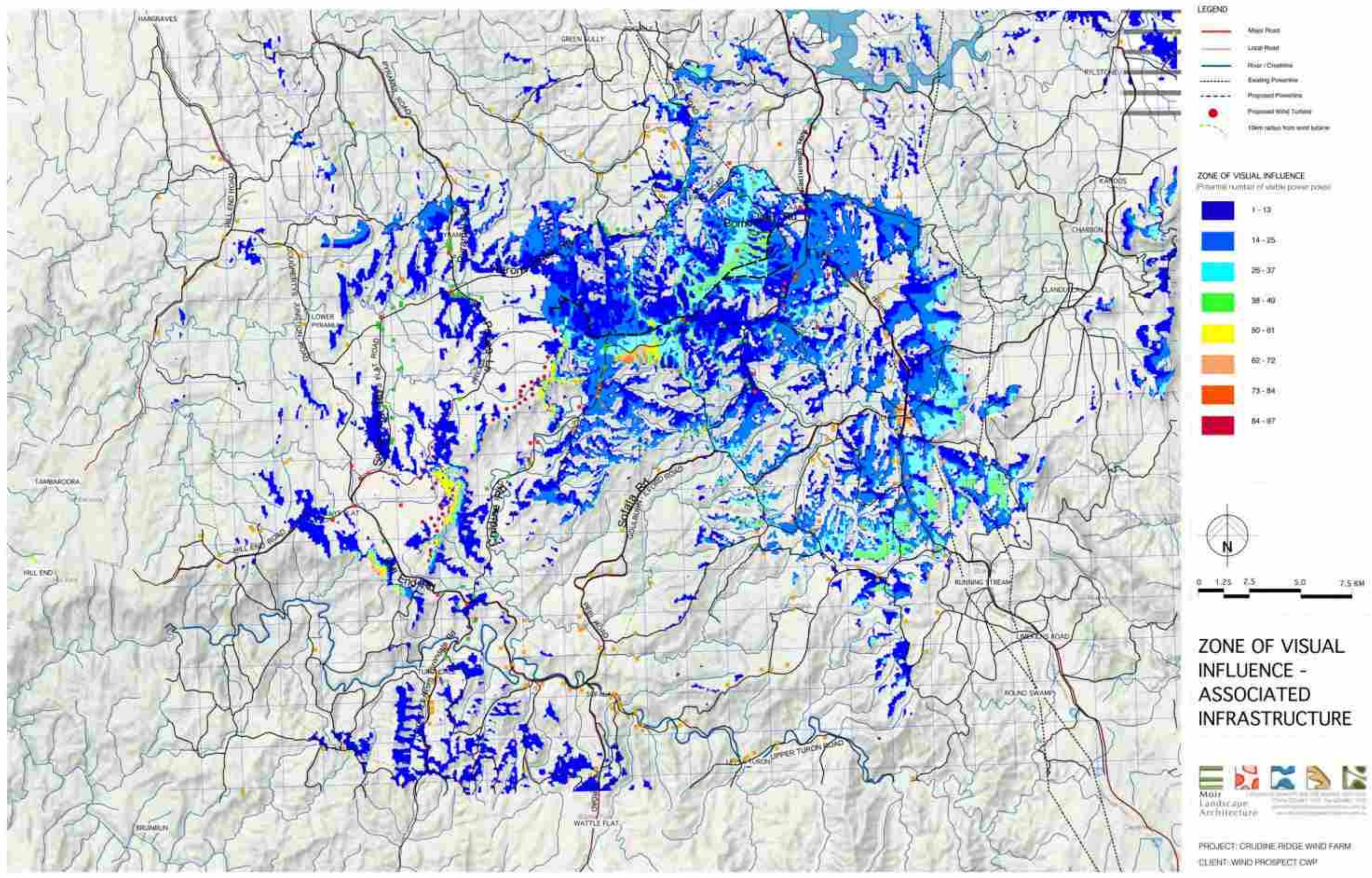


FIGURE 11: Zone of Visual Influence - Associated Infrastructure

# 8.0 VIEWPOINT ANALYSIS

## 8.1 VIEWPOINT ANALYSIS

This part of the visual assessment report considers the likely impact that development would have on the existing landscape character and visual amenity by selecting prominent sites, otherwise referred to as viewpoints.

### 8.1.1 Viewpoint Selection Process

Viewpoints are selected to illustrate a combination of the following:

- Present landscape character types.
- Areas of high landscape or scenic value.
- Visual composition (eg. focused or panoramic views, simple or complex landscape pattern).
- Range of distances
- Varying aspects and elevations;
- Varying extent of wind farm visibility (full and partial visibility).
- Sequential along specific routes.

Viewpoints have been carefully selected to be representative of the range of views within the study area. The selection of viewpoints is informed by ZVI and topographical maps, field work observations and other relevant influences such as access, landscape character and the popularity of vantage points.

A total of 35 viewpoints were taken during the field work process. Of these 35 viewpoints, 32 have been selected for inclusion in the report. The locations of the viewpoint and general viewing direction have been identified in Figure 12. The viewpoints which have been included represent the areas from where the development would appear most prominent, either based on the degree of exposure or the number of people likely to be affected.

It is important to note that viewpoints for this study have been taken only from accessible public land (typically roads) or from homesteads which were identified as having a potentially high visual impact through the ZVI process.

### 8.1.2 Process of Viewpoint Analysis

Once the viewpoint had been selected, panoramic photographs were taken on a level tripod at a height of 150cm (to represent eye level). Photographs were taken with a Canon 40D digital SLR through a 50mm fixed focal lens (Equivalent to 80mm on 35mm).

The visual impact of the viewpoint was then assessed both on site and with the topographic and aerial information to ensure accuracy. Viewpoint photographs and analysis is included the following pages. The findings of each viewpoint analysis have been quantified and are summarised in Table 14.

