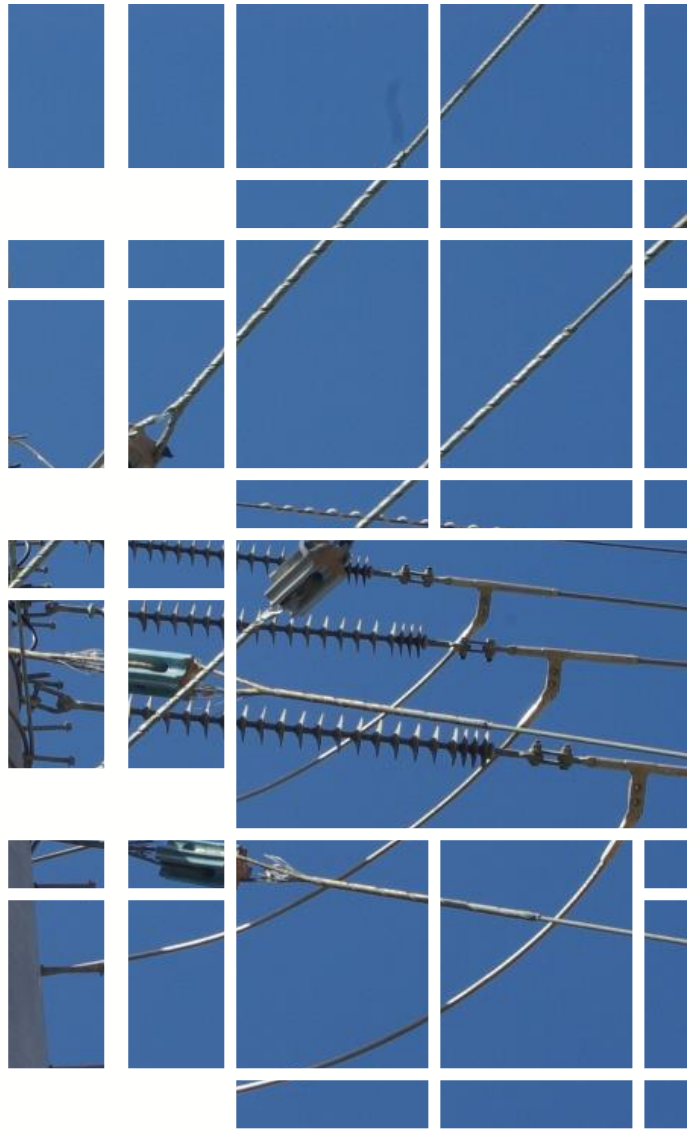




Newtricity Biala Wind Farm Electricity Network Connection and Line Route Options

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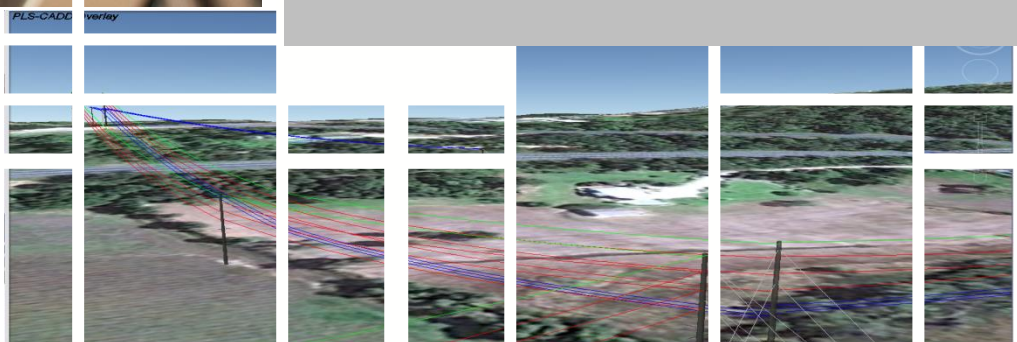


