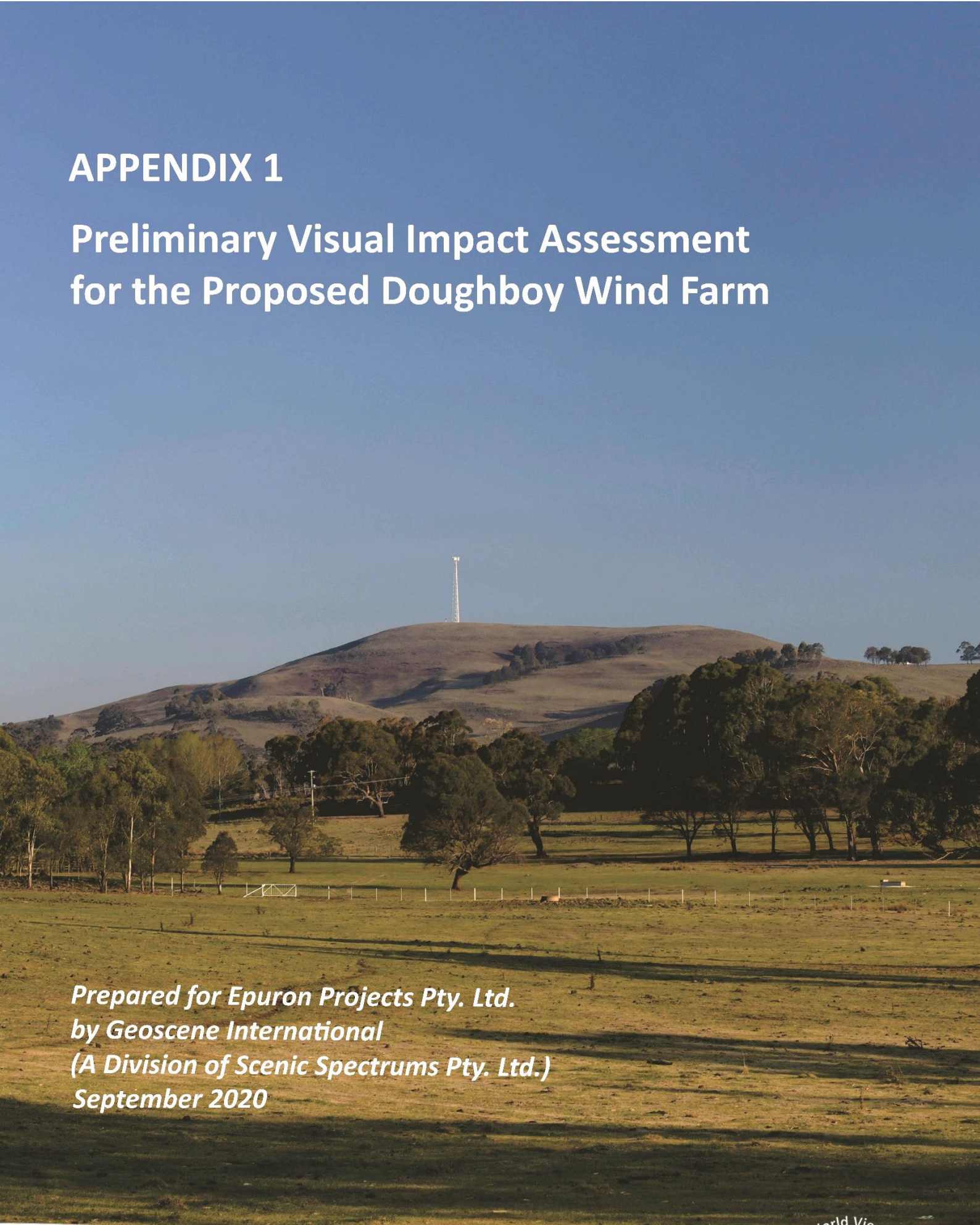
APPENDIX 1

Preliminary Visual Impact Assessment for the Proposed Doughboy Wind Farm



Prepared for Epuron Projects Pty. Ltd.
by Geoscene International
(A Division of Scenic Spectrums Pty. Ltd.)
September 2020

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Preliminary Visual Impact Assessment for the Proposed Doughboy Wind Farm

Prepared on behalf of

Epuron Projects Pty. Ltd.

by

Geoscene International

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September 2020

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Report Author: Dr. Dennis Williamson, Director of Geoscene International (a Division of Scenic Spectrums Pty. Ltd.), under instructions from Epuron Projects Pty. Ltd.

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Preliminary Visual Impact Assessment for the Proposed Doughboy Wind Farm

EXECUTIVE SUMMARY

The Preliminary Visual Impact Assessment

Epuron Projects Pty. Ltd. (Epuron) has engaged Geoscene International to prepare this Preliminary Visual Impact Assessment (PVIA) for the Doughboy Wind Farm in New South Wales under their instructions to meet the requirements of the NSW Wind Energy Visual Assessment Bulletin[1], as outlined on pages 7 – 11 of that guideline document.

The PVIA is to provide a rapid assessment of two of the six visual objectives that will be addressed during the full VIA and EIS assessment process. These two objectives, framed as rapid assessment tools, include:

- Visual Magnitude, and
- Multiple Wind Turbine Effects.

Epuron propose the construction of up to 60 wind turbines in the New England Tablelands about 50 km northeast of the City of Armidale, of which 52 are analysed in this report. The turbines would be a maximum of 230 m high on private agricultural landholdings of approximately 17,105 hectares.

Key Findings

This PVIA assessment has found that the proposed Doughboy Wind Farm would be developed within a pastoral Tableland landscape of Moderate Scenic Quality. This landscape presents subtle but visually complex variations in terrain and vegetation pattern conditions.

The PVIA Visual Magnitude analysis identified that 15 viewpoints consisting of 14 non-associated dwellings and one viewpoint at a local heritage site are located within of 3.05 km from wind turbines.

The PVIA Multiple Wind Turbine Effects analysis shows that 7 non-associated dwellings and key viewpoints have proposed wind turbines potentially visible within three or more 60° sectors and within 8 km of the viewpoints.

Overall, 15 non-associated dwellings or key viewpoints have been identified as potentially sensitive due to their locations within the PVIA 3.05 km Visual Magnitude distance of proposed turbines, or with three or more 60° viewing sectors with turbines located within 8 km distance.

[1] Source: NSW Department of Planning & Environment, 2016. Wind Energy: Visual Assessment Bulletin – For State significant wind energy development (December), Sydney, New South Wales, 40 pp.

1 INTRODUCTION

Geoscene International has been requested by Epuron Projects Pty. Ltd. (Epuron) to prepare this Preliminary Visual Impact Assessment (PVIA) for the Doughboy Wind Farm in New South Wales, under their instructions, in order to meet the requirements of the NSW Wind Energy Visual Assessment Bulletin[2] on pages 7 – 11 of that guideline document.

The PVIA is to focus on the rapid assessment tools as documented in the Bulletin (pp. 7 – 11), including:

- Visual Magnitude, and
- Multiple Wind Turbine Effects.

The proposed wind turbines would be located within the New England Tablelands about 50 km northwest of the city of Armidale. The wind farm project location shown in Figure 1.

The wind farm would include up to 60 wind turbines to a maximum of 230 m high on private agricultural landholdings of approximately 17,105 hectares.

The proposed development is further described in Section 3.

The following sections of this report include:

- Description of the Proposed Doughboy Wind Farm Project;
- Land Use Context and Key Landscape Features;
- Community Consultation Findings;
- Landscape Character Types and Scenic Quality Classes;
- Visual Magnitude Analysis of the Proposed Wind Turbines;
- Multiple Wind Turbine Effects Analysis; and
- Conclusions.

2 THE PVIA AS A RAPID ASSESSMENT APPROACH

2.1 Rapid Assessment Tools of the PVIA

The brief for this PVIA is limited to a focus on the rapid assessment tools as documented in the Bulletin (pp. 7 – 11), including:

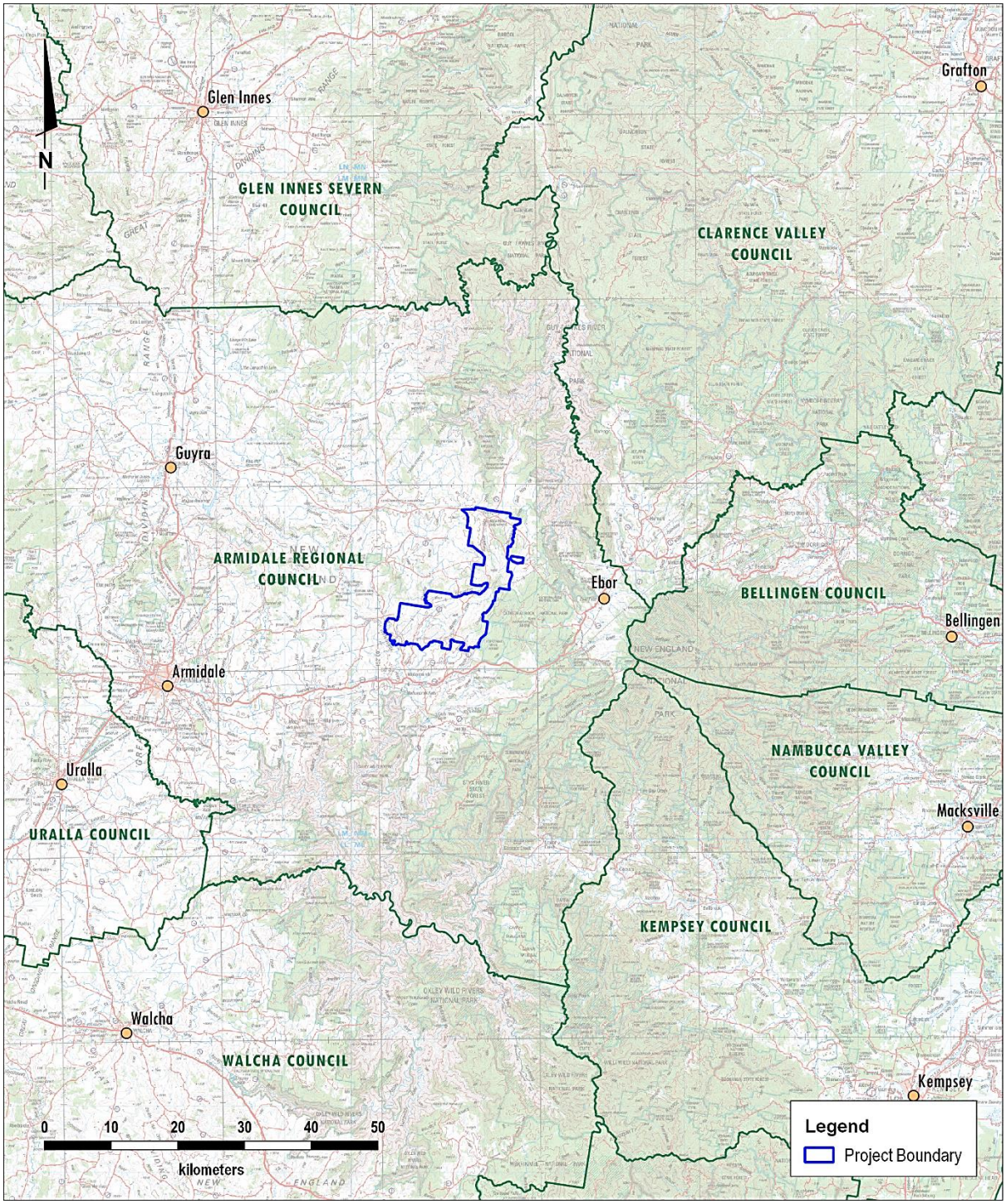
- Visual Magnitude, and
- Multiple Wind Turbine Effects.

2.2 PVIA Visual Magnitude Assessment

The PVIA Visual Magnitude assessment relies on the Visual Magnitude distance line in Figure 2. For the proposed 230 m high wind turbines the PVIA distance of 3.05 km applies. All key public viewpoints and Non-Associated Dwellings within that distance from each of the proposed wind turbines have been identified by Geoscene International for possible further investigation, as required for the PVIA.

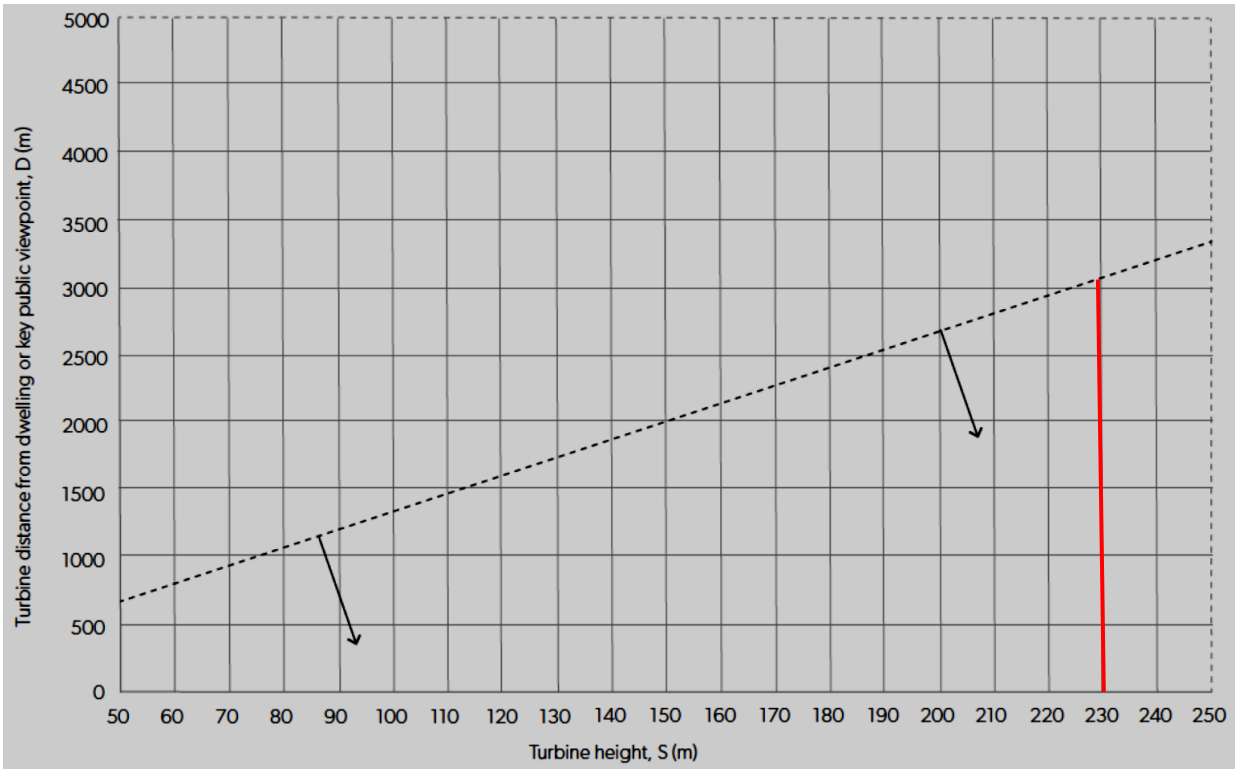
2 Source: NSW Department of Planning & Environment, 2016. Wind Energy: Visual Assessment Bulletin – For State significant wind energy development (December), Sydney, New South Wales, 40 pp.