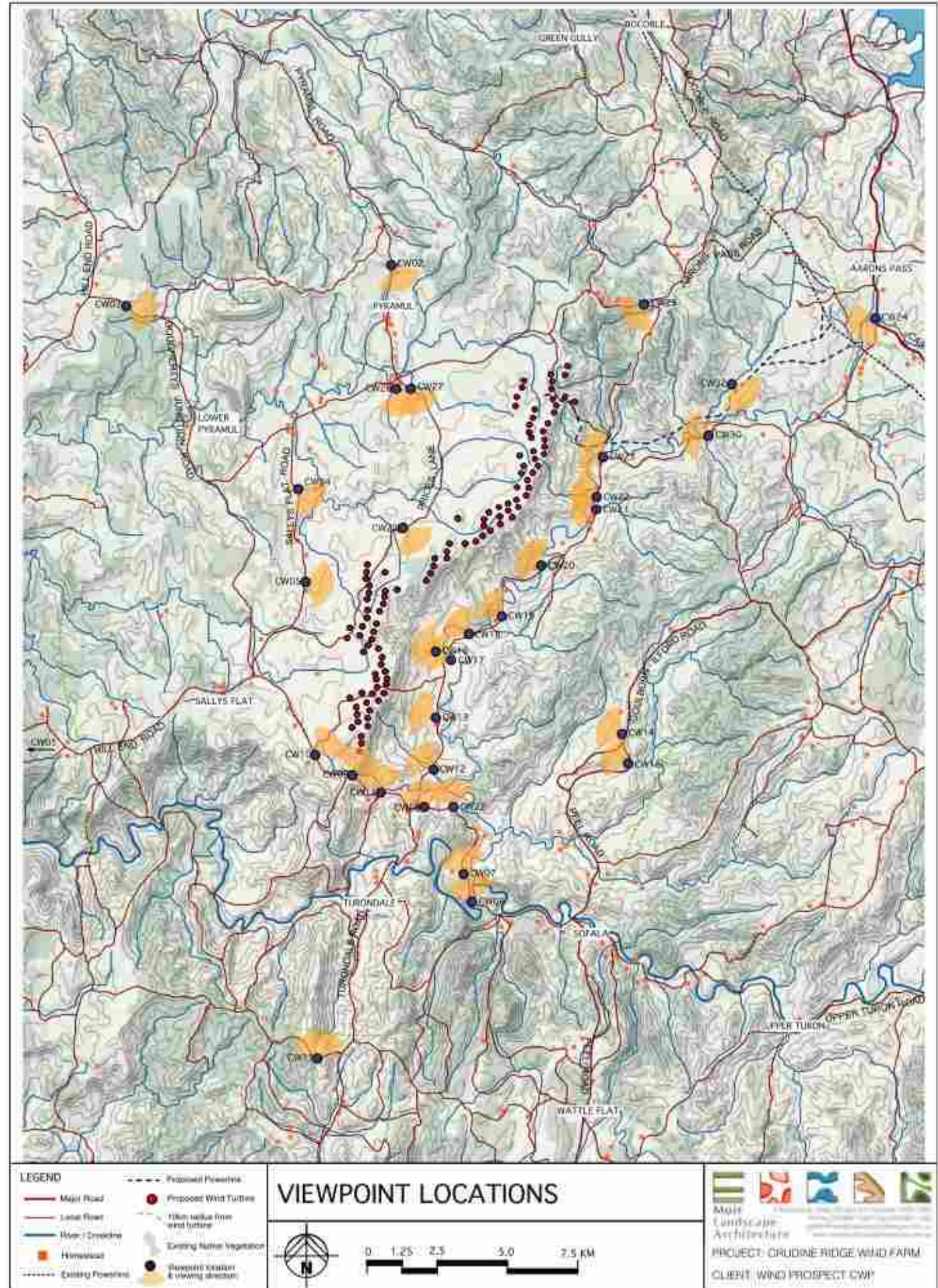


FIGURE 12: Viewpoint Locations

# 8.0 VIEWPOINT ANALYSIS

## CW01- Bald Hill Lookout



Viewpoint CW01: Bald Hill Lookout



Zoomed photograph cropped from Viewpoint CW01

VIEWPOINT CW01		LANDSCAPE DESCRIPTION:	POTENTIAL VISUAL IMPACT:
Location	Bald Hill Lookout	View from Bald Hill Lookout looking in an easterly direction, over the township of Hill End. Bald Hill lookout is a formal lookout and a local high point, approximately 1km west of Hill End, accessed by walking trails and a dirt road. Views from the lookout expand to the east, contained by the Crudine Ridge. The landform of this area is typical of the Hill End LCU with a combination of vegetated hill sides and cleared rural land.	From this viewpoint it is likely the majority of wind turbines will be visible. However due to the distance from the wind farm the visual effect from this viewpoint has been assessed as low. The proposed wind turbines would be a very small element within the view shed, and factors such as weather would significantly reduce their visibility.
Coordinates	S 33° 02.161' E 149° 24.159'		
Elevation	972m	The visual sensitivity of this viewpoint has been rated as moderate due to the distance from the proposed wind turbines.	The overall potential visual impact for this viewpoint has been rated as low.
LCU	-		
Viewing Distance (to nearest proposed turbine)	19.0km		
Land use	Lookout		
Visual Sensitivity	Moderate		
Visual Effect	Low		
Potential Visual impact	Low		

# 8.0 VIEWPOINT ANALYSIS

## CW02- Pyramul Road



Viewpoint CW02: Pyramul Road



Zoomed photograph cropped from Viewpoint CW02

VIEWPOINT CW02		LANDSCAPE DESCRIPTION:	POTENTIAL VISUAL IMPACT:
Location	Pyramul Road	View from Pyramul Road, approximately 4 kilometres north of the intersection of Aarons Pass Road and Prices Lane. Pyramul Road is a minor dirt road with isolated homesteads. Pyramul Road occurs along undulating to rolling low hills. The area is extensively cleared grazing land with a sparse coverage of woodland vegetation. Native woodland vegetation and a grass and scrub understorey occurs along the roadside, containing views. A farm house 'Golden Range' is visible in the foreground with associated ancillary buildings. Cultural planting of pine poplars are associated with the homestead.  The visual sensitivity of this viewpoint has been rated as moderate as a result of the land use and proximity to the proposed wind farm.	From this viewpoint it is likely a large percentage of the proposed wind turbines will be visible to the south east. The visual effect of the proposed wind farm from this viewpoint has been assessed as low. A combination of scattered groups of trees, roadside vegetation and undulating land screen a large portion of the visible wind turbines.  The overall visual impact for this viewpoint has been rated as low.
Coordinates	S 33° 51.464' E 149° 37.262'		
Elevation	857m		
LCU	Pyramul		
Viewing Distance (to nearest proposed turbine)	6.13km		
Land use	Minor Road / Rural House		
Visual Sensitivity	Moderate		
Visual Effect	Low		
Potential Visual Impact	Low		