Table of Contents

1.	INTRODUCTION.....	4
2.	ELECTRICITY NETWORK CONNECTION.....	5
2.1	CUSTOMER CONNECTION ENQUIRY	5
2.2	PROPOSED NETWORK CONNECTION	5
2.3	EXISTING ESSENTIAL ENERGY NETWORK.....	6
2.4	PROPOSED 132 KV NETWORK CONNECTION	7
3.	APPROVAL PROCESS.....	7
4.	ESSENTIAL ENERGY CONNECTION PROCESS	9
5.	TYPICAL ESSENTIAL ENERGY 132 KV TRANSMISSION LINE	9
6.	ANALYSIS METHODOLOGY	11
7.	LINE ROUTE CORRIDOR OPTIONS	12
7.1	OPTION 1 - WEST CORRIDOR	12
7.2	OPTION 2 - EAST CORRIDOR	15
7.3	SUMMARY	18
8.	TRANSMISSION LINE ELECTRIC AND MAGNETIC FIELDS	19
9.	LANDOWNER AND COMMUNITY ENGAGEMENT.....	21
10.	CONCLUSION	22
11.	DISCLAIMER.....	23
12.	REFERENCES.....	23
	APPENDIX A.....	24
	LOCATION PLAN	24
	APPENDIX B.....	25
	EXISTING 132 KV NETWORK AND 132 KV CONNECTION OPTIONS.....	25
	APPENDIX C.....	26
	STUDY AREA	26

APPENDIX D	27
CORRIDOR OPTIONS	27
APPENDIX E	28
PRELIMINARY ECOLOGY ASSESSMENT BY ERM	28
APPENDIX F	29
PRELIMINARY HERITAGE ASSESSMENT BY ERM.....	29
APPENDIX G	30
LANDOWNER AND COMMUNITY ENGAGEMENT	30

1. Introduction

Newtricity is proposing to develop the Biala Wind Farm comprising 31 turbines and an average capacity of 77.5 MW, approximately 14.5 km south-west of Crookwell and 8.5km east of Biala. A location plan is shown in Appendix A.

The connection of the wind farm to the existing electricity network is a critical element in the project.

Network connection investigations have identified two possible connection points to the electricity existing network. They are:

- Transgrid 330 kV near the Gullen Range Wind Farm, or
- Essential Energy 132 kV network.

The 330 kV connection requires the construction of a 330 kV to 132 kV substation and either associated 330 kV transmission line works or a 132 kV transmission line.

The nearest Essential Energy network is located 22 km from the Biala Wind Farm and comprises the Yass to Goulburn 132 kV line on the south side of Gunning. A 132 kV connection to the 132 kV Yass to Goulburn line requires a 132 kV transmission line and a 132 kV switching station at the network point of connection.

Newtricity have investigated both options for technical and commercial feasibility and have concluded a connection to the existing Yass to Goulburn 132 kV line is commercially and technically better suited to the scale of the Biala Wind Farm.

This report addresses the corridor route options and the approval process.

2. Electricity Network Connection

2.1 Customer Connection Enquiry

A Customer Connection Enquiry for the project has been submitted to Essential Energy and Essential Energy has advised the following:

- The wind farm is approximately 20 km from the Essential Energy Goulburn to Crookwell 66 kV line which is of light construction and fully committed.
- A potential connection to the Essential Energy Yass to Goulburn 132 kV line would involve significant line construction works.
- An alternative could be a connection to the Transgrid Yass to Bannaby 330 kV line via a connection substation.
- A 330 kV connection to the Yass to Bannaby 330 kV via the existing Gullen Range connection.

In regard to ownership of assets, Essential Energy advised Newtricity can either:

- Retain ownership of the connection assets, or
- Gift the assets in full or part to Essential Energy to own and operate.