Figure 1 Locality of the Proposed Doughboy Wind Farm Project[3]



3 Source: Epuron Australia Pty Ltd, 2020. Doughboy Wind Farm Project Regional Location Map.

Figure 2 Visual Magnitude Thresholds for Visual Assessment[4]



As stated in the Bulletin:

> *"Further assessment and justification for placement of turbines located in these sensitive areas in the EIS will be required, along with a description of the mitigation and management measures being employed to reduce impacts."* [5]

2.3 PVIA Multiple Wind Turbine Effects Assessment

In relation to the Multiple Wind Turbine Effects assessment, the PVIA process assesses the degree to which the cumulative visual impacts of the proposed wind turbines and turbines of any other nearby existing or planned wind farms potentially visible within 8 km from key public viewpoints or private dwellings. As stated in the Bulletin in relation to the PVIA:

> *"Where wind turbines are visible within the horizontal views of the dwelling or key public viewpoints in three or more 60° sectors, the proponents must identify the turbines, relative dwelling and key public viewpoint, along with the relative distance and submit these to the Department as part of the request for SEARs. These turbines will become a focus for assessment in the EIS."*[6]

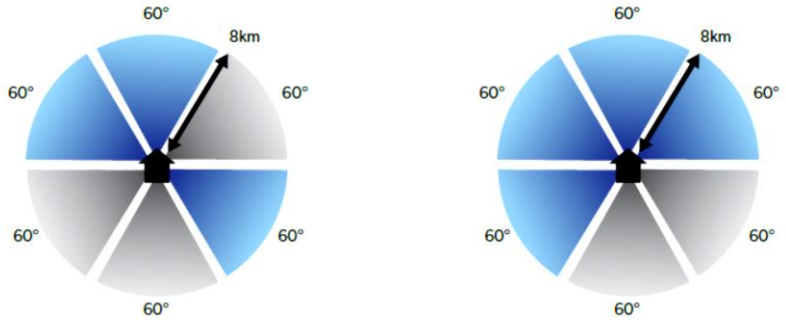
4 Source: NSW Department of Planning & Environment, 2016. Wind Energy: Visual Assessment Bulletin – For State significant wind energy development (December), Sydney, New South Wales, p. 9.

5 NSW Department of Planning & Environment, 2016. Wind Energy: Visual Assessment Bulletin – For State significant wind energy development (December), Sydney, New South Wales, p. 8.

6 NSW Department of Planning & Environment, 2016. ibid., p. 10.

Figure 3 shows two examples where wind turbines would be visible in three or four 60° sectors from hypothetical viewpoints.

Figure 3. Multiple Wind Turbine Assessment Compass Sectors[7]



As there can be an extensive number of viewpoints, the Multi Wind Turbine Effects tool may not necessarily be a rapid assessment process as intended for the PVIA. So, Geoscene International selects a smaller number of potentially critical viewpoints informed by the prior Visual Magnitude assessment, as well as viewpoints that are well distributed geographically around the proposed wind turbines, as well as in terms of distance, to provide representative viewpoints that will provide adequate information for analysis.[8]

The Bulletin suggests that further EIS assessment may include consideration of various factors, including topography, relative distance, existing vegetation that may screen views to turbines, and the relative position of the viewpoints in relation to a dwelling.

The Bulletin also states that:

> "Conversely, there may be circumstances where dwellings or key public viewpoints located above the line may require further consideration due to topography or other landscape features. The further detailed assessment and ground-truthing at the visual assessment stage must also consider impacts on these dwellings or key viewpoints. The relative position of the viewpoints in relation to a dwelling is also an important consideration that should be outlined in the EIS. For example, views to the turbines from the primary living areas *of the dwelling would be considered more important than views from non-habitable areas*."

It is noted that the above paragraph applies to the EIS stage. As part of the desktop analysis a single generic viewpoint for each dwelling has been used for the PVIA, which may require adjustment during the EIS stage of assessment.

7 Note: The areas shaded in blue represent 60° viewing sectors in which proposed, existing or planned wind turbines may potentially be visible. The grey areas represent those viewing sectors where no wind turbines would be potentially visible.

8 These selected viewpoints do not include those along Viewer Sensitivity Level 3 public roads, which are not included in the Bulletin's guidelines.

3 DESCRIPTION OF THE PROPOSED DOUGHBOY WIND FARM PROJECT

3.1 Proposed Wind Turbines and Wind Turbine Layout

The project will involve the construction, operation, maintenance, and decommissioning of key components as follows:

- Wind turbines – up to 60 wind turbines (rated at up to 6 MW each), with:
  - Three blades mounted on a tubular steel tower with a combined height (blade pus tower) to tip not exceeding 230 m; and
  - A crane hardstand area and turbine laydown area;
- Substation and transmission connection – linking the turbines to the existing TransGrid 330 kV transmission line network;
- Energy Storage Battery – approximately 100 MV / 400 MWh, based on lithium-ion technology and co-located in a centralised place within the substation;
- Electrical Connections – between wind turbines and the on-site substation/s, which will be a combination of underground cable and overhead powerlines linking segments of the site;
- Other associated infrastructure;
- Road upgrades to enable delivery access for installation and maintenance of wind turbines and related facilities; and
- Ancillary activities (including boundary adjustments and subdivision).

An indicative rendered illustration of the proposed wind turbine design in its front elevation and side profile is shown in Figure 4.

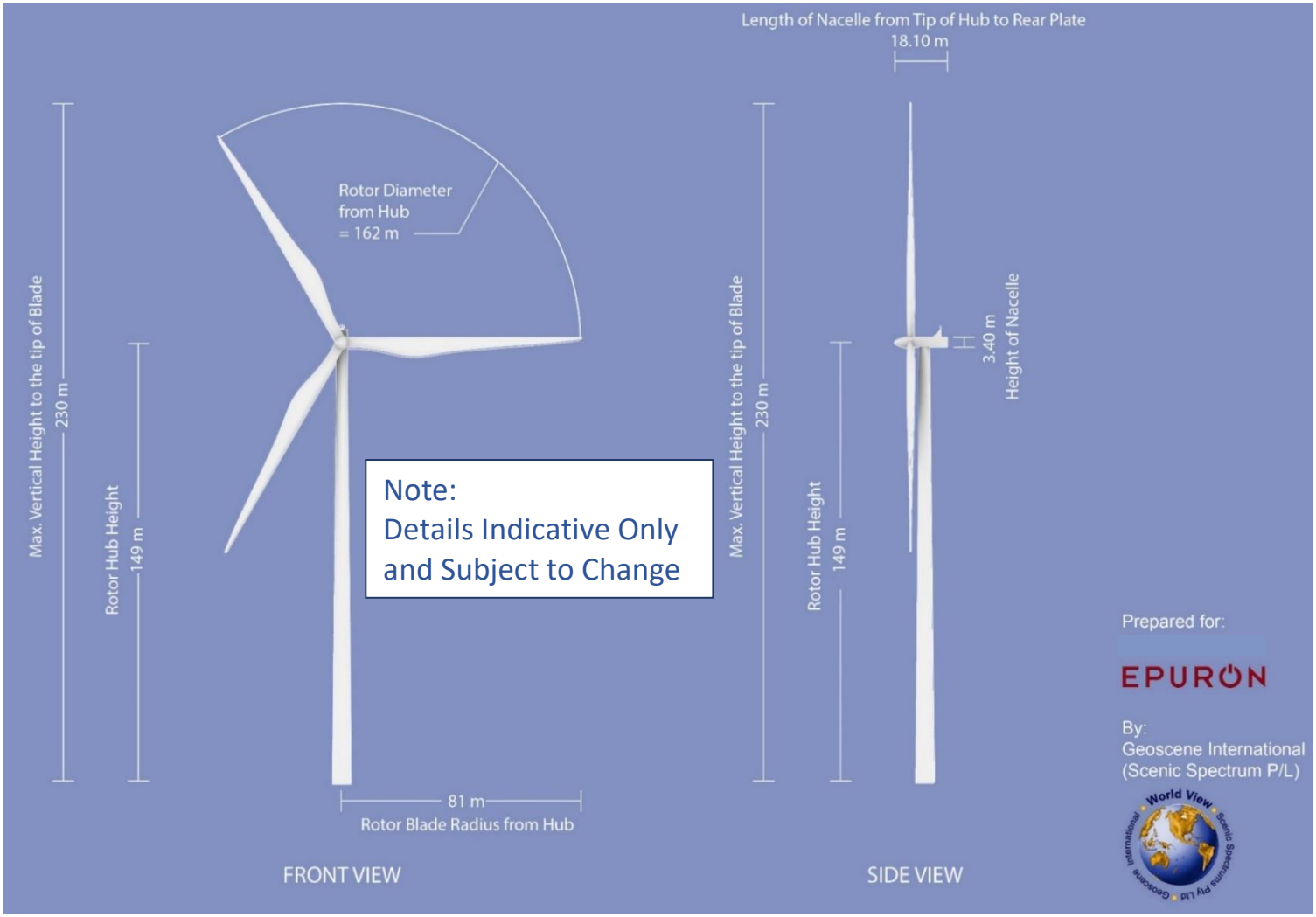
The current proposed 52 wind turbine layout is on a satellite image showing vegetation cover and surrounding national parks and reserves in Figure 5.

3.2 General Alterations to the Landscape

The above sections describe the types of alterations that the proposed development would add to the Doughboy area landscape.

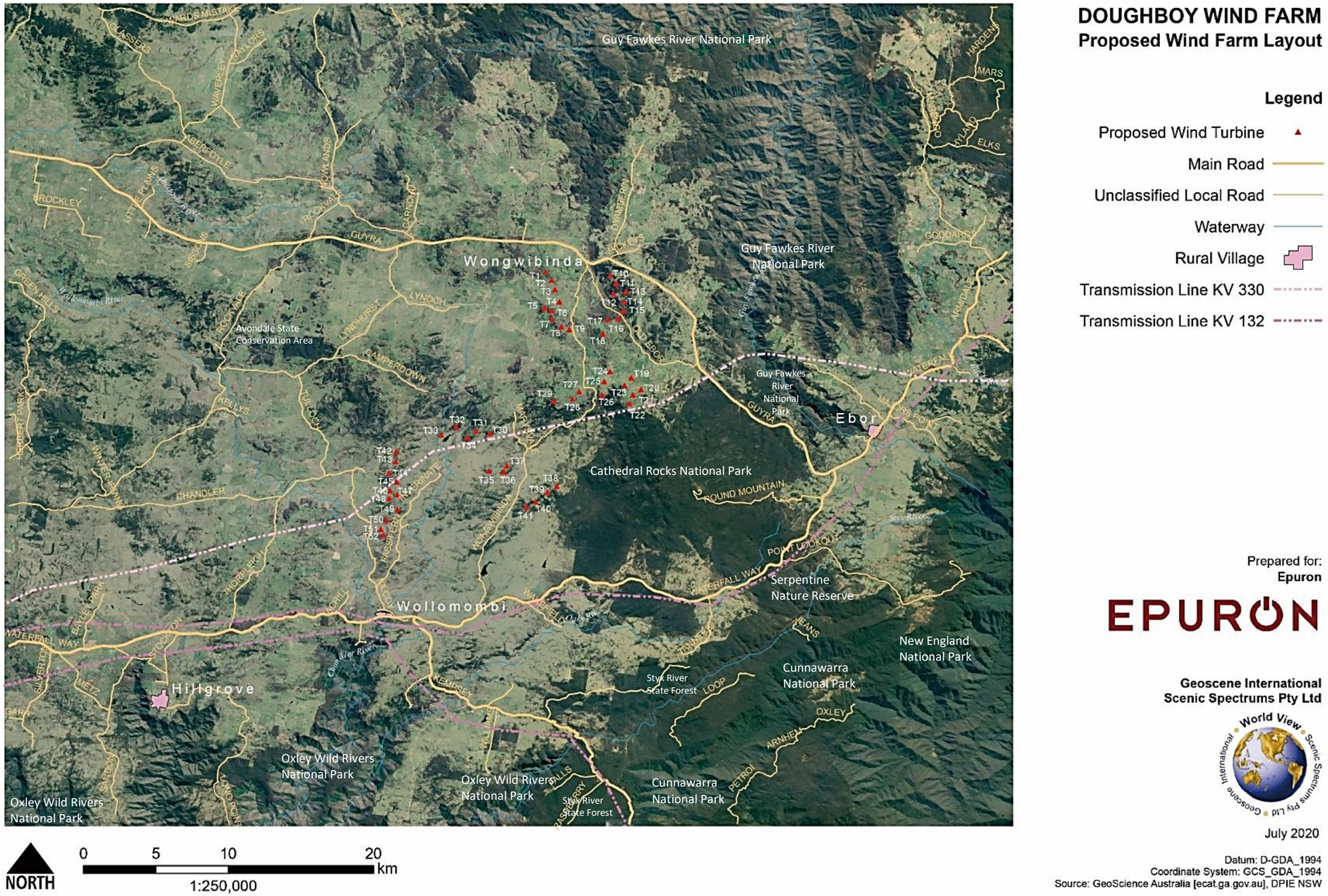
Photo 1 provides a general impression of what the wind turbine and road network alterations may look like using examples from other wind turbines at Ararat Wind Farm where 135m high wind turbines have been constructed.