# 8.0 VIEWPOINT ANALYSIS

## CW03- Doughertys Junction Road



Viewpoint CW03: Doughertys Junction Road



Zoomed photograph cropped from Viewpoint CW03

VIEWPOINT CW03		LANDSCAPE DESCRIPTION:	POTENTIAL VISUAL IMPACT:
Location	Lower Pyramul	View from Doughertys Junction Road, approximately 1.8km south of Hill End Road. Doughertys Junction Road is a minor unsealed road which runs between Hill End Road and Sallys Flat Road, servicing a small number of isolated homesteads. The landform through the area is steeply undulating with a combination of retained vegetation and cleared grazing land. The road is generally narrow and the roadside is typically vegetated by scrub vegetation and scattered groupings of trees.  The visual sensitivity of this viewpoint has been assessed as low due to the distance to the nearest proposed wind turbine and the land use.	From this viewpoint it is unlikely any wind turbines will be visible. A combination of both the distance to the proposed wind farm (exceeding 10km), roadside vegetation and land use result in a visual effect rating of low. Although some glimpse views may occur along Doughertys Junction Road, the viewpoint has been included as a representation of the typical character of this area.  The overall potential visual impact from this viewpoint has been assessed as low.
Coordinates	S 32° 52.982' E 149° 31.303'		
Elevation	890m		
LCU	Pyramul		
Viewing Distance (to nearest proposed turbine)	12.41km		
Land use	Minor Road		
Visual Sensitivity	Low		
Visual Effect	Low		
Potential Visual Impact	Low		



# 8.0 VIEWPOINT ANALYSIS

## CW04- Sallys Flat Road



Viewpoint CW04: Sallys Flat Road



Zoomed photograph cropped from Viewpoint CW04

VIEWPOINT CW04		LANDSCAPE DESCRIPTION:	POTENTIAL VISUAL IMPACT:
Location	Sallys Flat Road	View from Sallys Flat Road, approximately 2.5km south of Pyramul Road. Sallys Flat Road is an unsealed local road with roadside vegetation along both the eastern and western roadside containing views. The photograph is taken through a small clearing near the entry gates to farm house 'Lochiel'. The landscape character of this viewpoint is typical of the Sallys Flat LCU. The topography is slightly undulating with grazing land and scattered groupings of trees.	From this viewpoint it has been estimated that 46 of the proposed wind turbines will be visible through the clearing. Most of the proposed wind turbines will be screened by the foreground vegetation and retained roadside vegetation. The visual effect of the proposed wind farm from this viewpoint has been assessed as moderate.
Coordinates	S 32°56'342" E 149°35.645'		
Elevation	824m	The visual sensitivity of this viewpoint has been rated as high as a result of the land use and proximity to the proposed wind farm.	The overall visual impact for this viewpoint has been rated as moderate.
LCU	Sallys Flat		
Viewing Distance (to nearest proposed turbine)	3.49 km		
Land use	Minor Road		
Visual Sensitivity	High		
Visual Effect	Moderate		
Potential Visual impact	Moderate		REFER TO PHOTOMONTAGE 01.

# 8.0 VIEWPOINT ANALYSIS

## CW05- Sallys Flat Road



Viewpoint CW05: Sallys Flat Road



Zoomed photograph cropped from Viewpoint CW05

VIEWPOINT CW05		LANDSCAPE DESCRIPTION:	POTENTIAL VISUAL IMPACT:
Location	Sallys Flat Road	View from Sallys Flat Road, approximately 3.8 km north of Hill End Road. The photograph was taken from a clearing in roadside vegetation at the entry to one in a group of three properties. The landscape is characterised by undulating hills in the foreground with scattered groupings of retained vegetation amongst the cleared grazing land. A power pole associated with the property is visible in the foreground. The Crudine Ridge line forms the visual backdrop to the area. A mix of both native and exotic vegetation surrounds the property.  The visual sensitivity of this viewpoint has been assessed as high due to the land use and close proximity of the proposed wind turbines.	From this viewpoint approximately 88 of the proposed wind turbines may be visible. The wind turbines have the potential to become a dominate visual element in the landscape. The visual effect of the proposed wind farm from this viewpoint has been assessed as high. Existing planting surrounding the homestead and roadside vegetation may assist in reducing the visual impact.  The overall visual impact for this viewpoint has been rated as high.  REFER TO PHOTOMONTAGE 02
Coordinates	S 32°58.225' E 149°35.138'		
Elevation	824m		
LCU	Sallys Flat		
Viewing Distance (to nearest proposed turbine)	2.25 km		
Land use	Minor Road / Rural Resident		
Visual Sensitivity	High		
Visual Effect	High		
Potential Visual impact	High		

# 8.0 VIEWPOINT ANALYSIS

## CW06- Turon River



Viewpoint CW06: Turon River



Zoomed photograph cropped from Viewpoint CW06

VIEWPOINT CW06		LANDSCAPE DESCRIPTION:	POTENTIAL VISUAL IMPACT:
Location	Turon River	View from Hill End Road, just past the Turon River Bridge which was originally built to assist in the transportation of gold from Hill End to Sofala. The photograph was taken on the roadside opposite an occupied residence. Hill End Road is a tourist road linking the heritage town Hill End and Sofala. Views to the north are terminated by a steep vegetated hill. Dense vegetation is visible in the foreground, and the landscape in the area is typically grazing land.	From this viewpoint it is unlikely any of the proposed wind turbines will be visible. A combination of the undulating topography and existing vegetation in the foreground would screen views to the proposed wind farm which is located to the north west of this viewpoint. The viewpoint has been included in the report to provide an example of the landscape character in this area. The visual effect has been rated as low.
Coordinates	S 33°04.387' E 149°38.971'		
Elevation	569m	The visual sensitivity of this viewpoint has been assessed as moderate due to the tourist land use and relatively long distance to the proposed wind turbines.	The overall potential visual impact from this viewpoint has been assessed as low.
LCU	Turon River		
Viewing Distance (to nearest proposed turbine)	6.58 km		
Land use	Tourist Road		
Visual Sensitivity	Moderate		
Visual Effect	Low		
Potential Visual impact	Low		