Furthermore, Essential Energy has advised should Newtricity elect to gift the line to Essential Energy:

- The line route shall be approved by Essential Energy.
- Design and construction shall be in accordance with Essential Energy standards, policies and procedures.
- The Review of Environmental Factors will be in accordance with Essential Energy policies and procedures.
- Registered easements in favour of Essential Energy will be provided for the line route.

It is to be noted that the switching station will be located in the existing Yass to Goulburn 132 kV line and will be an Essential Energy asset.

2.2 Proposed Network Connection

Investigations based on Essential Energy advice found that there are 2 possible grid connection options for the wind farm, they being:

- A 132 kV connection to the Essential Energy Yass to Goulburn 132 kV line, or
- A 330 kV connection to the TransGrid switching station adjacent to the Gullen Range 330/33 kV substation.

330 kV Connection

Investigations have found that a 330 kV network could be made at the 330 kV switching station adjacent to the existing Gullen Range 330/33 kV substation. The connection would require either:

- Additions to the 330 kV switching station, a 330/132 kV substation adjacent to the 330 kV switching station and a 132 kV transmission line to the Biala Wind farm, or
- Additions to the 330 kV switching station, a 330 kV transmission line from the 330 kV switching station to the Biala Wind Farm and a 330/33kV substation at the Biala Wind Farm.

132 kV Connection

The nearest suitable Essential Energy network is the Yass to Goulburn 132 kV line on the south side of Gunning, approximately 22 km from the Biala Wind Farm.

The 132 kV connection to the 132 kV Yass to Goulburn line requires a 132 kV transmission line and a 132 kV switching station at the new connection point on the existing network.

Proposed Connection

Newtricity has considered both the 330 kV and 132 kV connection options. The 330 kV option requires alterations to the 330 kV switching station, a 330/132 kV substation and a significant financial contribution to access the existing 330 kV switching station.

Newtricity has concluded that for technical and commercial reasons a connection to the existing 132 kV network is better suited to the scale of the Biala Wind Farm.

2.3 Existing Essential Energy Network

The existing Essential Energy 132 kV network in the vicinity of the Biala Wind Farm is the Yass to Goulburn 132 kV line and the Gunning Wind Farm 132 kV line.

Yass to Goulburn 132 kV line

This line runs west-east between Yass and Goulburn and passes immediately south and adjacent to the township of Gunning. The rating of the line is 100 MVA (mega volt amps) and the primary purpose of the line is to provide an alternate supply to Goulburn. The use of the line by wind farms is secondary to the primary purpose and infeed from wind farms shall not impact on the capacity of the line to supply Goulburn.

Gunning Wind Farm 132 kV line

This line ties into the Yass to Goulburn 132 kV line approximately 13 km east of Gunning, adjacent to the Cullerin Wind Farm connection. The line traverses generally in a northerly direction for approximately 14 km to the Gunning Wind Farm. There is approximately 5 km of line through a large amount of vegetation. The line has a rating of 100 MVA.

2.4 Proposed 132 kV Network Connection

The Cullerin Wind Farm (30 MVA) and Gunning Wind Farm (40 MVA) connect to the Yass to Goulburn 132 kV line approximately 13 km east of Gunning. Essential Energy have advised that with a suitable switching and protection and control system configuration, the Biala Wind Farm output can be received into the Yass to Goulburn 132 kV line.

To avoid exceeding the Yass to Goulburn line rating the Biala Wind Farm output needs to connect to the Yass to Goulburn 132 kV line with an open point between the Biala connection and the Cullerin and Gunning connections. To achieve this a 132 kV switching station is proposed at the connection point. It is to be noted that the Biala Wind Farm cannot be connected to the existing Gunning Wind Farm 132 kV line as the combined output would exceed the Yass to Goulburn 132 kV line rating.

Essential Energy has advised that detailed network electrical studies need to be undertaken to determine the technical parameters for the connection. The studies are yet to be undertaken.

The existing 132 kV network and 132 kV connection options are shown in Appendix B.