Figure 4 Indicative Wind Turbine Generator[9]



9 Source: Geoscene International, 2020.

Figure 5 Proposed Doughboy Wind Turbine Layout[10]



DOUGHBOY WIND FARM
Proposed Wind Farm Layout

Legend

- Proposed Wind Turbine
- Main Road
- Unclassified Local Road
- Waterway
- Rural Village
- Transmission Line KV 330
- Transmission Line KV 132

Prepared for:
Epuron

EPURON

Geoscene International
Scenic Spectrums Pty Ltd

July 2020

Datum: D-GDA_1994
Coordinate System: GCS_GDA_1994
Source: GeoScience Australia [ecat.ga.gov.au], DPIE NSW

10 Note: Red lines indicate Local Government Area boundaries.

Photo 1 Wind Farm Post Construction[11]

4 LAND USE CONTEXT AND KEY LANDSCAPE FEATURES

4.1 Regional Context, Land Use and Key Viewpoints

As shown on Figure 6, the approximate centre of the proposed Doughboy Wind Farm development is located about 50 km northeast of the City of Armidale, a similar distance southeast of the town of Guyra and approximately 18 km north-northwest of the rural village of Ebor. The proposed Doughboy Wind Farm is also located within a triangle of highways and main roads, including:

- the New England Highway (A15), running from Armidale north through the town of Guyra;
- the Waterfall Way (B78), a main road which runs from Dorrigo southwest to Armidale; and
- Guyra-Ebor Road, a main road that runs from Guyra to Waterfall Way, southwest of Ebor.

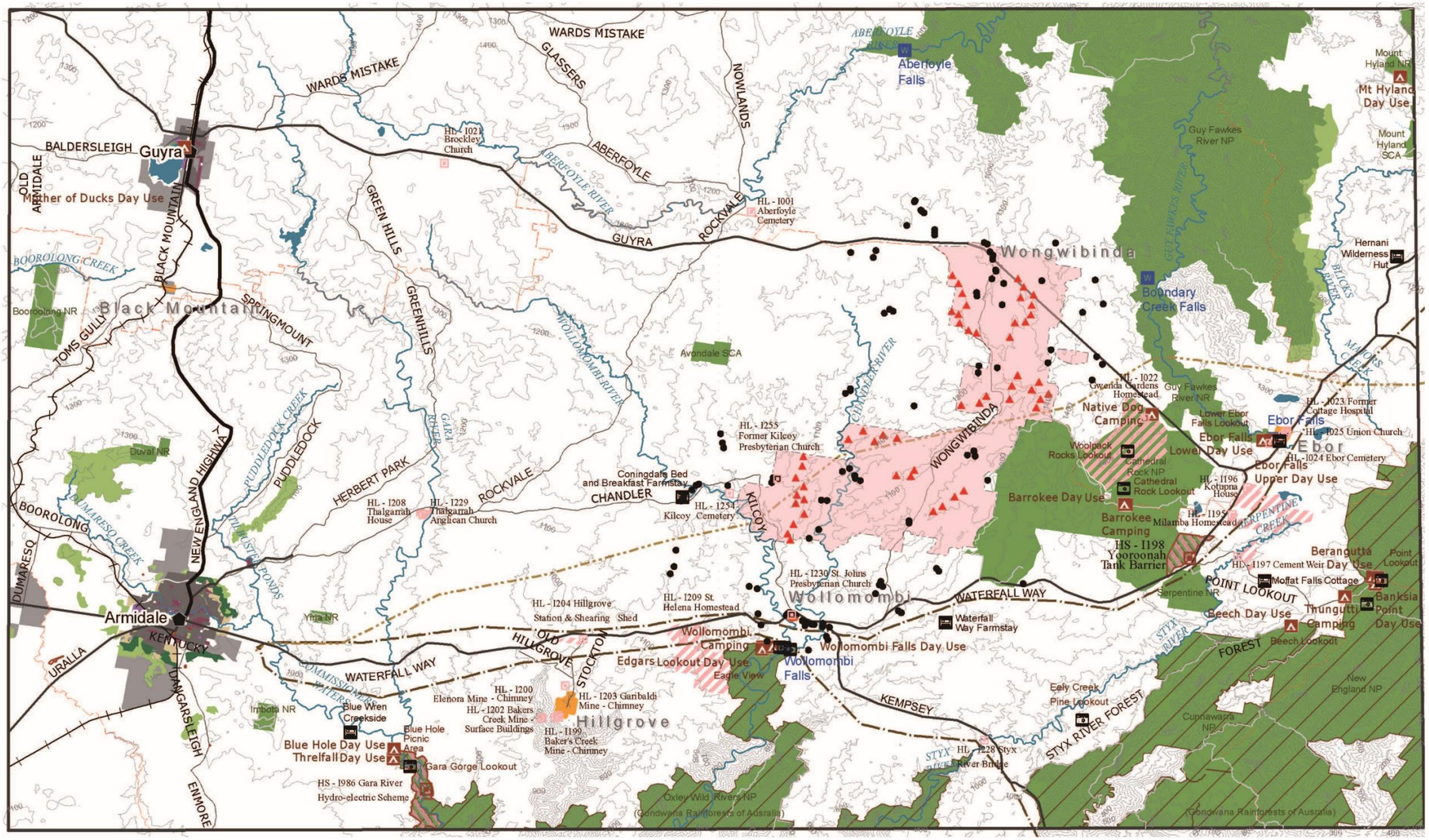
The wind farm would be centred between the Chandler River and Wongwibinda Road on the east-west axis and approximately 13 km north of Waterfall Way and approximately 11 km south of Guyra-Ebor Road on the north-south axis.

Described in terms of the Australian Land Use Management Classifications (ALUM), the proposed wind farm is primarily located within the primary land use Class 3 Dryland Agricultural and Plantation Production and more specifically under the secondary Class 3.2 of Grazing of Modified Pastures[12].

11 Source: http://www.ararat-windfarm.com/media/ as referred to in the RES Portfolio: https://www.res-group.com/en/portfolio/ ?ProjectID=1250#

12 ABARES 2016, The Australian Land Use and Management Classification Version 8, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra. CC BY 3.0. ISBN: 978-1-74323-310-8 ABARES project: 115063-43590

Figure 6 Regional Key Features



DOUGHBOY WIND FARM
Key Regional Features

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EPURON

By:

Geoscene International
Scenic Spectrums Pty Ltd

August 2020

Key Features

Transmission Line kV 132
Transmission Line kV 330
Highway
Main Roads
Unclassified Local Road
Railway
River
Dwelling (within 8km)
Town
Park Visitor Area
Scenic Viewpoint
Tourist Accomodation
Waterfall
Proposed Wind Turbine
Local Government Area
Lake & Reservoir
*Dryland Agricultural and Plantation Production
Associated Landholder Properties

NORTH
0 5 10 20 km
1:310,000

Sensitive Land Use Designations

Private Recreation
Public Recreation
State Heritage
Local Heritage
World Heritage
Rural Villages
National Parks & Nature Reserves
Environmental Living
Environmental Management
General Residential
Large Lot Residential
Low Density Residential
Natural Waterways

Datum: D-GDA_1994; Coordinate System: GCS_GDA_1994
Source: GeoScience Australia [ecat.ga.gov.au], DPIE NSW

*Australian Land Use and Management Class 3 Dryland Agricultural and Plantation Production.
Source: ABARES 2016, The Australian Land Use and Management Classification Version 8,
Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra. CC BY 3.0. ISBN: 978-1-74323-310-8.

The project is located within the Local Government Area boundary of the Armidale Regional Council. The corresponding Land Use Zone for the area in which the wind farm is proposed is RU1 Primary Production under the Armidale Dumaresq Local Environmental Plan (LEP) 2012 and the Guyra Local Environmental Plan (LEP) 2012.

There are no Sensitive Land Use Designations[13] within the proposed project area. However, the nearby villages of Hillgrove (south of Waterfall Way), Wollomombi (just north of Waterfall Way) and Ebor (to the east along Waterfall Way), are all zoned as RU5 Village under the Armidale Dumaresq LEP 2012, which are included on the list of Sensitive Land Use Designations. Wollomombi Village is the nearest village to any of the proposed turbines, approximately 5 km to the south.

Several protected areas and nature reserves exist within proximity of the nearest proposed wind turbines and those located within 10 km are listed below (shown in Figure 6):

- Cathedral Rock National Park (~ 1 km)
- Guy Fawkes River National Park (~ 5.2 km)
- Guy Fawkes River Nature Reserve (~ 7 km)
- Oxley Wild Rivers National Park (~7.25 km)
- Avondale State Conservation Area (~7.5 km).

The Oxley Wild Rivers National Park is also within the Gondwana Rainforests of Australia World Heritage Area.

4.2 Key Landscape Features

The proposed wind farm is located entirely on New England Tablelands ridges and plateau area west of the Great Dividing Range and near the eastern edge of dramatic NSW North Coast river escarpments. Locally known or more prominent hills and mounts surrounding the proposed windfarm include (clockwise from the north) Barneys Mountain (1170 m AHD[14]), Lark Hill (1219 m AHD), Mount Doughboy (1496 m AHD), Round Mountain (1586 m AHD), Black Mountain (1181 m AHD), Mount Davidson (1190 m AHD), Joeys Knob (1372 m AHD), Chandlers Peak (1473 m AHD), Bald Blair Sugarloaf (1430 m AHD), Mount Hourigan (1389 m AHD), and Aberfoyle Sugarloaf (1323 m AHD).

Elevations in the area of the proposed wind farm are in the range from approximately 970 m AHD along the lower sections of the Chandler River to ridgetops of ~1170 m AHD to 1496 m AHD in the north eastern portion of the project area.

In general, higher terrain on the tablelands of 960 m AHD or above occurs in a band running from the vicinity of Ebor Village and the headwaters of the Guy Fawkes and Styx Rivers, progressing westward to the highest levels at Round Mountain and Doughboy Mountain and then further west in two higher east-west plateau bands:

- higher terrain from Doughboy Mountain northwest to the vicinity of Fishington Road, which separates the north-flowing streams of Kangaroo Hills Creek and Doughboy Creek from such south flowing streams as Pipeclay Creek, the Chandler River and Maiden Creek; and

13 NSW Department of Planning & Environment, 2016. Wind Energy: Visual Assessment Bulletin – For State significant wind energy development (December), Sydney, New South Wales, Table 3, p. 27.

14 AHD – acronym for Australian Height Datum.

- higher terrain from Round Mountain northwest toward Doughboy Mountain but then splitting northeast in a set of hills and ridges running just east of Doughboy Creek to Guyra-Ebor Road and along that road to the vicinity of Fishington Road, separating such streams as Boundary Creek, Biscuit Creek, Native Dog Creek, Sandy Creek from the south flowing creeks of Station Creek, Ponds Creek, and Oaky River.

Within the wind farm project area, the terrain drops north of the plateaux from the hilltops to the vicinity of 1200 m AHD along the north-flowing creek valleys. However, to the south the elevations along the creek and river valleys displays a more significant drop to the vicinity of 940 m AHD along the Chandler River and Wollomombi River just north of Wollomombi. The elevations to the north and to the south fall to the lower tablelands before making more abrupt falls into the down-cut river gorges of the NSW North Coast river escarpments, which plunge to elevations as low as 37 m AHD along the Aberfoyle and Guy Fawkes Rivers in the north and northeast and along the Gara River, Chandler River, Oaky River, Styx River, Gorges Creek, Cunnawarra Creek, and Five Day Creek in the south and southeast within the Gondwana Rainforests of Australia World Heritage Area.

Several waterfalls, rivers and river gorges exist in the area, including:

- Boundary Creek Falls (Guy Fawkes River N.P.);
- Guy Fawkes River Gorge (Guy Fawkes River N.P.);
- Wollomombi Falls (Oxley Wild Rivers N.P.);
- Wollomombi River Gorge and Chandler River Gorge (Oxley Wild Rivers N.P.);
- The Wollomombi River and the Chandler River.

Most of the park facilities are located from 13 to 46 km from the nearest proposed wind turbine, with the exception of those facilities located within Cathedral Rock National Park and the northern end of Oxley Wild Rivers National Park, which are within 6 to 9 km of the nearest proposed wind turbines.

The wind farm project area primarily consists of cleared grazing paddocks, predominantly with scattered eucalypt and native woodlands, occasionally with more densely treed patches. Significant remnant woodlands exist in patches throughout the project area.

4.3 Major Landscape Alterations

Aside from clearing of native woodlands for agricultural grazing over the past 200 years, the region surrounding the proposed Doughboy Wind Farm has a few notable landscape alterations.

A 330 Kv high voltage electricity transmission line transects the central portion of the proposed wind farm from east to west and two 132 kV electricity transmission lines exist at distances over 6 km to the south of the proposed wind farm in the vicinity of Wollomombi (refer to Figure 2). A communications tower is also located on Mount Doughboy, east of Wollomombi Road (refer to cover photo).

Significant mining areas exist in the Bakers Creek Gorge area near Hillgrove and the Gara Hydro Electric Scheme is located on the Gara River Gorge southeast of Armidale. The New England Highway, a series of Main Roads (including Waterfall Way and Guyra-Ebor Road) and a network of Unclassified Local Roads criss-cross the region. Settlement is relatively sparse in the vicinity of the proposed wind farm, but 86 non-associated dwellings exist within 8 km of the proposed wind turbines (refer to Figure 7).

4.4 Dwellings and Key Viewpoints

A summary of dwellings and viewpoints within 10km is provided below. The full EIS will further evaluate dwellings and viewpoints within the broader region as part of the baseline study (refer to Figure 7 for dwelling identification numbers).

Non-Associated Dwellings within 8 km

There are 86 identified Non-Associated Dwellings (within 8 km and shown on Figure 7 with black dots), including:

- D1 through D14
- D19 and D20
- D27 through D34
- D37
- D39
- D44 through D47
- D50 through D90
- D104 through D118.