# 8.0 VIEWPOINT ANALYSIS

## CW07- Hill End Road



Viewpoint CW07: Hill End Road



Zoomed photograph cropped from Viewpoint CW07

VIEWPOINT CW07		LANDSCAPE DESCRIPTION:	POTENTIAL VISUAL IMPACT:
Location	Hill End Road	View from an unsealed section of Hill End Road approximately 5.5km from Peel Road. The photograph was taken from the entry to an isolated homestead on the valley floor. Associated ancillary buildings are visible in the foreground. The landscape is slightly undulating, open grazing land with a sparse coverage of isolated vegetation. Roadside vegetation occurs along Hill End Road intermittently. Views extend over the valley floor and are terminated at the southern end of the Crudine Ridge (visible in the background). A lower, densely vegetated ridge is visible in the middle ground. This combination of vegetated and cleared hill sides and foothills creates a high scenic quality.  The visual sensitivity of this viewpoint has been rated as moderate due to the land use and distance from the proposal.	From this viewpoint it has been estimated that approximately 40% of the proposed wind turbines will be visible. The visual effect of the proposed wind farm from this viewpoint has been assessed as moderate. Existing roadside vegetation may assist in reducing the visual impact.  The overall visual impact for this viewpoint has been rated as moderate.
Coordinates	S 33° 3.546' E149°38.490'		
Elevation	605m		
LCU	Crudine Valley		
Viewing Distance (to nearest proposed turbine)	5.78 km		
Land use	Tourist Road		
Visual Sensitivity	Moderate		
Visual Effect	Moderate		
Potential Visual impact	Moderate		

# 8.0 VIEWPOINT ANALYSIS

## CW08- Hill End Road



Viewpoint CW08: Hill End Road



Zoomed photograph cropped from Viewpoint CW08

VIEWPOINT CW08		LANDSCAPE DESCRIPTION:	POTENTIAL VISUAL IMPACT:
Location	Hill End Road	View from an elevated section of Hill End Road approximately 500m east of Crudine Road. Land through this area is typically open grazing land with a sparse coverage of vegetation. The topography is steeply undulating falling into a valley towards Crudine Road which is visible in the middle ground of the photograph. Views are contained by the neighbouring ridge lines with Crudine Ridge in the background. Roadside vegetation is intermittent along Hill End Road.  The visual sensitivity of this viewpoint has been rated as moderate due to the land use and distance to the nearest proposed wind turbines.	From this viewpoint it has been estimated that approximately 93 of the southern most proposed wind turbines will be visible. The visual effect of the proposed wind farm from this viewpoint has been assessed as moderate. Existing roadside vegetation and the direction of travel along Hill End Road will assist in reducing the visual impact.  The overall visual impact for this viewpoint has been rated as moderate.  REFER TO PHOTOMONTAGE 03
Coordinates	S 33° 2.380' E 149°37.560'		
Elevation	689m		
LCU	Crudine Valley		
Viewing Distance (to nearest proposed turbine)	3.08 km		
Land use	Tourist Road		
Visual Sensitivity	Moderate		
Visual Effect	Moderate		
Potential Visual impact	Moderate		

# 8.0 VIEWPOINT ANALYSIS

## CW09- Hill End Road



Viewpoint CW09: Hill End Road



Zoomed photograph cropped from Viewpoint CW09

VIEWPOINT CW09		LANDSCAPE DESCRIPTION:	POTENTIAL VISUAL IMPACT:
Location	Hill End Road	View from informal stopping bay on a bend along Hill End Road, approximately 3km north east of Crudine Road. Hill End Road is winding and unsealed in this area with steep and rocky embankments defining the road edge. This viewpoint is the closest publicly accessible viewpoint, within 1km of the southern edge of the proposed wind farm layout. The southern edge of the Crudine ridgeline dominates views from this point with a rocky and densely vegetated character. The topography is steep and views are expansive beyond the ridge with views over mid-distant and distant mountain ranges.  The visual sensitivity of this viewpoint has been assessed as high due to the land use and close proximity of the nearest turbine.	From this viewpoint it is likely that only one of the proposed turbines would be visible, however it is located 827m from the road and will therefore have a prominent visual presence. Due to the height and proximity of the ridge line, the angle of view towards the proposed wind turbine will be out of direct eye level for motorists travelling along this section of Hill End Road. The visual effect from this viewpoint has been assessed as moderate.  The overall visual impact from this viewpoint has been rated as moderate.
Coordinates	S 33° 1.574' E 149°36.161'		
Elevation	827m		
LCU	Turondale		
Viewing Distance (to nearest proposed turbine)	0.8 km		
Land use	Tourist Road		
Visual Sensitivity	High		
Visual Effect	Moderate		
Potential Visual impact	Moderate		

# 8.0 VIEWPOINT ANALYSIS

## CW10- Hill End Road



Viewpoint CW10: Hill End Road



Zoomed photograph cropped from Viewpoint CW10

VIEWPOINT CW10		LANDSCAPE DESCRIPTION:	POTENTIAL VISUAL IMPACT:
Location	Hill End Road	View from Hill End Road, approximately half way between Crudine Road and Sallys Flat Road at the entry to the property 'Illoura'. The photograph was taken from the roadside looking towards Crudine Ridge. This section of Hill End Road is sealed and is characterised by a raised mound along the northern edge of the road. Retained vegetation along the northern roadside contains views towards the north. The topography through this area is steeply undulating, sloping down towards a valley.  The visual sensitivity of this viewpoint has been assessed as high due to the land use and close proximity of the nearest turbine.	From this viewpoint it is estimated that 40 of the proposed wind turbines may be visible through the roadside vegetation. Due to the close distance of the wind turbines the visual effect from this viewpoint has been rated as moderate.  The overall visual impact from this viewpoint has been assessed as moderate.
Coordinates	S 33° 01.674' E 149°35.468'		
Elevation	961m		
LCU	Crudine Valley		
Viewing Distance (to nearest proposed turbine)	1.54 km		
Land use	Tourist Road		
Visual Sensitivity	High		
Visual Effect	Moderate		
Potential Visual impact	Moderate		REFER TO PHOTOMONTAGE 04

# 8.0 VIEWPOINT ANALYSIS

## CW11- Hill End Road



Viewpoint CW11 Hill End Road



Zoomed photograph cropped from Viewpoint CW11

VIEWPOINT CW11		LANDSCAPE DESCRIPTION:	POTENTIAL VISUAL IMPACT:
Location	Hill End Road	View from a sealed section of Hill End Road, approximately 1.5 km north west of Crudine Road. Photograph was taken from the entry to an isolated homestead 'Round Hill' looking towards Crudine Ridge. Land use in this area is typically grazing land. The topography is steeply undulating with a moderate coverage of vegetation. Views are contained by mid distant ridge lines with multiple valleys and minor creek lines characterising the area. Retained roadside vegetation defines the northern edge of Hill End Road. The roadside vegetation screens most views to the north, limiting views of the ridge line to glimpses.  The visual sensitivity of this viewpoint has been assessed as high due to the close proximity to the proposed wind turbines and the land use of a homestead and tourist road.	From this viewpoint approximately 5 wind turbines may be visible through the vegetation. The visual effect from this viewpoint has been assessed as low due to the level of screening provided by existing vegetation.  The overall visual impact from this viewpoint has been assessed as moderate.
Coordinates	S 33° 02.305' E 149°36.928'		
Elevation	697m		
LCU	Crudine Valley		
Viewing Distance (to nearest proposed turbine)	1.60 km		
Land use	Tourist Road		
Visual Sensitivity	High		
Visual Effect	Low		
Potential Visual impact	Moderate		