3. Approval Process

Following agreement with the Department of Planning and Environment (DP&E), the proposed 132 kV transmission line connection no longer forms part of the wind farm project and will be progressed separately with Essential Energy (the 132 kV network operator) under Part 5 of the Environmental Planning and Assessment Act 1979 (EP&A Act).

Under Part 5 of the Act, Essential Energy is the Proponent for the transmission line and have the responsibility to determine whether the proposed transmission line connection is likely to have a significant impact on the environment. Essential Energy has the

responsibility to examine and take into account to the fullest extent possible, all matters affecting, or likely to affect the environment by reason of the activity.

Newtricity, the wind farm proponent, is responsible for undertaking the environmental investigations, community consultation and the preparation the Review of Environmental Factors (REF). When approved, Newtricity will undertake the design and construction of the transmission line to Essential Energy technical and environmental standards.

The following issues (among others) will be addressed in the REF and where relevant, mitigation and management measures devised to manage identified potential impacts:

- Biodiversity;
- Landscape and visual;
- Socio-economic;
- Cultural heritage;
- Electromagnetic interference;
- Construction (including road traffic) and operational noise;
- Construction traffic;
- Land use impacts; and
- Cumulative impacts.

Following construction, Newtricity will gift the line to Essential Energy and Essential Energy will own, operate and maintain the infrastructure as part of their existing electricity network.

Newtricity acknowledge that the transmission line connection of the wind farm to the existing grid is fundamental to the viability and operability of the project. Whilst the transmission line component is subject to separate assessment under Part 5 of the EP&A Act, DP&E has advised that it will be necessary for Newtricity to demonstrate as part of the Environmental Impact Statement (EIS) for the wind farm that there are no unreasonable constraints that would preclude the development of the transmission line, such as would affect the feasibility of or pose a restriction to, the development of the wind farm.

Newtricity has engaged the following consultants to provide assistance with the transmission line connection:

- Clarence Consultants to investigate the network connection and the transmission line required to connect the wind farm to the existing electricity network and consider the technical aspects.
- Environmental Resources Management Australia Pty Ltd (ERM) to consider the potential environmental and planning constraints of the transmission line.

- Inclusive Engagement to identify all landholders within the proposed transmission line corridor and work with landholders to determine the final route of the line.

Whilst investigations into the final alignment are continuing, Newtricity anticipate that the REF will be submitted to Essential Energy in Q2, 2016.

4. Essential Energy Connection Process

Where the line is to be owned and operated by Essential Energy, the Essential Energy approval process generally comprises the following steps:

- Customer Connection Enquiry and Customer Connection Application.
- Route Options Investigation and Essential Energy endorsement of the proposed route.
- Community Consultation.
- Network and system studies (load flows, protection etc).
- Landholder negotiations.
- Easement acquisition.
- Switching station land acquisition.
- Review of environmental factors.
- Line survey and detailed design.
- Essential Energy approval.
- Switching station design and approval.
- Line and switching station construction, commissioning and handover to Essential Energy.

5. Typical Essential Energy 132 kV Transmission Line

The proposed 132 kV transmission line will comprise concrete or galvanized steel poles, typically 18 to 20 metres in height, spaced up to 200 metres apart. The conductors (wires) will be aluminium and will be designed to be a minimum 8 metres above the ground at maximum operating temperature. The design life of the line will be 50 years.

The poles will generally be 'direct buried' in the ground avoiding the use of large concrete pads at the base of the pole. Depending on the slope at the pole locations, it may be necessary to establish 'construction pads' adjunct to some poles. These level areas would be typically 20m x 20 m.

There will be 4 conductors, one of which will be an earth shield wire protecting the line from lightning strikes. The line will ideally have a minimum of deviations as they necessitate 'backstays' to support the conductor tension. Minimising backstays reduces the impact on cropping and machinery operations in the vicinity of the poles. Figure 5.1 shows the proposed configuration of the proposed Biala transmission line.