Associated Dwellings within 3.05 km

There are 32 Associated Dwellings, as shown in Figure 7 with black stars, including:

- D15 through D18
- D21 through D26
- D35 and D36
- D38
- D40 through D43
- D48 and D49
- D91 through D103

Rural Villages (RU 5 Zone) within 10 km

Wollomombi is the only Rural Village (RU5 Zones) located within 10 km of the proposed wind farm, with the following potential representative viewpoints:

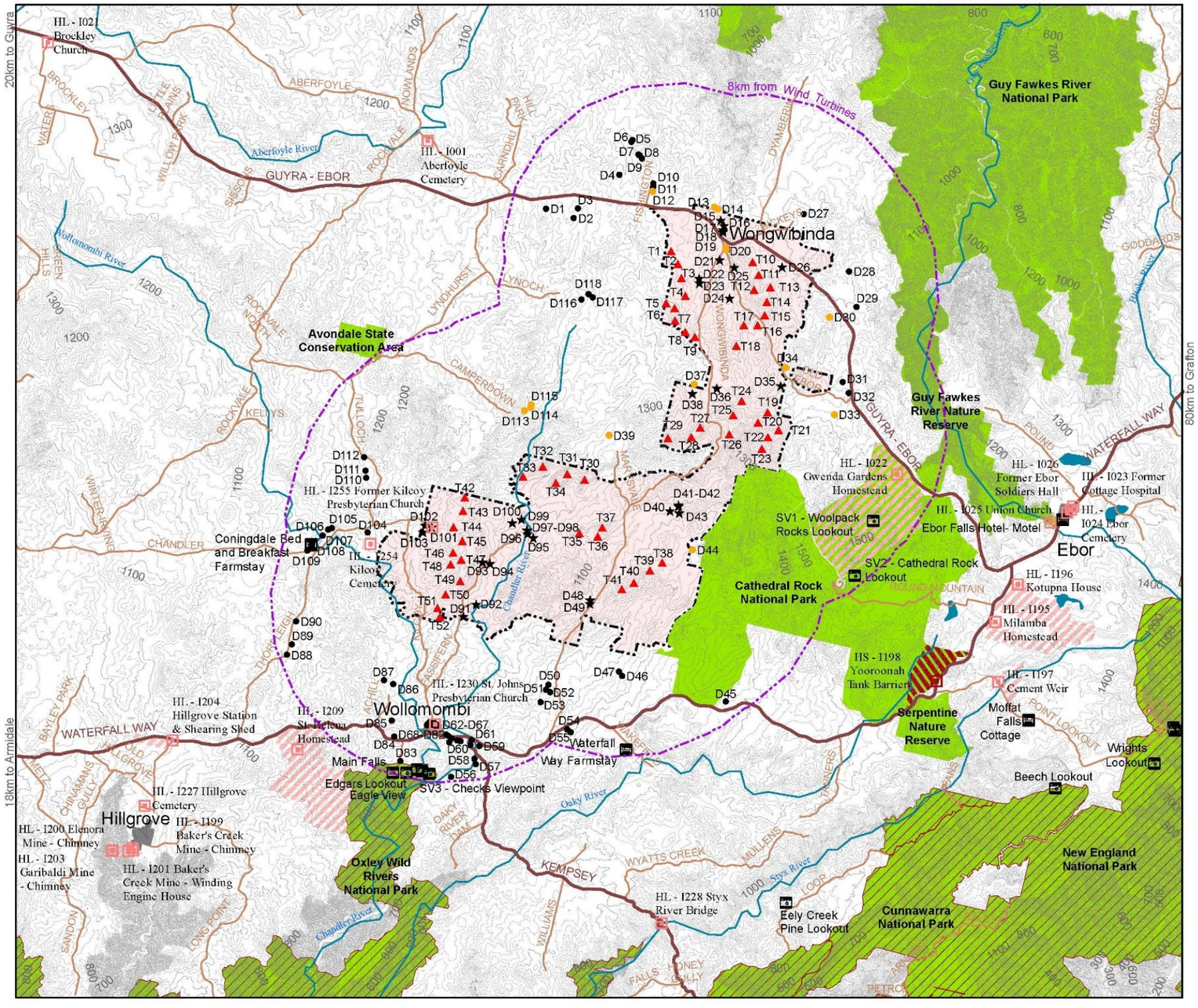
- Wollomombi, Intersection of Wollomombi Road & Kilcoy Road; and
- Wollomombi, Wollomombi Road between Wollomombi Hall and General Store.

Scenic or Recreational Viewpoints of National/State Significance within 10 km

Scenic or Recreational Viewpoints of National or State Significance in the Doughboy region within 10 km include:

- Edgars Lookout (Oxley Wild Rivers N.P. – World Heritage);
- Wollomombi Falls Lookout (Oxley Wild Rivers N.P. – World Heritage);
- Checks Viewpoint Lookout (Oxley Wild Rivers N.P. – World Heritage);
- Cathedral Rock Viewpoint (Cathedral Rock N.P.); and
- Woolpack Rocks Lookout (Cathedral Rock N. P.).

Figure 7 Subregional Dwellings and Key Viewpoints



GeoScience Australia [ecat.ga.gov.au], DPIE NSW
Datum: D-GDA_1994
Coordinate System: VicGrid (GDA94 Datum)

DOUGHBOY WIND FARM
Subregional Dwellings and Key Viewpoints

Legend

- Proposed Wind Turbines
- 8km from All Proposed Wind Turbines
- Non-associated Dwellings within 3.05 km of Turbines
- Non-associated Dwellings between 3.05 km and 8 km of Turbines
- Associated Dwellings
- Associated Landholder Properties
- Local Heritage Sites
- State Heritage Sites
- World Heritage
- National Parks & Reserves
- Scenic Viewpoints
- Tourism Accommodation Facilities
- Main Roads
- Unclassified Local Road
- Waterways
- Lakes & Reservoirs
- Rural Villages
- 20m Contours

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August 2020

Walking Tracks in State or National Parks or Natural Reserves within 10 km

- Chandler Walking (Wollomombi Falls area, Oxley Wild Rivers N.P. – World Heritage);
- Cathedral Rock Track (Cathedral Rock N.P.); and
- Barokee to Native Dog Creek Track (Cathedral Range N.P.).

Local Heritage Sites within the Armidale Regional Council within 10 km

Local Heritage Sites listed in the Armidale Dumaresq Local Environmental Plan (LEP) 2012 – Schedule 5 Environmental Heritage, Part 1 (Local)Heritage Items include:

- ''St. Helena' Homestead (HL-I209, Hillgrove, 3138 Grafton Rd. Lot 3, DP 1145435, Lots 9, 10, 12-18, 26, 32, 42, 53, 57, 58, 73, 75 and 96, DP 755828);

- Kilcoy Cemetery (HL-I254, Lyndhurst, 1568 Chandler Road, Lot 7302, DP 1146818);

- Former Kilcoy Presbyterian Church (HL-I255, Wollomombi, 1894 Chandler Rd., Lot 73, DP 751442); and

- St. John's Presbyterian Church (HL-1230, Wollomombi, 78 Wollomombi Village Rd., Lot 163, DP 751442).

Local Heritage sites gazetted under the Guyra Local Environmental Plan (LEP) 2012 – Schedule 5 Environmental Heritage, Part 1 (Local)Heritage Items include:

- Aberfoyle Cemetery (HL-I001, Aberfoyle, Aberfolyle Rd., Lot 7300, DP 1153423); and

- 'Gwenda Gardens' Homestead (HL-I022, Cathedral Rock N.P., Guyra-Ebor Rd., Lot 34, 'DP 751472);

Tourist and Visitor Accommodation Facilities within 10 km

Tourist and visitor accommodation facilities of note in the region include:

- Coningdale Bed & Breakfast Farmstay (near Kilcoy Cemetery)
- Waterfall Way Farmstay (Walker Road, south of Waterfall Way)

Other Potential Viewpoints within 10 km

Other potential viewpoints in relation to the proposed Doughboy Wind Farm include the following Main Roads:

- Waterfall Way (Grafton Rd.);
- Guyra-Ebor Road; and
- Kempsey Highway (south of Waterfall Way from Wollomombi to Kempsey or bottom edge of map).

There are no railways or navigable waterways within the region. No roads are classified Tourist Roads[15] in the region, however, Waterfall Way and Guyra-Ebor Road are promoted by the Armidale-Regional Council and regional Visitor Information Centres as a Tourist Drive[16].

5 COMMUNITY CONSULTATION FINDINGS

Epuron has conducted community consultations as described in the Scoping Report. This included a community consultation "drop-in" session at Sauer Memorial Hall in Wollomombi Village during the afternoon of 24 October 2019. Several information displays regarding the wind farm proposal were posted on the walls for viewing, including A1 colour display sheets for:

- the VIA Procedure Flow Chart;
- preliminary Regional Key Features;
- preliminary Public Viewpoints;
- preliminary Scenic Quality Class Frame of Reference;
- preliminary Scenic Quality Class Example Photos; and
- preliminary Scenic Quality Class map.

At the time of the Drop-In Session, the proposed locations of the wind turbines were not yet known, so the maps only showed the potential wind resource areas.

The Drop-In Session was attended by 27 residents from the area surrounding the proposed Doughboy Project Area. Epuron was represented by four of their own personnel plus two consultants (Margaret Harvie of PlanCom and Dr. Dennis Williamson of Geoscene International). Epuron have summarised the findings from the consultations in their Scoping Report. During Dr. Williamson's discussions with the local participants, there were general expressions of appreciation for the local landscape and views, but little mention of any specific landscape features of value to them. Mount Doughboy was mentioned by one person who lived near there.

The draft Scenic Quality Map, Frame of Reference Criteria and example photos of high, moderate, and low scenic quality provided the best form of feedback from the participants regarding scenic features and issues. In general, the comments received regarding the preliminary scenic quality assessment criteria and the scenic quality of local landscape features provided general support for Geoscene International's interpretation of how the landscapes and features rated and how they should be translated to a map of Scenic Quality Classes. There were no objections expressed toward this approach. As such, the Scenic Quality Class map presented at the community consultation sessions remains unaltered and is presented with a description of its rationale in Section 6.

15 Pursuant to the NSW Road Act 1993 and as listed under the Tourist Road Classification of the Schedule of Classified Roads and Unclassified Regional Roads, Version 11, April 2017. Weblink: https://www.rms.nsw.gov.au/business-industry/partners-suppliers/lgr/documents/classified-roads-schedule.pdf

16 Anon, date unknown. Tourist Drive 17, The Best of New England High Country, New England High Country Brochure. Weblinks: http://www.experiencethehighs.com.au/pdf/ScenicDrive17.pdf ; http://www.armidaletourism.com.au/maps-guides; https://walchansw.com.au/scenic-drives/ ; and https://www.uralla.com/Explore/Tourist-Drives . Accessed 28 August 2020.

6 LANDSCAPE CHARACTER TYPES AND SCENIC QUALITY CLASSES

6.1 Preliminary Landscape Character Types and Bioregions

The NSW Wind Energy Visual Assessment Bulletin requires the identification and description of the Landscape Character Types (LCTs) that influence the landscape features and Scenic Quality Classes assessment within and near proposed wind farm projects, as part of the full Visual Impact Assessment in the EIS stage. A preliminarily assessment of LCTs and Scenic Quality Class has been conducted early in this PVIA for scenic quality reference purposes. These LCTs are regional scale landscapes with common distinguishing landforms, major land cover patterns and landscape features such as water features, rock outcrops, and distinctive vegetation types or patterns. The LCTs and their features provide a "frame of reference" for the assessment of relative Scenic Quality Classes (e.g., high, moderate, and low scenic quality classes). The geology, soils and climate of the area also influence the landscape character and scenic quality of a landscape.

A combination of descriptive text and photographs can be used to provide a visual profile of the region, including what types of features or landscape phenomena are considered as typical, less common, rare, or unusual and outstanding. A frame of reference for scenic quality assessment can be prepared based on the degree of visual presence and aesthetic quality of specific landform, waterforms, and vegetation forms and patterns that may be seen in the landscape being assessed. Commonly used sources for identifying regional Landscape Character Types include:

- Learmonth, Nancy, and Andrew, 1971. *Regional Landscapes of Australia: Form, Function and Change*, Angus and Roberson Publishers, Sydney; and
- Australia's bioregional framework as delineated via the Interim Biogeographic Regionalisation for Australia (IBRA) maps[17].

In this case, the bioregional characteristics and boundaries provide a useful basis for the identification of Landscape Character Types.

6.2 Overview of IBRA Bioregions and Subregions[18]

IBRA Bioregions and Subregions

The IBRA defined New England Tableland Bioregion and North Coast Bioregion occur within the vicinity of the proposed Doughboy Wind Farm, as shown in Figure 8. Each of these bioregions is made up of several IBRA Subregions as listed in Table 1 and delineated in Figure 8 and Figure 9.

17 Interim Biogeographic Regionalisation for Australia (IBRA): https://www.environment.gov.au/land/nrs/science/ibra/australias-bioregions

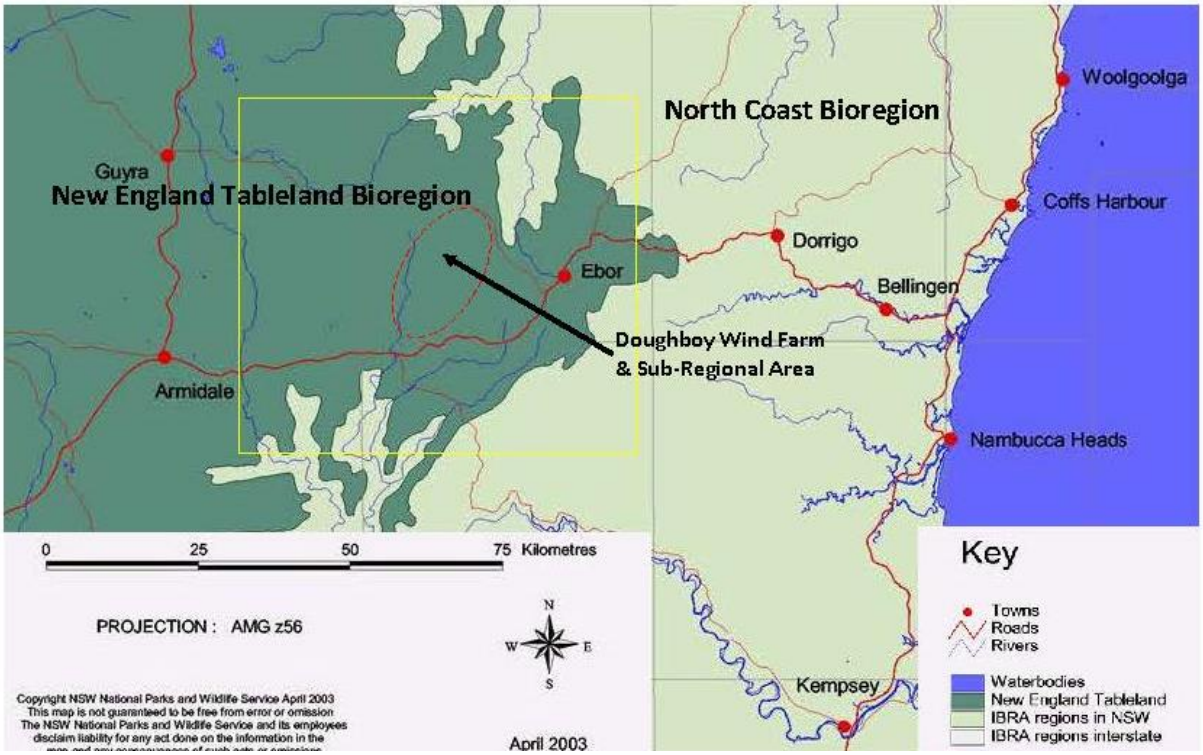
18 The information for this section has primarily been drawn from NSW National Parks and Wildlife Service, 2003, The Bioregions of New South Wales:their biodiversity, conservation and history – Chapter 13: The New England Tablelands Bioregion and Chapter 14: The North Coast Bioregion. NSW National Parks and Wildlife Service, Hurstville, NSW, 283+ pp.: https://www.environment.nsw.gov.au/resources/nature/newEnglandTableland.pdf.