# 8.0 VIEWPOINT ANALYSIS

## CW12- Crudine Road



Viewpoint CW12: Crudine Road



Zoomed photograph cropped from Viewpoint CW12

VIEWPOINT CW12		LANDSCAPE DESCRIPTION:	POTENTIAL VISUAL IMPACT:
Location	Crudine Road	View from a creek line along Crudine Road approximately 1.7 km north of Hill End Road. The creek line is largely devoid of riparian vegetation. Crudine Road is an unsealed minor road servicing isolated homesteads along the eastern foothills of Crudine Ridge. The land use in this area is sheep grazing land. The landscape is undulating and mostly cleared grazing land with some groupings of retained vegetation. Views from this viewpoint are contained by mid-distant ranges and Crudine Ridge in the distance. Roadside vegetation is common along Crudine Road, however intermittent.  From this viewpoint there are no visible homesteads and due to the land use as a minor local road the visual sensitivity from this viewpoint has been rated as low.	From this viewpoint the proposed wind turbines are likely to be visible. Approximately 11 of the turbines would be viewed against the sky line. The visual effect from this viewpoint has been assessed as moderate.  The potential visual impact has been assessed as low.
Coordinates	S 33° 01.876' E 149° 38.119'		
Elevation	629m		
LCU	Crudine Valley		
Viewing Distance (to nearest proposed turbine)	2.69 km		
Land use	Grazing Land		
Visual Sensitivity	Low		
Visual Effect	Moderate		
Potential Visual impact	Low		

# 8.0 VIEWPOINT ANALYSIS

## CW13- Crudine Road



Viewpoint CW13: Crudine Road



Zoomed photograph cropped from Viewpoint CW13

VIEWPOINT CW13		LANDSCAPE DESCRIPTION:	POTENTIAL VISUAL IMPACT:
Location	Crudine Road	View from Crudine Road approximately 3.7km north of Hill End Road. The photograph was taken from a section of cleared roadside vegetation, opposite the homestead 'Nalya'. Topography in this area is slightly undulating and rises steeply at Crudine Ridge. The landscape is typically cleared grazing land with some scattered trees. Vegetation increases in density towards Crudine Ridge. From this viewpoint views to the west are contained by Crudine Ridge.  The visual sensitivity from this viewpoint has been assessed as high due to the proximity of a rural residential property to the viewpoint.	From this viewpoint approximately 60% of the proposed wind turbines would be visible along the ridgeline in the background, through the roadside vegetation. The visual effect from this viewpoint has been assessed as moderate due to a combination of the proximity to the proposed wind farm and the existing screening provided by roadside vegetation.  The overall visual impact from this viewpoint has been assessed as high.
Coordinates	S 33° 1.005' E 149°38.159'		
Elevation	630m		
LCU	Crudine Valley		
Viewing Distance (to nearest proposed turbine)	2.22 km		
Land use	Minor Road / Rural Residential		
Visual Sensitivity	High		
Visual Effect	Moderate		
Potential Visual impact	High		

# 8.0 VIEWPOINT ANALYSIS

## CW14- Peel Road



Viewpoint CW14: Peel / Sofala Road



Zoomed photograph cropped from Viewpoint CW14

VIEWPOINT CW14		LANDSCAPE DESCRIPTION:	POTENTIAL VISUAL IMPACT:
Location	Peel / Sofala Road	View from Peel Road approximately 9km north of the Sofala township. Peel Road is a major road connecting Mudgee & Bathurst. The road follows an elevated ridge line and has expansive views to both the east and west. This photo was taken from the western side of the road looking out towards Crudine Ridge. A large vegetated ridge line is visible in the mid-distance, located between the road and Crudine Ridge. Views extend to Crudine Ridge which is visible as a cleared to semi-vegetated ridge in the background of the photograph. A sparse coverage of roadside vegetation occurs along Peel Road.	From this viewpoint 47 of the southern portion of the wind turbines may be visible along the ridge line in the distance. Due to the speed of travel along Peel Road and the direction of view, views of the proposed wind farm would be fleeting and therefore the visual effect has been assessed as low.  The overall visual impact from this viewpoint has been rated as low.
Coordinates	S 33° 01.321' E 149°42.445'		
Elevation	752m		
LCU	Sofala		
Viewing Distance: (to nearest proposed turbine)	8.59 km		
Land use	Major Road		
Visual Sensitivity	Low	The visual sensitivity of this viewpoint has been assessed as low due to the land use and distance from the proposal.	REFER TO PHOTOMONTAGE 05
Visual Effect	Low		
Potential Visual impact	Low		

# 8.0 VIEWPOINT ANALYSIS

## CW15- Peel Road



Viewpoint CW15: Peel Road



Zoomed photograph cropped from Viewpoint CW15

VIEWPOINT CW15		LANDSCAPE DESCRIPTION:	POTENTIAL VISUAL IMPACT:
Location	Peel Road	View from Peel Road, approximately 7.5 km north of Sofala Village. Peel Road is steep and winding in this section. The photograph was taken from an elevated point on the roadside looking to the west towards Crudine Ridge. Views from this point are broad and expansive over the undulating topography associated with the Crudine Valley. A ridge line in the mid-distance tapers to reveal views of Crudine Ridge in the distance.  The visual sensitivity from this viewpoint has been rated as low as a result of the distance from the proposal, speed of travel along the road and direction of the view.	From this viewpoint it has been estimated that approximately 40% of the proposed wind turbines would be visible in the distance. As motorists would be focusing on the road, their direction of view would be either north or south from this viewpoint. The visual effect of the viewpoint has been assessed as low due to the distance, direction of view and number of visible turbines.  The overall visual impact from this viewpoint has been assessed as low.
Coordinates	S 33° 01.855' E 149°42.627'		
Elevation	712m		
LCU	Sofala		
Viewing Distance (to nearest proposed turbine)	9.14 km		
Land use	Major Road		
Visual Sensitivity	Low		
Visual Effect	Low		
Potential Visual impact	Low		

# 8.0 VIEWPOINT ANALYSIS

## CW16- Crudine Road



Viewpoint CW16: Crudine Road



Zoomed photograph cropped from Viewpoint CW16.