Figure 5.1
Proposed Biala 132 kV transmission line configuration

Heavy vehicle access typically comprising cranes, semi-trailers, pole hole borer and elevating platform vehicles will require access to the transmission line route for construction. Where necessary access tracks, culverts etc will be constructed along the easement to assist construction and maintenance access, however the extent and complexity of these disturbances, considering the type of plant accessing the easement, is expected to be minor. The construction time for 2 or 3 km section would be typically 3 or 4 weeks.

The transmission design specification will be for high reliability and a life span in excess of 50 years requiring minimal access for the life of the line. Routine maintenance inspections would generally be undertaken from aircraft or on ground in 4 wheel drive vehicles.

6. Analysis Methodology

An investigation into possible route corridors for the transmission line has been undertaken by Clarence Consultants, with the western corridor connection to the 132 kV Yass to Goulburn line identified as the preferred route. Further field investigations will be undertaken to identify a preferred alignment of the transmission line within the identified corridor to avoid and or minimise environmental impacts.

The following explains the investigation and the findings undertaken to date.

Study Area

The initial step in the investigation identified the study area, the broad area in which line route corridors are investigated.

The following factors were considered in defining the study area:

- The area extends to the south of the Biala Wind Farm for connection to the Yass to Goulburn 132 KV line.
- The Biala line is to connect to the Yass to Goulburn 132 KV line west of the Gunning Wind Farm 132 kV tee allowing the Gunning Wind Farm and the Cullerin Wind Farm to feed to Goulburn and Biala to Yass.
- Ideally the line will be as short as practical.
- Ideally the line will avoid developed areas.
- The study area has been identified as the area between the Biala Wind Farm, the Gunning Wind Farm 132 kV line tee and Gunning township.

Appendix C shows the study area.

Line Route Corridors

The optimum route for a transmission line is determined by identifying and evaluating a number of factors. The factors that are considered include:

- Terrain
- Land use (zoning)
- Environment

- Ecological.
 - Aboriginal and historic heritage.
- Landowners and Community.
- Design Issues.
- Buildability and Maintainability.

There is arguably never an ‘ideal’ route that will address all factors 100% and as such the analysis process and the adoption of a final route is a consideration of all factors to come to an ‘on balance’ decision.

The term ‘line route corridor’ refers to a broad strip, 500m in width between the wind farm and the Yass to Goulburn 132 kV line.

A line route corridor is deliberately defined as a wide strip to provide a basis on which to investigate and compare options and provide flexibility for the development of a final line alignment.

The proposed route corridor provides a starting point to:

- Initiate consultation and negotiations with landowners and local community,
- Work with landowners and local community to determine a final route,
- Obtain Essential Energy in principle acceptance of the network connection, and
- Initiate on ground environmental investigations (ecology and heritage studies)

The terms ‘line route’ and ‘line route corridor’ are generally used interchangeably.

7. Line Route Corridor Options

Based on factors identified in section 6 two line route corridors, ‘Option 1 West’ and ‘Option 2 East’ have been identified within the study area.

The corridors are shown in Appendix D.

7.1 Option 1 - West Corridor

The original corridor is located between heavily vegetated Cullerin Range to the east and Hurd Range and the Lachlan River to the west and is generally centred around the Gunning-Grabben Gullen Road.

Community and landowner consultation has initially been undertaken on the basis of this corridor and early indications in landowner consultation suggested a more practical route for the transmission line could be further to the west than initially anticipated. This corridor would utilise existing Crown and Council roads for a significant distance. The following discussion addresses the revised corridor. Refer Appendix D.

Land Zoning

The land zoning is RU1 primary production and RU2 rural landscape. There are no planning restrictions relative to the proposed line identified in the Upper Lachlan Local Environmental Plan 2010.

Minimum Lot Size

The Upper Lachlan Local Environmental Plan 2010 specifies minimum lot sizes as AB2–40 Ha and AD-100Ha.