Table 1 Surrounding IBRA Bioregions and Subregions

	IBRA Bioregions	
	New England Tableland	**North Coast**
IBRA Subregions	▪ Armidale Plateau ▪ Glenn Innes – Guyra Basalts ▪ Nightcap ▪ Wongwibinda Plateau ▪ Ebor Basalts ▪ Round Mountain	▪ Chaelundi ▪ Guy Fawkes ▪ Coffs Coast and Escarpment ▪ Maclaey Gorges

Twenty- nine of the proposed wind turbines are located within the Wongwibinda Plateau Subregion, and twenty-three turbines are within the Armidale Plateau Subregion, as shown in Figure 8.

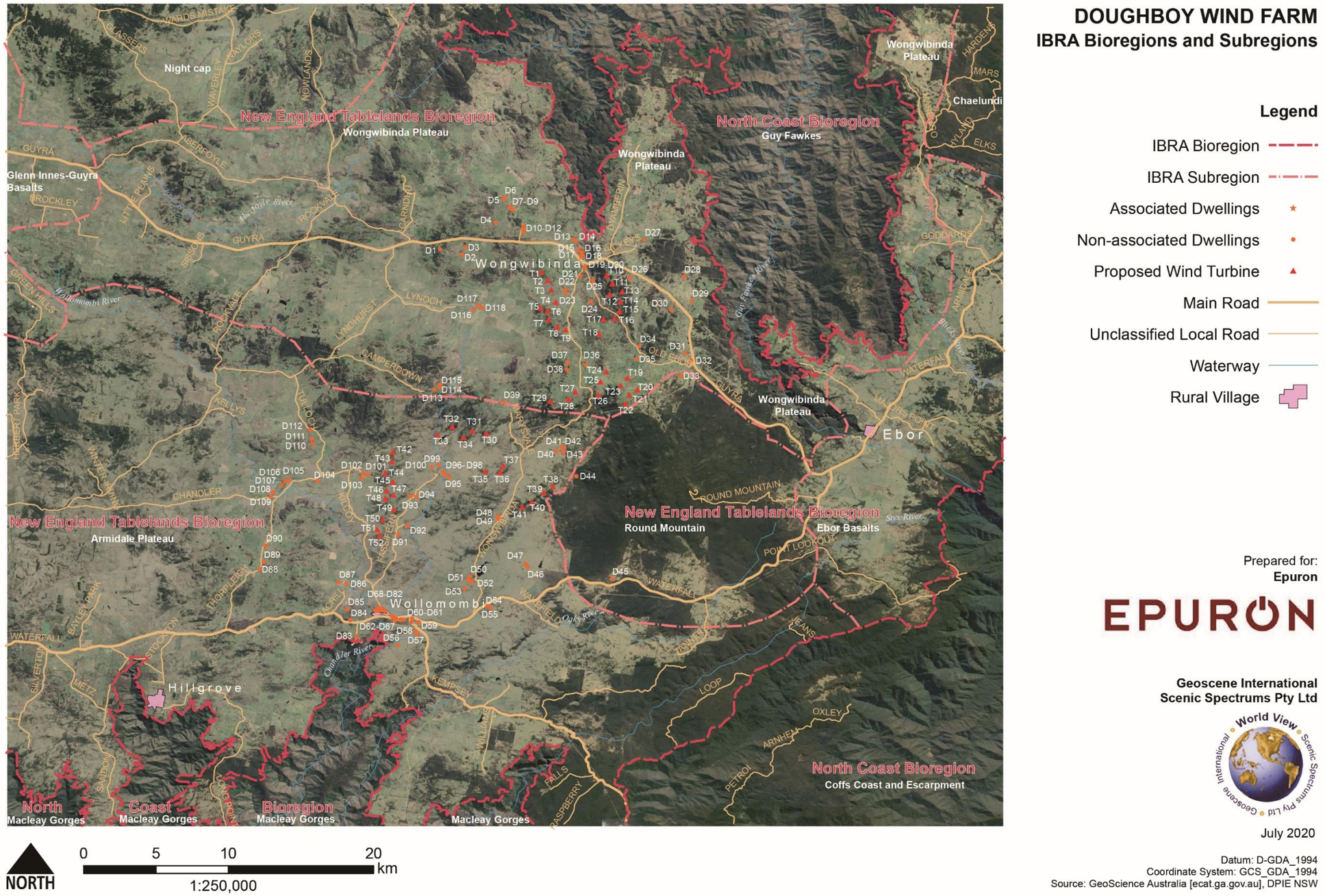
Figure 8 New England and North Coast Bioregions [19]



19 Adapted from:

- Department of Agriculture, Water and the Environment, Australia's Bioregions IBRA, IBRA A7 Map of Subregions: https://www.environment.gov.au/system/files/pages/5b3d2d31-2355-4b60-820c-e370572b2520/files/subregions-new.pdf
- NSW National Parks and Wildlife Service, 2003. The Bioregions of New South Wales:their biodiversity, conservation and history – Chapter 13: The New England Tablelands Bioregion. NSW National Parks and Wildlife Service, Hurstville, NSW, 283+ pp.: https://www.environment.nsw.gov.au/resources/nature/newEnglandTableland.pdf.

Figure 9 Surrounding IBRA Bioregions and Subregions[20]



DOUGHBOY WIND FARM
IBRA Bioregions and Subregions

Legend

- IBRA Bioregion
- IBRA Subregion
- Associated Dwellings
- Non-associated Dwellings
- Proposed Wind Turbine
- Main Road
- Unclassified Local Road
- Waterway
- Rural Village

Prepared for:
Epuron

EPURON

Geoscene International
Scenic Spectrums Pty Ltd

July 2020

Datum: D-GDA_1994
Coordinate System: GCS_GDA_1994
Source: GeoScience Australia [ecat.ga.gov.au], DPIE NSW

20 Adapted from: Department of Agriculture, Water and the Environment, Australia's Bioregions IBRA, IBRA A7 Map of Subregions: https://www.environment.gov.au/system/files/pages/5b3d2d31-2355-4b60-820c-e370572b2520/files/subregions-new.pdf; and; NSW National Parks and Wildlife Service, 2003. The Bioregions of New South Wales:their biodiversity, conservation and history – Chapter 13: The New England Tablelands Bioregion. NSW National Parks and Wildlife Service, Hurstville, NSW, 283+ pp.: https://www.environment.nsw.gov.au/resources/nature/newEnglandTableland.pdf

These IBRA Bioregions and Subregions serve as a foundational basis for the delineation and description of Landscape Character Types and for the development of Scenic Quality Classification criteria for the subregion surrounding the proposed Doughboy Wind Farm.

6.3 Landscape Character Types

Based on the IBRA Bioregions, two separate Landscape Character Types (LCTs) have been delineated within the Doughboy Wind Farm subregion:

- New England Tablelands LCT;
- and North Coast River Gorges LCT.

Minor variations have been made with the alignment of the southern portion of the Guy Fawkes Subregion boundary of the North Coast Bioregion in forming the North Coast River Gorges LCT boundary in that area. This LCT extends the North Coast Bioregion boundary to include the steeper gorge terrain of the Guy Fawkes River Gorge south to Ebor Falls. This anomaly is attributed to the fact that the IBRA boundaries were probably drawn at a much smaller scale than that used in delineating LCT boundaries for this report. The amended LCT boundaries reflect the landscape as it is viewed on the ground within the region, ensuring that:

- all large river gorges are contained within the North Coast River Gorge LCT; and
- all plateau and tablelands are within the New England Tablelands LCT.

Areas that are somewhat of an anomaly to the above groupings of river gorge and tableland landforms include:

- the Round Mountain Subregion occupied by Cathedral Rock National Park, which is classified as a plateau but is dominated by a combination of granitic extrusion and large sedgelands/wetlands, as well as more intact Eucalypt forests and woodlands within the surrounding heavily cleared basalt plateau landforms; and

- the Chaelundi Subregion, which is an uplifted forested hill landform that is technically part of the North Coast Bioregion but has been included within the New England Tablelands LCT for the purposes of the scenic analysis as the Chaelundi area is not bounded by the plateau rim and rises up from the New England Tablelands in a manner similar to the Round Mountain Subregion.

With the inclusion of the above two anomalies, the New England Tablelands LCT more generally reflects a more heavily modified agricultural grazing land plateau with two smaller incursions of intact or remnant Eucalypt forests and sedgelands. In contrast, the North Coast River Gorges LCT represents more heavily dissected river gorges with some more mountainous ridgelines and extensive areas of dry and wet sclerophyll forest and rainforest landscapes.

6.4 Scenic Quality Class Assessment

A search has revealed no existing landscape or scenic assessment studies within the subregion surrounding the proposed Doughboy Wind Farm that provide any useful information for the assessment of aesthetic landscape values or scenic quality for the purposes of this assessment.

A Scenic Quality Class Frame of Reference for the has been prepared which combines features of two identified Landscape Character Types (LCTs) that occur within the Doughboy Wind Farm Subregional area:

- New England Tablelands LCT; and
- North Coast River Gorges LCT.

Scenic Quality is an expression of the relative degree of visual beauty or aesthetic pleasure or preference that any landscape exhibits to human viewers. This is often considered to be a subjective assessment, often associated with the opinion that "beauty is in the eye of the beholder". However, both long established principles of the aesthetic arts and more recent scenic perception research studies have shown a large degree of consensus regarding the positive or negative effects of certain landscape features and dimensions and on the composition of view on peoples' perceptions of scenic quality.

Given the lack of objections to the preliminary scenic quality criteria and assessment displayed during the Community Drop-In Session at Wollomombi (refer to Chapter 3). Scenic Quality Class Frames of Reference have been prepared for the Doughboy Wind Farm subregion that reflect the community feedback, the IBRA Bioregion and Subregion descriptions, and as various scenic perception research findings, for example as those by Williamson and Chalmers[21], Kaplan and Kaplan[22], Green[23], Nassar[24], Phillips et. al.[25]. The body of environmental and scenic perception research is extensive, and it is not intended to review all the potentially relevant research findings in this report.

The Frame of Reference provides a descriptive qualitative framework or guide for the identification and mapping of key landscape features from both LCTs that contribute substantially to the relative scenic quality of the Doughboy Subregion. A single Frame of Reference is used because from certain viewpoints in one LCT, features of the other LCT may potentially be visible. Even though the broader landscape character and land use may vary, specific features within each LCT may display different classes of scenic quality which can be delineated on the same map of the study area.

21 Williamson, Dennis N. and Chalmers, John A., 1982. Perceptions of Forest Scenic Quality in Northeast Victoria: A Technical Report of Research Phases I and II. Landscape Management Series. Melbourne, Victoria: Forests Commission Victoria, 228 pp.

22 Kaplan, R. and Kaplan, S, 1989. The Experience of Nature: A Psychological Perspective. Cambridge, Massachusetts: Cambridge University Press, 340 pp.

23 Green, Ray, 2000. "Scenic and Town Character Assessment: A Methodology for Community Involvement" in Australian Planner Vol. 37 (1).

24 Nasar, Jack, 2001. "Images of Cities" in International Encyclopedia of the Social Behavioural Sciences. N.J. Smelser and P.B. Baltes (Eds.), pp. 1822-1825. Oxford, UK: Elsevier Science Ltd. Pergamon.

25 M.R. Phillips, A.M. Edwards, and A.T. Williams, 2010. "An incremental scenic assessment of the Glamorgan Heritage Coast, UK" in The Geographical Journal, Vol. 176, No. 4, December 2010, pp. 291–303, doi: 10.1111/j.1475-4959.2010.00361.x .

In doing this, an effort has been made to identify those types of features that are likely to be perceived as visually outstanding or above what may be commonly found in the regional landscape, as opposed to those types of features that may be commonly seen and occur repeatedly throughout the landscape. There may also be certain features that fall somewhat below the common features and scenic quality of the regional landscape, which may include such features as visually prominent landscape alterations (e.g., high voltage powerlines, larger mining areas, frequently disturbed pine plantations, etc.).

The Frame of Reference focuses on four types of landscape features, including:

- Landforms;
- Waterforms; and
- Vegetation (Flora)
- Cultural/Heritage Features and Alterations.

The scenic quality assessment is purposely applied in a broadscale manner to not be overly focused on numerous minor features. For a similar reason, rural villages are automatically considered as moderate scenic quality.

Cultural or heritage features have been included, however, unless they are of a relatively large scale visually, they are unlikely to be mapped given the size of area involved. In most cases, such features will not be located close to proposed wind turbines or other alterations, so they are unlikely to influence the ultimate Visual Influence Zones or Visual Performance Objectives. Heritage features that are listed as of Local or State Significance in the Council Land and Environment Plans or on the NSW Heritage Register have been identified and included as viewpoints for the visibility analyses, however.

Although the viewing of native fauna or wildlife is known to have a very positive influence on peoples viewing experience and perception of scenic quality, they are not included in the Frame of Reference due to the general lack of reliable date regarding the areas where they might be regularly viewed. The high variability and transient nature of wildlife presence also makes it difficult to delineate on a map. Hence, it has been deemed prudent to leave wildlife for ecological specialists to assess and to not include this factor in the Frame of Reference.

Table 2 shows the Frame of Reference for the assessment of High, Moderate and Low Scenic Quality Classes within the Doughboy Subregion.

Examples of landscapes with features and qualities that achieve the High, Moderate and Low Scenic Quality Classes identified in the Frame of Reference are shown in Figure 10.

Application of the assessment criteria to the Doughboy Subregion is shown on the Scenic Quality Class map in Figure 11.