VIEWPOINT CW16		LANDSCAPE DESCRIPTION:	POTENTIAL VISUAL IMPACT:
Location	Crudine Road 'Linwood'	View from property 'Linwood' located on Crudine Road approximately 5.8km north of Hill End Road. The property is located approximately 300 metres from the Crudine River within the Crudine Valley. The photograph was taken from the rear of the property looking in a west direction beyond the dense screen planting which surrounds the west of the house. Views towards the west are dominated by the steep eastern slope of Crudine Ridge. The landscape is typically cleared grazing land with groups of retained native vegetation scattered through the landscape.  The visual sensitivity from this viewpoint has been rated as high due to the land use. It is important to note this viewpoint represents a worst case scenario from this property.	Views from the property towards the wind turbines would mostly be screened from view by the existing dense screen planting that is located on the western edge of the property. Approximately 35 of the proposed wind turbines may be visible from this viewpoint from the west of the screen planting. The visual effect from this viewpoint has been assessed as high.  The overall visual impact from this viewpoint has been assessed as high.  REFER TO PHOTOMONTAGE 06
Coordinates	S 32° 59.656' E 149° 38.217'		
Elevation	649m		
LCU	Crudine Valley		
Viewing Distance (to nearest proposed turbine)	1.90km		
Land use	Rural Residential		
Visual Sensitivity	High		
Visual Effect	High		
Potential Visual impact	High		

# 8.0 VIEWPOINT ANALYSIS

## CW17- Crudine Road



Viewpoint CW17: Crudine Road



Zoomed photograph cropped from Viewpoint CW17

VIEWPOINT CW17		LANDSCAPE DESCRIPTION:	POTENTIAL VISUAL IMPACT:
Location	Crudine Road	View from paddock to the east of 'Linwood' (refer to viewpoint CW16). Photograph was taken from a farm track within the paddock adjacent a power line pole. The view is dominated by the steep eastern slope of Crudine Ridge in the background of the photograph. The landscape is predominantly extensively cleared grazing land. Isolated Eucalyptus trees dot the landscape. Roadside vegetation associated with Crudine Road is visible in the middle ground of the photograph. Dense vegetation towards the north is associated with the Crudine River which crosses the road approximately 300 metres from this viewpoint.  The visual sensitivity from this viewpoint has been assessed as low.	From this viewpoint it has been estimated approximately 80% of the proposed wind turbines would be visible along the ridge line in the distance. It is likely the proposed wind turbines would visually dominate the landscape due to the close proximity and degree of horizontal viewing angle. The visual effect from this viewpoint has been assessed as high.  The overall potential visual impact from this viewpoint has been assessed as moderate.
Coordinates	S 32° 59.829' E 149°38.549'		
Elevation	644m		
LCU	Crudine Valley		
Viewing Distance (to nearest proposed turbine)	2.33 km		
Land use	Grazing Land		
Visual Sensitivity	Low		
Visual Effect	High		
Potential Visual impact	Moderate		

# 8.0 VIEWPOINT ANALYSIS

## CW18- Crudine Road



Viewpoint CW18: Crudine Road



Zoomed photograph cropped from Viewpoint CW18

VIEWPOINT CW18		LANDSCAPE DESCRIPTION:	POTENTIAL VISUAL IMPACT:
Location	Crudine Road	View from the front yard of property 'Trelawney' located approximately 7km along Crudine Road from Hill End Road. The property is located at the eastern foothills of Crudine Ridge, adjacent to Crudine Creek. The topography is flat and rises steeply towards Crudine Ridge. The land use in this area is generally open grazing land with a sparse coverage of vegetation.  There is a mixture of native and exotic spot tree planting around the property partially screening views to the west.	From this viewpoint approximately 39 of the proposed wind turbines may be visible. It is likely the proposed wind turbines would become a dominant visual feature of the landscape.  The potential visual impact from this viewpoint has been rated as high.  REFER TO PHOTOMONTAGE 07
Coordinates	S 33° 59.314', E 149° 38.920'		
Elevation	639m		
LCU	Crudine Valley		
Viewing Distance (to nearest proposed turbine)	2.46 km		
Land use	Rural Residence		
Visual Sensitivity	High		
Visual Effect	High		
Potential Visual impact	High		

# 8.0 VIEWPOINT ANALYSIS

## CW19- Crudine Road



Viewpoint CW19: Crudine Road



Zoomed photograph cropped from Viewpoint CW19

VIEWPOINT CW19		LANDSCAPE DESCRIPTION:	POTENTIAL VISUAL IMPACT:
Location	Crudine Road	View from the entry gate to property 'Willow Bend' located approximately 8.5km north of Hill End road along Crudine Road. The property 'Willow Bend' is located 200m from a bend in the Crudine River and has a woodland setting. The property is sited within a pocket of retained native vegetation within the Crudine Valley on a localised rise. Farm ancillary buildings associated with the property are visible in the mid-distance.  The visual sensitivity from this viewpoint has been assessed as high.	From this viewpoint it is unlikely any of the proposed wind turbines would be visible. This viewpoint has been included to illustrate the effectiveness of existing vegetation in screening views towards Crudine Ridge.  There will be no significant visual impact from this viewpoint.
Coordinates	S 32° 59.036' E 149°39.723'		
Elevation	661m		
LCU	Crudine Valley		
Viewing Distance (to nearest proposed turbine)	3.06km		
Land use	Rural Residential		
Visual Sensitivity	High		
Visual Effect	-		
Potential Visual impact	-		



# 8.0 VIEWPOINT ANALYSIS

## CW20- Crudine Road



Viewpoint CW20: Crudine Road



Zoomed photograph cropped from Viewpoint CW20

VIEWPOINT CW20		LANDSCAPE DESCRIPTION:	POTENTIAL VISUAL IMPACT:
Location	Crudine Road	This viewpoint is located at the entry to property 'Willow Downs' off Crudine Road within the Crudine Valley. The landscape is predominately cleared grazing land with dense coverage of vegetation on the slopes and ridge of Crudine Ridge. This section of Crudine Road has extensive roadside vegetation. Juvenile pine plantings which line the driveway towards the homestead are visible in the middle ground of the photograph surrounded by a mix of exotic and native plantings.	From this viewpoint 77 of the proposed wind turbines may be visible, sited along the ridge line in the background. The proposed wind turbines have the potential to visually dominate the landscape in this location. The property in the middle ground faces east and has farm ancillary buildings to the rear. The visual effect from this viewpoint has been assessed as high.
Coordinates	S 32° 58.054' E 149°40.635'		
Elevation	674m	The visual sensitivity from this viewpoint has been assessed as high due to the close proximity to the proposal and location of the homestead.	The overall visual impact from this viewpoint has been assessed as high.
LCU	Crudine Valley		
Viewing Distance (to nearest proposed turbine)	2.44km		
Land use	Rural Residential		
Visual Sensitivity	High		
Visual Effect	High		
Potential Visual impact	High		REFER TO PHOTOMONTAGE 08