Land Use

The primary land use is stock grazing with some cropping activity.

Terrain

The west corridor traverses a variety of landforms including flat to gently sloping terrain, moderate to steeply inclining rolling hills and a ridgeline.

Ecological – Option 1 West Corridor

ERM has undertaken a desktop review of potential ecological constraints associated with threatened ecological communities and species listed under the NSW Threatened Species Conservation Act 1995 (TSC Act) and Commonwealth Environment Protection and Biodiversity Act 1999 (EPBC Act). This desktop review for the Option 1 (west) corridor is provided at Appendix E.

Based on the available information, the west corridor has the potential to impact on threatened species and their habitats, and areas of vegetation that may constitute the TSC Act and EPBC Act listed community, White Box Yellow Box Blakeley's Red Gum Woodland. Both wooded and previously cleared areas (derived native grassland) may represent forms of this community. However, the desktop vegetation is indicative only, and ground-truthing will be required to confirm the vegetation communities present. Due to development of the west option involving creation of a new easement, there may be flexibility to site the transmission line to avoid disturbance to ground-truthed native vegetation communities and threatened species habitat features.

Heritage

Historic Heritage

ERM has undertaken a desktop review in order to determine the currently known historic heritage values within the Option 1 (west) corridor, refer to Appendix F.

Three historic heritage items listed under the Upper Lachlan Local Environmental Plan 2010 have been identified within, or in close proximity to the proposed Option 1 corridor. The installation of the transmission line within or adjacent to the curtilages of the ‘Collingwood’ building (LEP ID # I113) and Baltinglass Homestead (LEP ID # I97) may result in impacts to the heritage values of these items. Further assessment would be required to determine the nature and extent of these impacts to seek approval from Council (such as the preparation of a Statement of Heritage Impact).

The landscape has been historically used for agricultural purposes, and activities such as gold mining have occurred within the region. There is a potential for historic heritage items associated with agricultural activities and settlement across the region to be located within both of the proposed corridor options.

Aboriginal Heritage

The desktop review undertaken by ERM did not identify any Aboriginal heritage sites within or in close proximity to the study area, refer to Appendix F. It was noted that the limited number of sites identified is likely a reflection of limited investigation in the area, rather than actual archaeological record.

Based on a predictive model for Aboriginal heritage, various landforms surrounding the Option 1 corridor are considered to have the potential to contain surface or subsurface Aboriginal archaeological deposits. In particular, predictive modelling has indicated that Aboriginal heritage sites will likely occur in the form of stone artefact sites (though other sites may be found including scarred trees, quarries, stone arrangements, burial sites, art sites, shelter sites, middens and grinding grooves). There are various landforms within the Option 1 corridor that have been associated with previously recorded Aboriginal heritage sites including slopes, crests, creek banks, gentle rises, hilltops and stream banks. Sites will most likely be in proximity to water sources and in particular the Lachlan River is a key landscape feature within the wider region which would have been an attractive location for camping and utilisation of various subsistence resources.

The desktop assessment is indicative only, and ground-truthing will be required to confirm the Aboriginal heritage values present. Due to development of the west option involving creation of a new easement, there may be flexibility to site the transmission line to avoid disturbance to ground-truthed Aboriginal heritage values.

Landowners and Community

There are 12 existing dwellings in the vicinity of the 500m wide corridor, however no dwellings are sited within the corridor itself. The corridor crosses 60 titled parcels of land.

Design Issues

The corridor traverses undulating terrain that will allow the transmission line design to achieve maximised pole spacing and minimised deviations (change in direction) therefore minimising the aesthetic and environmental impact. The corridor provides the opportunity to avoid proximity to dwellings.

Buildability and Maintainability

The west corridor traverses terrain on which a steel or concrete pole 132 kV line can be constructed. In general good access would be available along the line easement, crown and council roads.