Table 2 Scenic Quality Frame of Reference for the Doughboy Subregion

Landscape Features	Scenic Quality Class		
	High Scenic Quality	**Moderate Scenic Quality**	**Low Scenic Quality**
Landforms	▪ Isolated peaks or tabletop hills. ▪ Distinctive stepped plateau terraces or escarpments. ▪ Large or distinctive rock outcrops or boulders (granite or basalt flow extrusions/columns). ▪ Remnant but well-defined volcanic cones or basalt plugs. ▪ Distinctive lunettes. ▪ Well defined, steep sided hills, valley escarpments and gullies.	▪ Rounded hills, ridges and peaks that are not visually dominant or distinctive. ▪ Broad shallow valleys. ▪ Moderately deep or steep gorges/gullies and valley walls. ▪ Minor rock outcrops.	▪ Large expanses of indistinctly dissected or unbroken landforms that provide little illusion of spatial definition or landmarks with which to orient.
Vegetation	▪ Strongly defined patterns with combinations of eucalypt forest, naturally appearing openings, streamside vegetation and/or scattered exotics. ▪ Distinctive stands of vegetation, including dry sclerophyll, wet sclerophyll, or rainforest, that may create unusual forms, colours or textures in comparison to surrounding vegetation. ▪ Areas of vegetation with dramatic displays of seasonal colour.	▪ Predominantly open sclerophyll forest or woodland combined with some natural openings in patterns that offer some visual interest. ▪ Vegetative stands that exhibit a range of size, form, colour, texture and spacing.	▪ Extensive areas of similar vegetation, such as grasslands with limited variation in colour and texture.
Waterforms	▪ Visually prominent large lakes, reservoirs, rivers, streams, or wetlands	▪ Moderately sized permanent or intermittent streams, lakes, rivers, wetlands, and reservoirs.	▪ Small to absent permanent or intermittent streams, lakes, reservoirs, or wetlands.
Cultural/ Heritage Features and Alterations (Visual Only)	▪ Very prominent, unique, or extensive visual influence of cultural heritage features reflecting local history through built forms and structures such as farm buildings, kilns, stone walls, fences etc. with traditional/ historic architecture styles that visually enhance the landscape. ▪ Very prominent and extensive visual influence of contemporary cultural features and built forms of positive or high scenic value to the community. ▪ Visually distinctive introduced or exotic vegetative patterns created through human altered land uses, including native or exotic tree rows (wind breaks), hedgerows, feature trees, paddocks, croplands, orchards, vineyards, and plantations creating patchwork effects of colour, texture and form that are visually prominent over moderate to larger areas of the landscape.	▪ Moderate visual presence and influence of cultural heritage features reflecting local history through built forms and structures such as farm buildings of architectural styles not particularly unique or notably positive within the surrounding landscape. ▪ Moderate visual presence and influence of contemporary cultural features and built forms of high scenic value to the community. ▪ Visually notable but not visually distinctive or prominent introduced or exotic vegetative patterns created through human altered land uses, including native or exotic tree rows (wind breaks), hedgerows, feature trees, paddocks, croplands, orchards, vineyards, and plantations creating patchwork effects of colour, texture and form.	▪ Little to no visual presence and influence of cultural heritage features reflecting local history or contemporary cultural features of high scenic value to the community as reflected through built forms and structures. ▪ Areas with extensive high density urban, industrial, and mining areas, or utility land uses (e.g. high voltage electricity powerlines, dam walls, etc.) with visually dominant structures and extensive absence of native trees and other positive landscape features.

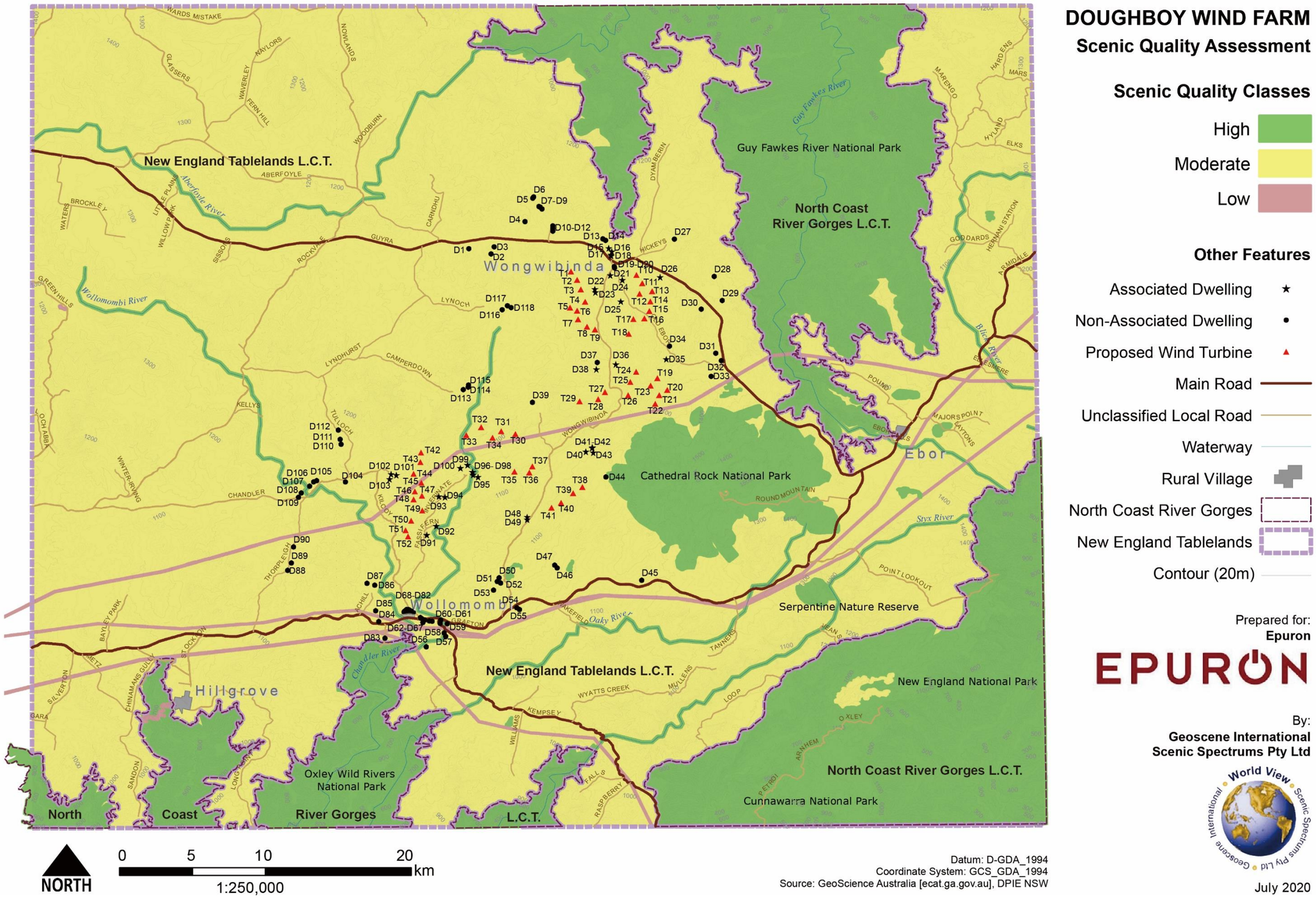
Figure 10 Examples of High, Moderate and Low Scenic Quality Class Landscapes

High Scenic Quality Class

Moderate Scenic Quality Class

Low Scenic Quality Class

Figure 11 Scenic Quality Classes



DOUGHBOY WIND FARM
Scenic Quality Assessment

Scenic Quality Classes

- High
- Moderate
- Low

Other Features

- Associated Dwelling ★
- Non-Associated Dwelling •
- Proposed Wind Turbine ▲
- Main Road
- Unclassified Local Road
- Waterway
- Rural Village
- North Coast River Gorges
- New England Tablelands
- Contour (20m)

Prepared for:
Epuron

By:
Geoscene International
Scenic Spectrums Pty Ltd

Datum: D-GDA_1994
Coordinate System: GCS_GDA_1994
Source: GeoScience Australia [ecat.ga.gov.au], DPIE NSW

July 2020

The Doughboy Subregion is dominated by typical New England Tableland landscapes in which cleared agricultural grazing lands of Moderate Scenic Quality predominate. The principal exception within this LCT is the Cathedral Rock National Park, where the uplifted plateau nature of Round Mountain, its extruded granite rock outcrops, its extensive Eucalypt forests, woodlands and sedgelands stand out as an island of High Scenic Quality within the surrounding agricultural plateau.

The North Coast River Gorges LCT generally occupy the fringes of the Doughboy Subregion and have been assessed as predominantly High Scenic Quality due to the dramatic gorge terrain and the mosaics of dry sclerophyll, wet sclerophyll, and rainforest vegetation cover. There are only a few isolated areas within this LCT that have been assessed as of Moderate Scenic Quality. These are areas where the forest and woodland clearing of the tablelands has been extended into the fringes of Guy Fawkes Subregion or the Coffs Coast & Escarpment Subregion southwest of the Styx River in the New England National Park. Low Scenic Quality areas have been limited to the 330 kV and 130 Kv electricity transmission lines that extend across the Doughboy Subregion from east to west.

Additional reference photos displaying some of the landscape features and scenic qualities discussed above are provided in Addendum 3.

7 VISUAL MAGNITUDE ANALYSIS OF PROPOSED WIND TURBINES

7.1 Analysis of Viewpoints within Visual Magnitude Distances

As stated in Section 2.1 the PVIA Visual Magnitude assessment relies on identifying proposed wind turbines that are sited within the black line distance of Figure 2, set based on variable wind turbine heights. As applied to the proposed 230 m high Doughboy wind turbines, the relevant distance is 3.05 km.

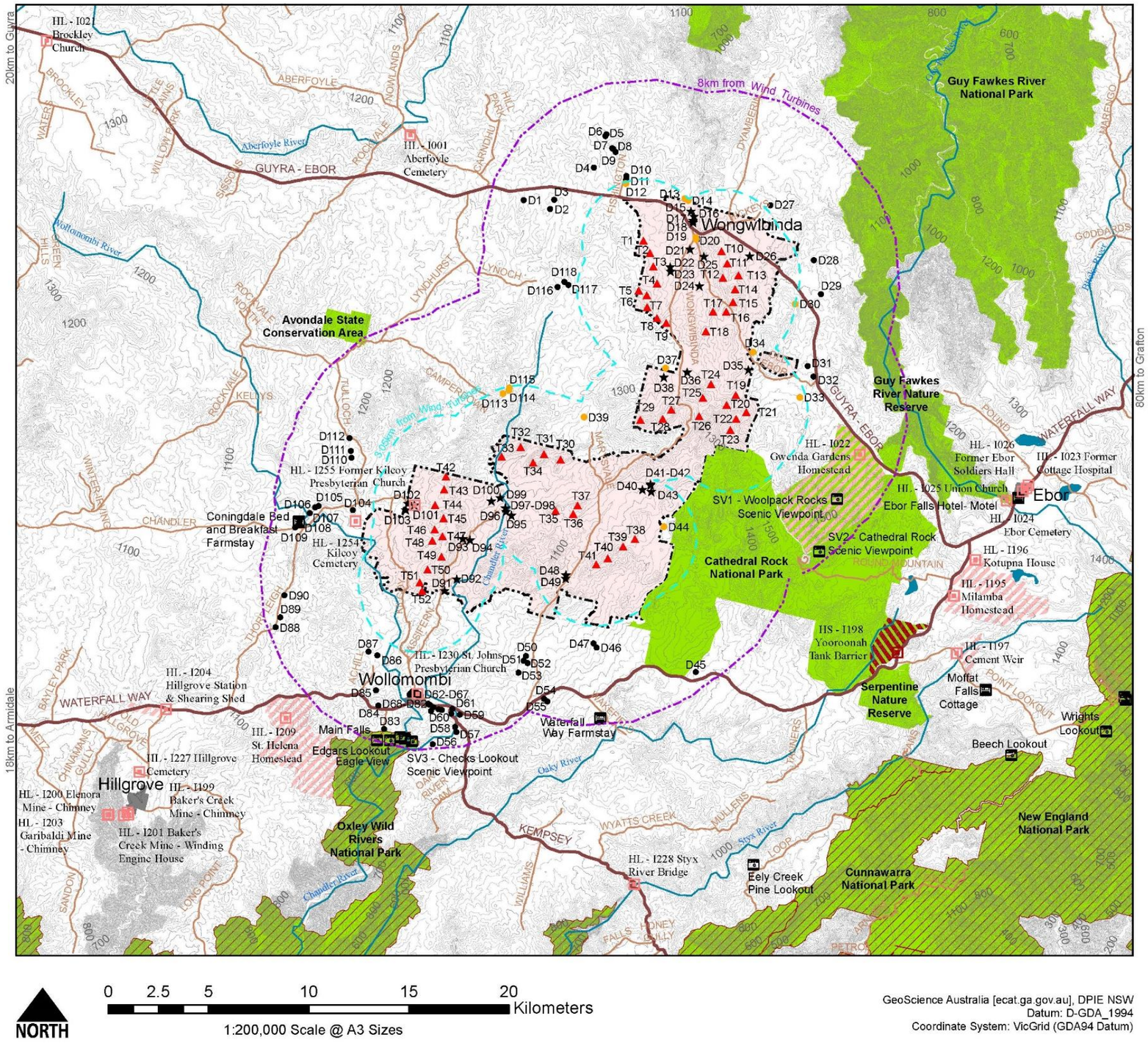
Non-associated dwellings and key viewpoints located at or within 3.05 km of the proposed wind turbines are listed in Table 3, along with their distance from the nearest wind. The key viewpoints, non-associated dwellings and associated dwellings located between the proposed turbines and 3.05 km (including at 3.05 km) are shown in Figure 12, as well as within the 8 km distance in relation to Visual Magnitude for some potentially sensitive key viewpoints and in relation to the Multiple Wind Turbine Effects analysis (presented in Section 8).

To provide the 3.05 km Distance Analysis of viewpoints in relation to individual turbines, Addendum 1 includes maps of greater detail for each of the eight wind turbine clusters shown on Figure 12, including:

- Cluster A: T1 – T9
- Cluster B: T10 – T18
- Cluster C: T19 – T26
- Cluster D: T27 – T29
- Cluster E: T30 – T34
- Cluster F: T35 – T37
- Cluster G: T38 – T41
- Cluster H: T42 – T52

The findings in Table 3 indicate that 15 dwellings and key viewpoints are located within ~1 km to 3.05 km from the nearest proposed wind turbines. Eleven wind turbines have been identified as the nearest to these dwellings and key viewpoints. These represent spatial distances only and do not consider potential screening by terrain and vegetation, which will be addressed as part of a full VIA during the EIS stage.