# 8.0 VIEWPOINT ANALYSIS

## CW21- Crudine Road



Viewpoint CW21: Crudine Road



Zoomed photograph cropped from Viewpoint CW21

VIEWPOINT CW21		LANDSCAPE DESCRIPTION:	POTENTIAL VISUAL IMPACT:
Location	Crudine Road	View from Crudine Road at the entry to a paddock. The landscape in this area is open and extensively cleared and views are vast, terminated to the west by the eastern slopes of Crudine Ridge. Some isolated Eucalyptus trees are scattered through the landscape and on the slopes of Crudine Ridge. A tributary drainage line of the Crudine River is visible in the foreground. The landscape is utilised for sheep grazing, a farm ancillary building and small wind turbine is located in the middle ground of the photograph surrounded by retained native vegetation. A homestead is located on the property to the north on the creek line.  The visual sensitivity from this viewpoint has been assessed as high.	From this viewpoint it has been estimated 82 of the proposed wind turbines would be viewed against the sky line above the ridge. The proposed wind turbines will become a dominative element in the landscape from this viewpoint. The visual effect from this viewpoint has been assessed as high due to the close proximity and number of visible turbines.  The overall visual impact from this viewpoint has been assessed as high.  REFER TO PHOTOMONTAGE 09
Coordinates	S 32° 56.980' E 149°41.915'		
Elevation	689m		
LCU	Crudine Valley		
Viewing Distance (to nearest proposed turbine)	2.64 km		
Land use	Rural Residential		
Visual Sensitivity	High		
Visual Effect	High		
Potential Visual impact	High		

# 8.0 VIEWPOINT ANALYSIS

## CW22- Crudine Road



Viewpoint CW22: Crudine Road



Zoomed photograph cropped from Viewpoint CW22

VIEWPOINT CW22		LANDSCAPE DESCRIPTION:	POTENTIAL VISUAL IMPACT:
Location	Crudine Road	View from the entry to property 'Glen Daire' on Crudine Road. The landscape is gently sloping to broadly rolling towards the Crudine Ridge. The steep eastern slope of Crudine Ridge is visually dominant in this viewpoint. The landscape is open and views are expansive with views to vegetated ridge lines to the south in the distance behind Crudine Ridge. The land use of this areas is extensively cleared grazing land. Some retained vegetation is visible on the slope of Crudine Ridge to the north west. Isolated retained trees are scattered through the paddocks.  The visual sensitivity from this viewpoint has been assessed as high.	From this viewpoint 87 of the proposed wind turbines may be visible. The visual effect from this viewpoint has been assessed as high due to the proximity and number of visible wind turbines. It is important to note the visual effect would be significantly lessened from the house due to the extensive tree planting surrounding the house and therefore this viewpoint represents a worst case scenario.  The overall visual impact from this viewpoint has been rated as high.  REFER TO PHOTOMONTAGE 10
Coordinates	S 32° 56.769' E 149°41.892'		
Elevation	692m		
LCU	Crudine Valley		
Viewing Distance (to nearest proposed turbine)	2.51 km		
Land use	Rural Residential		
Visual Sensitivity	High		
Visual Effect	High		
Potential Visual impact	High		

# 8.0 VIEWPOINT ANALYSIS

## CW23- Crudine Road



Viewpoint CW23: Crudine Road



Zoomed photograph cropped from Viewpoint CW23

VIEWPOINT CW23		LANDSCAPE DESCRIPTION:	POTENTIAL VISUAL IMPACT:
Location	Crudine Road	View from a small group of homesteads from the entry to property 'Glenvale' on Crudine Road within the Crudine Valley. Views from this location are expansive, terminating at Crudine Ridge in the mid-distance to the west. The landscape is generally cleared and open with some native vegetation on the slopes of Crudine Ridge and a mix of exotic and native planting surrounding the property. Roadside vegetation is intermittent along this section of Crudine Road. Land in this area is generally utilised for sheep grazing.  The visual sensitivity from this viewpoint has been assessed as high due to the land use and close proximity of the nearest proposed wind turbine.	From this viewpoint it is estimated that 55 of the proposed wind turbines may be visible along the ridge line in the mid-distance. The proposed wind turbines would visually dominate the landscape viewed with a sky backdrop. The visual effect from this viewpoint has been assessed as high.  The overall visual impact has been assessed as high.  REFER TO PHOTOMONTAGE 11
Coordinates	S 32° 56.938' E 149°42.074'		
Elevation	698m		
LCU	Crudine Valley		
Viewing Distance (to nearest proposed turbine)	2.16 km		
Land use	Rural Residential		
Visual Sensitivity	High		
Visual Effect	High		
Potential Visual impact	High		

# 8.0 VIEWPOINT ANALYSIS

## CW24- Castlereagh Highway



Viewpoint CW24: Castlereagh Highway



Zoomed photograph cropped from Viewpoint CW24

VIEWPOINT CW24	LANDSCAPE DESCRIPTION:		POTENTIAL VISUAL IMPACT:
Location	Castlereagh Highway	View from a property along Castlereagh Highway across from Crudine Road. Castlereagh Highway is a major travel corridor extending from Lithgow to the Queensland border. The road is utilised by heavy vehicles, local residents and tourists. Views from this viewpoint are broad and expansive, yet not distant. The landscape is predominately cleared with scattered groups of native vegetation.  The visual sensitivity from this viewpoint has been assessed as low.	From this viewpoint it is unlikely that the proposed wind turbines will be visible. This viewpoint has been included to illustrate the landscape character of this area.  There will be no visual impact from this viewpoint.
Coordinates	S 32° 53.184' E 149°48.469'		
Elevation	773m		
LCU	Sofala		
Viewing Distance (to nearest proposed turbine)	11.40 km		
Land use	Major Road		
Visual Sensitivity	Low		
Visual Effect	-		
Potential Visual impact	-		