Figure 12 Subregional Dwellings and Key Viewpoints within Designated Distances



GeoScience Australia [ecat.ga.gov.au], DPIE NSW
Datum: D-GDA_1994
Coordinate System: VicGrid (GDA94 Datum)

DOUGHBOY WIND FARM

Subregional Key Features, Dwellings and Key Viewpoints

Legend

- Proposed Wind Turbines
- 3.05km from All Proposed Wind Turbines
- 8km from All Proposed Wind Turbines
- Non-associated Dwellings within 3.05 km of Turbines
- Non-associated Dwellings between 3.05 km and 8 km of Turbines
- Associated Dwellings
- Associated Landholder Properties
- Local Heritage Sites
- State Heritage Sites
- World Heritage
- National Parks & Reserves
- Scenic Viewpoints
- Tourist Accommodation
- Main Roads
- Unclassified Local Road
- Waterways
- Lakes & Reservoirs
- Rural Villages
- 20m Contours

Prepared for:

EPURON

By:

Geoscene International
Scenic Spectrums Pty Ltd

August 2020

Table 3 Viewpoints within 3.05 km Distance of Proposed Wind Turbines[26]

Non-Associated Dwellings	Key Public Viewpoints	Approximate Distance to Nearest Turbine (km)	Turbine ID No.
D12		2.96 km	T1
D13		2.91 km	T1
D14		2.97 km	T1
D19		1.44 km	T10
D20		1.39 km	T10
D30		3.05 km	T14 and T15
D33		2.75 km	T20
D34		2.30 km	T19
D37		2.09 km	T27
D39		2.36 km	T30
D44		1.56 km	T38
	HL I255 (Former Kilcoy Presbyterian Church)	1.02 km	T44
D113		2.77 km	T32
D114		2.84 km	T32
D115		2.97 km	T32

7.2 Future Visibility Analysis in the EIS Stage

The non-associated dwelling and key viewpoints listed above have been assessed based on their physical distance to proposed wind turbines and not on visibility. Terrain and vegetation screening effects will be assessed further during the EIS stage, which may find some of the above viewpoints will not have unobstructed views of the proposed wind turbines.

During the EIS stage, visibility assessments from all necessary dwellings will be applied according to the Bulletin's full VIA steps during the EIS stage of assessment.

8 MULTIPLE WIND TURBINE EFFECTS

8.1 Application of Multiple Turbine Analysis

The Applied Procedure

The Multiple Wind Turbine Effects tool, referred to following as the Multiple Turbine Analysis (MTA), has been applied to the proposed Doughboy Wind Farm using the PVIA guidelines described in Section 2.1. Geoscene International's methodology selects approximately 25 viewpoints with a wide range of geographic positions and distances in relation to the proposed turbines and project area terrain. These viewpoints are selected to reflect worse-case and best-case scenarios. The findings from the 25 viewpoints may be extrapolated to the remaining viewpoints, where it is obvious that no further viewpoints would have wind turbines in more than two 60° sectors at or within 8 km.

26 The distances indicated are geometric distances only, measured using Google Earth, and do not indicate the level of visibility given potential topographic and vegetative screening of the line-of-sight. Such visibility analysis would be conducted during the EIS stage of assessment.

Viewpoints Selected for Analysis

The 25 viewpoints selected for the MTA assessment are shown in Figure 13 and are analysed in Table 4. Example MTA maps are displayed in Figure 14. Analysis maps for each of the 25 viewpoints are included in Addendum 2, showing those 60°sectors that would be likely visible based on terrain only visibility analysis.

The findings shown in Table 4 indicate that seven non-associated dwellings and key viewpoints have wind turbines proposed within three or more 60° sectors, including:

- D19
- D20
- D34
- D37
- D39
- D44
- D114

Other known existing or planned wind farm developments are located more than 16 km from the proposed Doughboy wind turbines, placing them out of range of the area to be assessed using the Multiple Wind Turbine Tool.

8.2 Future Visibility Analysis in the EIS Stage

Varying degrees of turbine visibility from all 25 viewpoints analysed will occur, depending on to the unique topographic and vegetative screening conditions of individual viewpoints, which is to be assessed during the EIS assessment.

The viewpoint positions assessed here will be reviewed and amended during the EIS stage of the assessment, particularly in the selection of photo points for production of photomontages during the EIS stage, as outlined in the Bulletin.

9 CONCLUSIONS

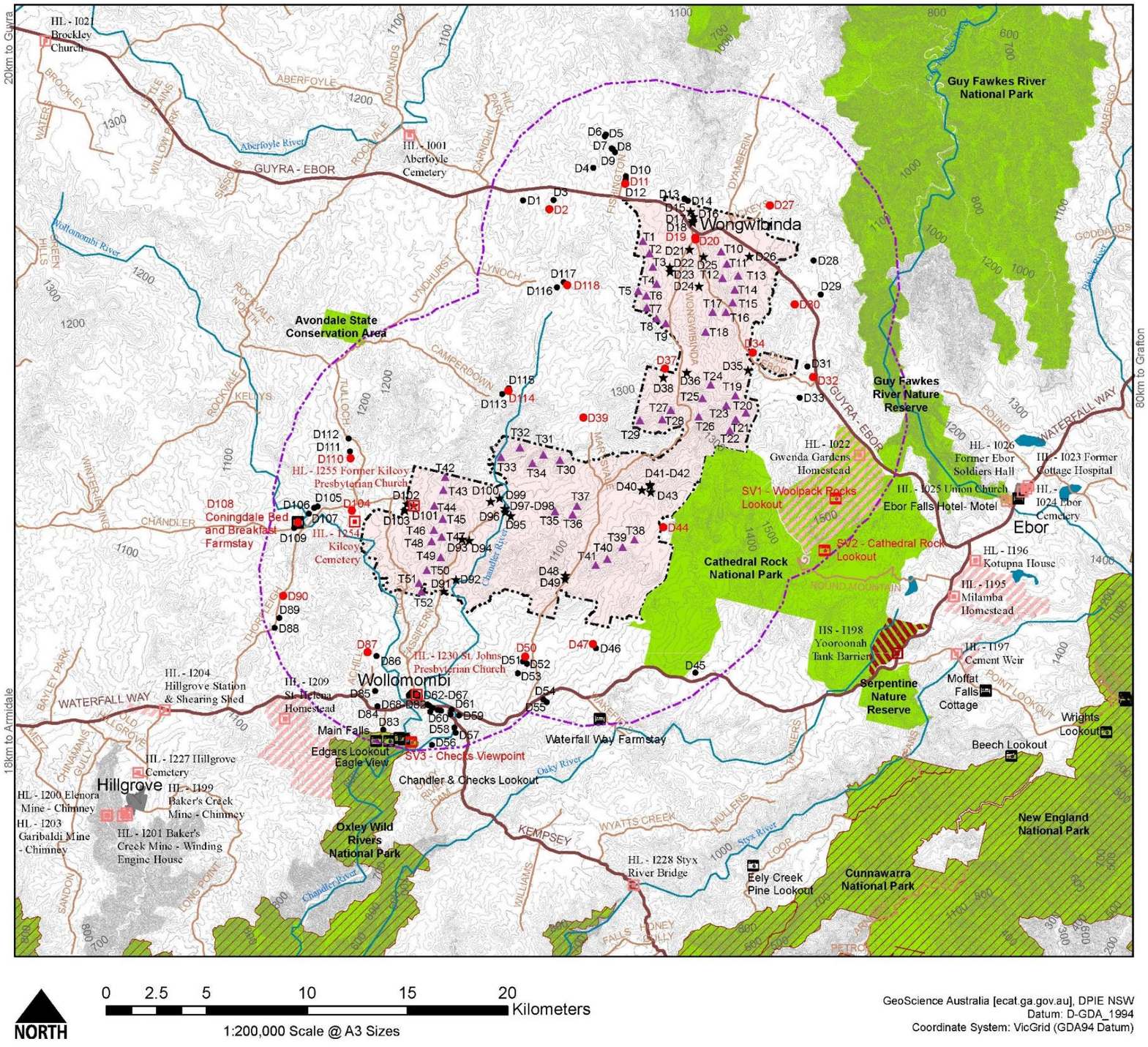
9.1 Preliminary Visual Assessment and Analyses Completed

This PVIA has applied the visual assessments required by the NSW Department of Planning, Infrastructure and Environment in its Wind Energy Visual Assessment Bulletin, as well as some additional analysis brought forward from the full VIA that may otherwise be done during the EIS stage.

The Doughboy Wind Farm has been examined in terms of its Regional and Subregional landscape features and scenic quality within the context of the Tablelands and the North Coast River Gorges Landscape Character Types. Scenic perception research has been reviewed and the community has been consulted regarding those landscape features and scenic qualities. The Scenic Quality Class map reflects these values.

The assessment finds the area in and surrounding the proposed wind farm is predominantly of a Moderate Scenic Quality Class. In the surrounding region the larger rivers and streams, such as the Chandler River, and the more outstanding rock outcrops and extensive wetlands in the Cathedral Rocks National Park are classified as of High Scenic Quality. Few Low Scenic Quality areas exist, the most major being associated with high voltage electricity transmission lines and with mining sites in the Hillgrove area.

Figure 13 Viewpoints Selected for Multiple Wind Turbine Effects Assessment



DOUGHBOY WIND FARM
Multiple Turbine Analysis Viewpoints

Legend

- Multiple Turbine Analysis Viewpoints
- 8km from All Proposed Wind
- Non-Associated Dwellings within 8 km
- Proposed Wind Turbines
- Associated Dwellings
- Associated Landholder Properties
- Local Heritage Sites
- State Heritage Sites
- World Heritage
- National Parks & Reserves
- Scenic Viewpoints
- Tourism Accommodation
- Main Roads
- Unclassified Local Road
- Waterways
- Lakes & Reservoirs
- Rural Villages
- 20m Contours

Prepared for:

EPURON

By:

Geoscene International
Scenic Spectrums Pty Ltd

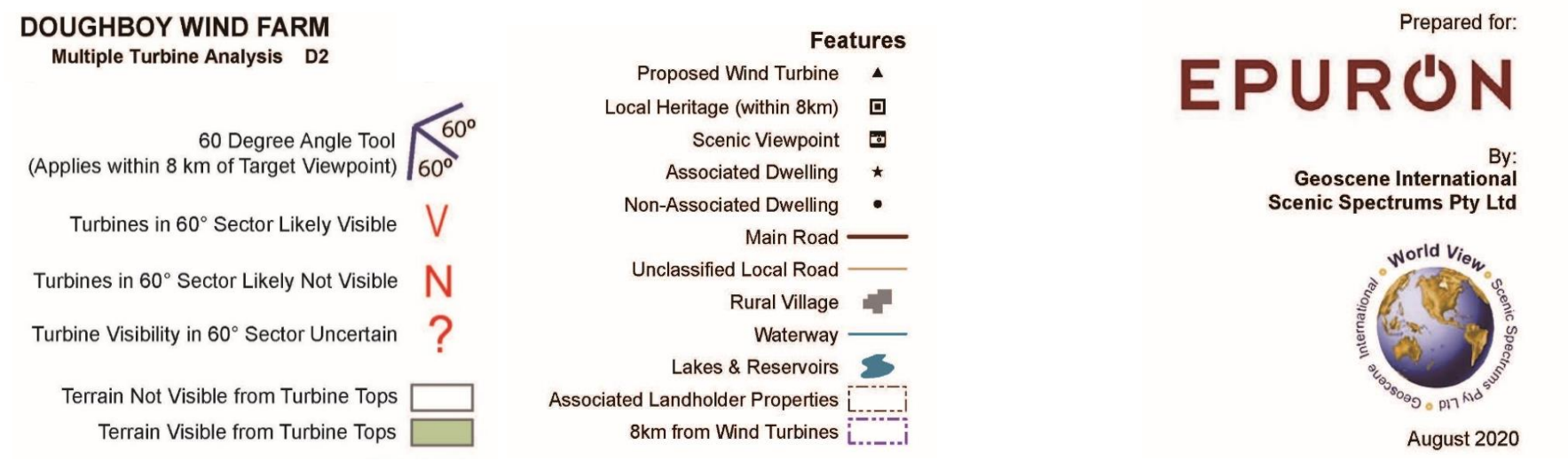
August 2020

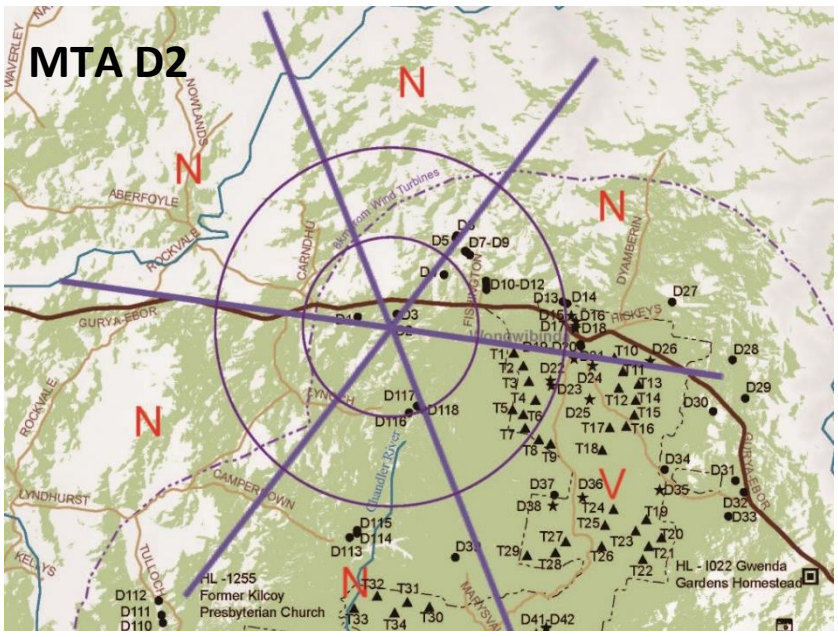
Table 4 Multiple Turbine Analysis Summary