# 8.0 VIEWPOINT ANALYSIS

## CW25- Aarons Pass Road



Viewpoint CW25: Aarons Pass Road



Zoomed photograph cropped from Viewpoint CW25

VIEWPOINT CW25		LANDSCAPE DESCRIPTION:	POTENTIAL VISUAL IMPACT:
Location	Aarons Pass Road	View from Aarons Pass Road, approximately 1.1km east of the Castlereagh Highway. The photograph was taken from near the entry to property 'Glencoe' and 1081 Aarons Pass Road. Views from this viewpoint are distant panoramic views, almost entirely screened by dense roadside vegetation. Aarons Pass Road is a narrow dirt road enclosed by dense roadside vegetation including Ghost Gums, Brown Stringy Gum and Scribbly Gum.  The visual sensitivity from this viewpoint has been rated as low.	From this viewpoint it is highly unlikely the proposed wind farm will be visible, however some glimpse views may be visible. Views are obstructed by dense roadside vegetation in the foreground. The speed of travel combined with the dense screen planting results in a visual effect assessment of low.  The overall visual impact from this viewpoint is low.
Coordinates	S 32° 52.922' E 149°43.143'		
Elevation	936m		
LCU	Aarons Pass		
Viewing Distance (to nearest proposed turbine)	3.61 km		
Land use	Minor Unsealed Road		
Visual Sensitivity	Low		
Visual Effect	Low		
Potential Visual impact	Low		

# 8.0 VIEWPOINT ANALYSIS

## CW26- Prices Lane



Viewpoint CW26: Prices Lane



Zoomed photograph cropped from Viewpoint CW26

VIEWPOINT CW26		LANDSCAPE DESCRIPTION:	POTENTIAL VISUAL IMPACT:
Location	Prices Lane	View from a property on the corner of Aarons Pass Road and Prices Lane. The landscape is characterised by the Sallys Flat LCU with broad rolling hills and scattered groups of retained vegetation. The photograph has been taken from the eastern yard of the property through exotic foreground screen planting towards the proposed wind farm. Retained native vegetation is visible in the middle ground screening some views to the west.  The visual sensitivity from this viewpoint is rated as high.	It is estimated that 17 of the proposed wind turbines will be visible from this viewpoint. The property faces north and is surrounded by screen planting. The visual effect has therefore been rated as low.  The overall visual impact from this viewpoint has been assessed as moderate.  REFER TO PHOTOMONTAGE 12
Coordinates	S 32° 54.471' E 149°37.431'		
Elevation	833m		
LCU	Sallys Flat		
Viewing Distance (to nearest proposed turbine)	4.11 km		
Land use	Rural Residence		
Visual Sensitivity	High		
Visual Effect	Low		
Potential Visual impact	Moderate		

# 8.0 VIEWPOINT ANALYSIS

## CW27- Prices Lane (Burra Brae)



Viewpoint CW27: Prices Lane



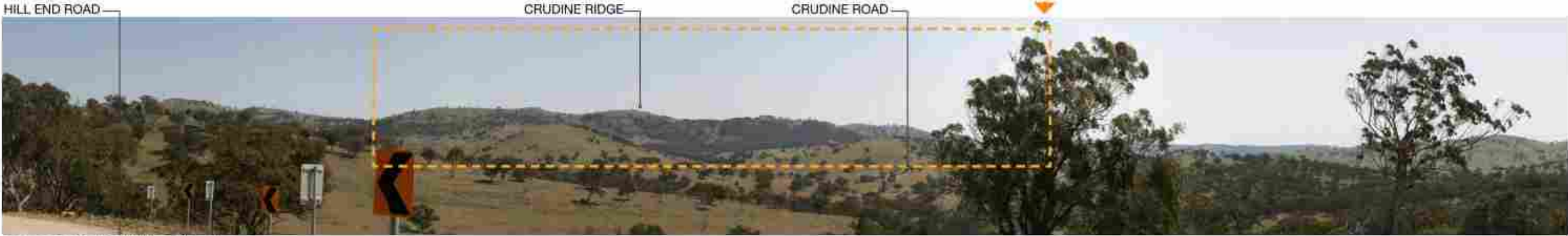
Zoomed photograph cropped from Viewpoint CW27

VIEWPOINT CW27		LANDSCAPE DESCRIPTION:	POTENTIAL VISUAL IMPACT:
Location	Prices Lane	View from property 'Burra Brae' on Prices Lane approximately 600 metres south east of the Pyramul Road intersection. The photograph has been taken in an easterly direction from the north eastern corner of the house. Views from this viewpoint are limited by foreground screen planting. The landscape is gently undulating with groups of native vegetation throughout the landscape. A vegetated ridge line is visible towards the north.  The visual sensitivity from this viewpoint has been assessed as high due to the land use.	From this viewpoint it is likely 43 of the proposed wind turbines may be visible. A combination of distance, and screen planting in the foreground is likely to screen most of the wind turbines. The visual effect from this viewpoint has been assessed as moderate.  The overall visual impact from this viewpoint has been assessed as moderate.  REFER TO PHOTOMONTAGE 13
Coordinates	S 32° 54.469' E 149°37.712'		
Elevation	831m		
LCU	Sallys Flat		
Viewing Distance (to nearest proposed turbine)	3.68 km		
Land use	Rural Residence		
Visual Sensitivity	High		
Visual Effect	Moderate		
Potential Visual impact	Moderate		



# 8.0 VIEWPOINT ANALYSIS

## CW28- Hill End Road



Viewpoint CW28:Hill End Road



Zoomed photograph cropped from Viewpoint CW28

VIEWPOINT CW28		LANDSCAPE DESCRIPTION:	POTENTIAL VISUAL IMPACT:
Location	Hill End Road	View from Hill End Road approximately 1.5km east of Crudine Road. The photograph was taken from a clearing in roadside vegetation in a generally north west direction looking towards the Crudine Ridge. Riparian vegetation associated with the Crudine River is visible in the middle ground of the photograph. Land is broadly cleared on lower slopes utilised for sheep grazing. Dense native vegetation is retained on steep land unsuitable for agricultural activity. The topography in this area is rolling and views are expansive looking over the Crudine Valley.  The visual sensitivity from this viewpoint has been assessed as moderate.	From this viewpoint worst case scenario would be that all of the proposed wind turbines will be visible on the ridge line in the distance. The visual effect from this viewpoint has been assessed as high due to the number of visible turbines and proximity to the study site.  The overall visual impact from this viewpoint has been rated as high.  REFER TO PHOTOMONTAGE 14
Coordinates	S 33° 02.371' E 149° 38.326'		
Elevation	661m		
LCU	Sofala		
Viewing Distance (to nearest proposed turbine)	3.81 km		
Land use	Tourist Road		
Visual Sensitivity	Moderate		
Visual Effect	High		
Potential Visual impact	High		