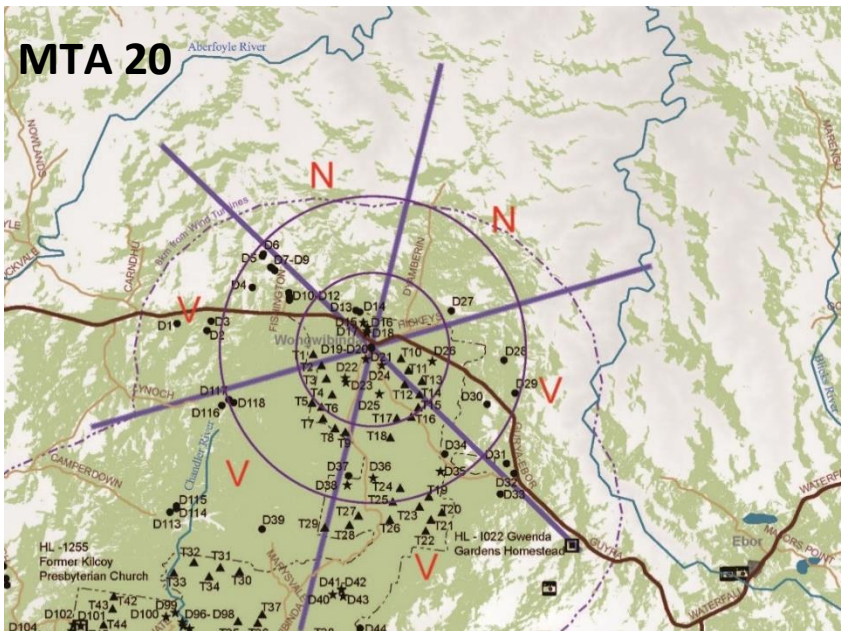
Viewpoint No.	Wind Turbines within 8 km of MTA Viewpoint	No. of 60° Sectors with Wind Turbines within 8 km of Viewpoint	General Distance Ranges of Turbines within 8 km
D2	T1 – T7	1	~ 6 --8 km
D12	T1 – T13	1	3 – 8 km
D19	T1 – T7, T10 – T15, T16 – T18, T8, T9 and T24	3	~ 2 – 5 km
D20	T1, T2 – T9, T10, T11, T13, T14, T12, T15 – T18, T19, T24, T25	4	~2 –8 km
D27	T1 – T4, T10 - T18,	1	~3 – 8 km
D30	T4, T8 – T18, T19 – T26	1	3 – 8 km
D32	T11 – T26	2	4 – 8 km
D34	T2 – T4, T10 - T17, T5 – T9, T18, T29. T19 – T28	3	2 – 8 km
D37	T1-T12, T13 – T18, T19 – T26, T27 – T29	4	2 – 7 km
D39	T4 – T9, T18, T24 – T29, T31 – T35, T36 – T41	4	2 – 8 km
SV1[27]	T19 – T23	1	6 – 8 km
SV2[28]	T22	1	8 km
D44	T20 – T22, T19, T23 – T29, T30, T31, T35 – T37, T38 – T41	4	1 – 8 km
D47	T35 – T41	1	~4 – 7 km
D50	T35 – T37, T39 – T41, T47 – T52	2	6 - 8
HL I230[29]	T47 – T52	1	~5 – 8 km
D87	T45 – T52	1	4 – 8 km
D90	T50 – T52	1	~ 8 km
HL I254[30]	T42 – T50, T51, T52	2	4 – 6 km
HL – I255[31]	T42 –T44, T45 – T50, T51 - T52	2	1 –5 km
D104	T42 – T50, T51 – T52	2	4 – 6 km
D108[32]	T44, T46, T48, T50 – T52	1	~ 8 km
D110	T42 – T52	1	4 – 8 km
D114	T30 – T31 T34 – T37, T32 – T33, T42 – T47	3	3 – 8 km
D118	T1 – T9, T29,	1	4 – 8 km

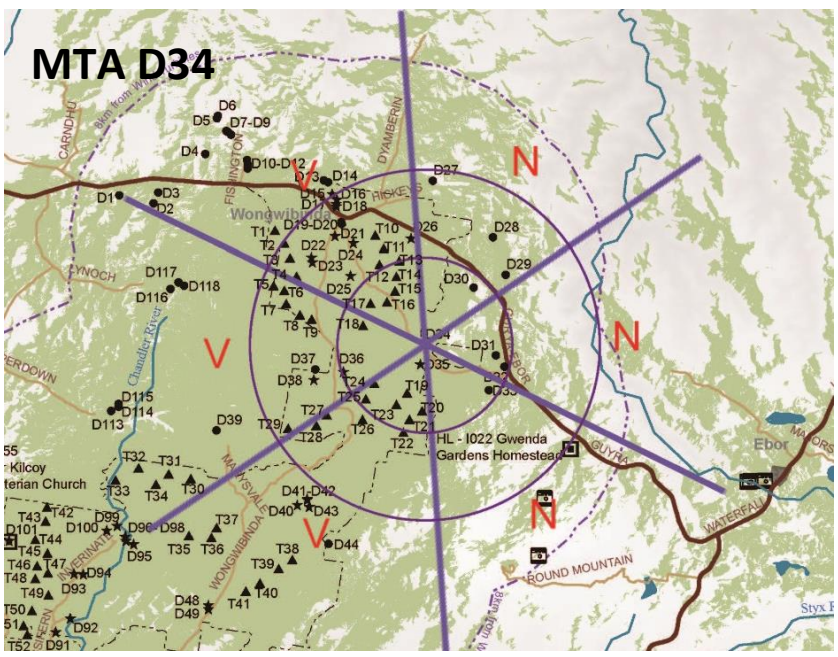
27 Scenic Viewpoint 1 - Woolpack Rocks, Cathedral Rock National Park
28 Scenic Viewpoint 2 – Cathedral Rock, Cathedral Rock National Park
29 Local Heritage Site Item 230 – St. John's Presbyterian Church, Wollomombi Village
30 Local Heritage Site Item 254 – Kilcoy Cemetery, Kilcoy
31 Local Heritage Site Item 255 – Former Kilcoy Presbyterian Church, Kilcoy
32 Dwelling D108 – Coningdale Bed and Breakfast Farmstay.

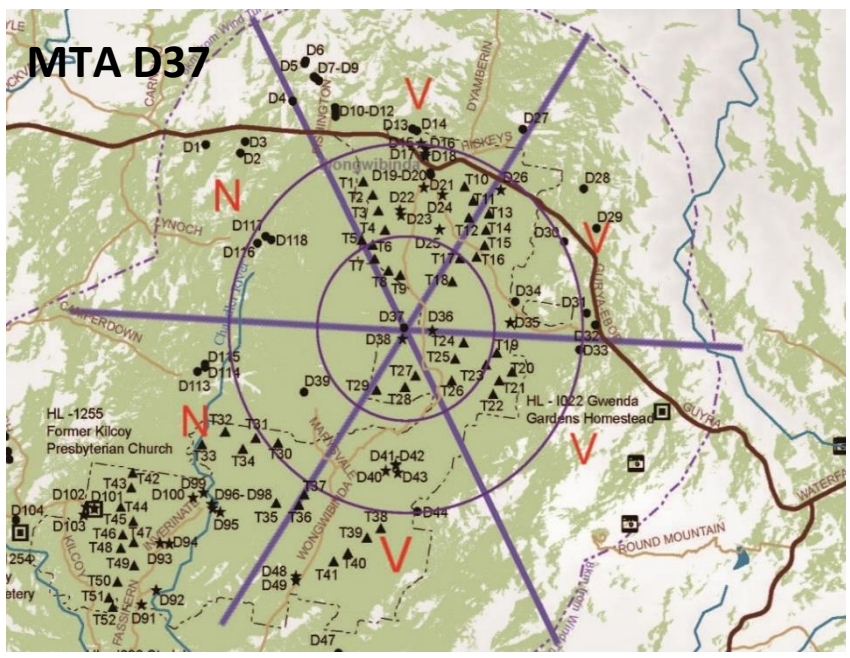
Figure 14 Multiple Turbine Analysis Maps - Example Viewpoints[33]

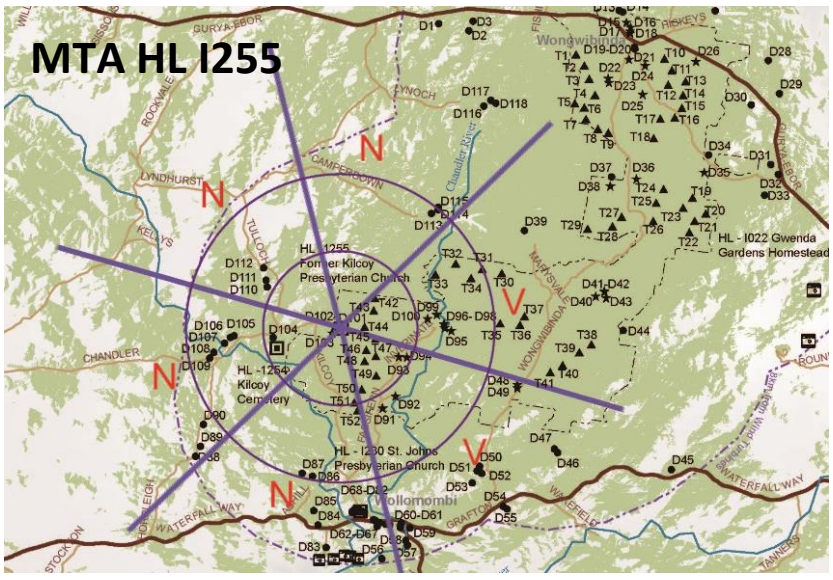


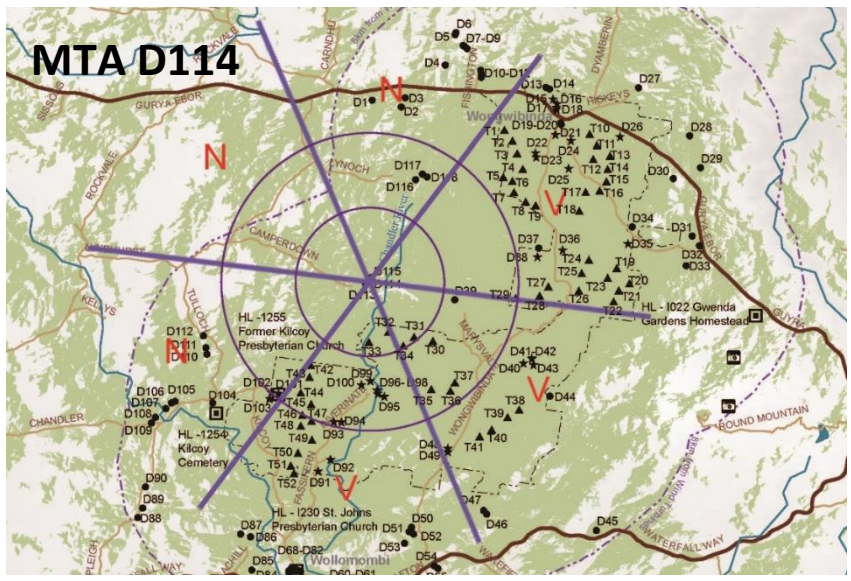












33 Refer to Appendix 5 for Multiple Turbine Effects Analysis Maps for all 25 viewpoints analysed.

A wide range of dwellings and key public viewpoints have been identified for consideration, including rural villages, 118 associated and non-associated dwellings, heritage sites of state and local significance, scenic viewpoints and walking tracks in National Parks and nature reserves, and tourist accommodation facilities. A network of roads, from main roads to unclassified local roads have also been identified but have not been considered in the viewpoints analysed. Further EIS assessment will be required to classify these viewpoints in terms of Viewer Sensitivity Levels.

Computerized visibility-distance zone analyses and consideration of the potential terrain and vegetative screening effects on visibility have not been included in this report. That level of analysis will be performed during the full VIA analysis as part of the EIS stage of assessment.

Two PVIA tools (or selected Visual Performance Standards) have been applied as required:

- The Visual Magnitude assessment tool; and
- The Multiple Wind Turbine Effects assessment tool.

This PVIA provides a basic, preliminary assessment of the potential visual effects of the proposed Doughboy Wind Farm. Further analysis, particularly regarding visibility analysis that take potential screening of views by the terrain and by vegetation will be undertaken during the EIS stage. At that time, further field visits to selected dwellings and other critical viewpoints, as well as selective photomontage preparation and analysis, are recommended to provide the more detailed visibility analysis and visual effects assessment.

9.2 Visual Magnitude Effects

The PVIA Visual Magnitude assessment has been presented in Section 7.1. It relies on identifying proposed wind turbines that are sited within the black line distance 3.05 km for the proposed wind turbines of 230 m high, as shown in Figure 2.

The analysis of the 3.05 km distance presented in Figure 12 and Table 3 finds one heritage site of local significance and 14 non-associated dwellings located at or within 3.05 km of proposed wind turbines.

9.3 Multiple Wind Turbine Effects

Selected Viewpoints Identified with Turbines in Three or More 60 Sectors within 8 km

Twenty-five viewpoints were selected for the Multiple Turbine Analysis (MTA) assessment as shown in the Figure 13 and analysed in Table 4.

The findings shown in Table 4 indicate that seven non-associated dwellings and key viewpoints have wind turbines proposed in three or more 60° sectors and within 8 km of the viewpoints, including:

- D19
- D20
- D34
- D37
- D39
- D44
- D114.

Varying degrees of turbine visibility from all 25 viewpoints analysed for Multiple Wind Turbine Effects will occur, depending on to the unique topographic and vegetative screening conditions of individual viewpoints, which is to be assessed in greater detail during the EIS assessment.

Future EIS Stage Visibility and Multiple Turbine Analysis

The NSW Wind Energy Visual Assessment Bulletin requires further detailed consideration of the potential cumulative impacts of these viewpoints and the proposed wind turbines potentially visible from these viewpoints during the full VIA in the EIA stage.

9.4 Concluding Remarks

This PVIA assessment has found that the proposed Doughboy Wind Farm would be developed within a pastoral Tableland landscape of Moderate Scenic Quality. This landscape presents subtle but visually complex variations in terrain and vegetation pattern conditions. These variations will affect the visibility of turbines identified through the PVIA Visual Magnitude and Multiple Wind Turbine Effects analyses as presented in this report. Such visibility analyses would be conducted during the EIS stage with a full VIA assessment. Within this context, the following key findings have been made.

1. The PVIA Visual Magnitude analysis finds one heritage site of local significance and 14 non-associated dwellings are located within 3.05 km of proposed wind turbines, in a range from ~1 km to 3.15 km.

2. The PVIA Multiple Wind Turbine Effects analysis shows that 7 non-associated dwellings and key viewpoints have proposed wind turbines potentially visible within three or more 60° sectors and within 8 km of the viewpoints.

3. Altogether, 15 non-associated dwellings or key viewpoints have been identified as potentially sensitive due to their locations within the PVIA 3.05 km Visual Magnitude distance of proposed turbines, or with three or more 60° viewing sectors with turbines located within the 8 km distance. These viewpoints include:

   - D12
   - D13
   - D14
   - D19
   - D20
   - D30
   - D33
   - D34
   - D37
   - D39
   - D44
   - D113
   - D114
   - D115
   - HL – I255 (former Kilcoy Presbyterian Church).

4. The above identified viewpoints may require further field analysis, visibility analysis and consultation during the full VIA and EIS stage to consider in further detail the potential screening of views to the proposed turbines by terrain or vegetation.