Access tracks and construction pads at pole locations may be necessary at some locations.

7.2 Option 2 - East Corridor

This corridor is generally north and east of Cullerin Range and adjacent to the range. The existing Gunning Wind Farm 132 kV line, approximately 14 km in length, is within the proposed corridor. The distance between the Biala Wind Farm and the Gunning Wind Farm 132 kV line is approximately 15 km, making the length of line from Biala to the Gunning Wind Farm tee approximately 29km in length.

Land Zoning

The land zoning is RU1 primary production and RU2 rural landscape. There are no planning restrictions relative to the proposed line identified in the Upper Lachlan Local Environmental Plan 2010.

Minimum Lot Size

The Upper Lachlan Local Environmental Plan 2010 specifies minimum lot sizes as AB2–40 Ha and AD-100Ha.

A significant number of the land parcels that the corridor crosses are less than the minimum lot size for dwelling construction limiting the potential for future dwellings without boundary adjustments or lot consolidation.

Land Use

The primary land use is stock grazing.

Terrain

The east corridor traverses a variety of landforms including flat to gently sloping terrain, moderate to steeply inclining rolling hills and a ridgeline.

Ecological

ERM has undertaken a desktop review of potential ecological constraints associated with threatened ecological communities and species listed under the NSW TSC Act and Commonwealth EPBC Act. This desktop review for the Option 2 (east) corridor is provided at Appendix E.

The east corridor is centered on the existing Gunning Wind Farm 132 kV line. A second line parallel to the existing would require the existing easement to be widened from 40m to 60m and an additional 5km of vegetation clearing.

Based on the information available, the east corridor has the potential to impact on threatened species and their habitats, and areas of vegetation that may constitute TSC Act or EPBC Act listed communities, in particular, White Box Yellow Box Blakeley's Red Gum Woodland. Both wooded and previously cleared areas (derived native grassland) may represent forms of this community. The east corridor will also require clearing of forest and woodland along approximately 5 km of the corridor, to accommodate widening of the existing easement. Due to east corridor being aligned parallel to an existing transmission line, there may be limited scope to avoid ground-truthed native vegetation through refined siting for this option.

Heritage*Historic Heritage*

ERM has undertaken a desktop review in order to determine the currently known historic heritage values within the Option 2 (east) corridor, refer to Appendix F.

No historic heritage items were identified within, or in close proximity to the proposed transmission line corridor. The landscape has been historically used for agricultural purposes, and activities such as gold mining have occurred within the region. There is a potential for historic heritage items associated with agricultural activities and settlement across the region to be located within both of the proposed corridor options.

Aboriginal Heritage

An AHIMS database search was undertaken by ERM as part of the desktop review for the east corridor. Thirty-six Aboriginal Heritage Sites were identified including 32 stone artefact sites (divided into 21 isolated finds and 11 stone artefact scatters), 3 potential archaeological deposits and one culturally modified tree. A large number of these sites are located within or in close proximity to the east corridor (refer Appendix F).

Approximately half of the east corridor has been previously assessed as part of archaeological investigations for Gunning Wind Farm (Austral Archaeology 2009). The assessment of this transmission line was undertaken by Austral Archaeology (2009) as an amendment to previous assessments for Gunning Wind Farm (JMCHM 2003; Austral Archaeology 2005). As part of the assessment of that transmission line, Austral Archaeology (2009) identified 25 new sites, which included 13 artefact scatters, 9 isolated finds, 2 areas of PADs and a scarred tree. It was observed that the line route traversed a variety of landforms including flat to gently sloping terrain, moderate to steeply inclining rolling hills and a ridgeline.

As part of the subsequent development of the Gunning Wind Farm transmission line, a number of the Aboriginal heritage sites were subject to Section 87/90 Consents under the NSW National Parks and Wildlife Act 1974, and have been subsequently salvaged and relocated.

Based on the environmental context of the east corridor, previous archaeological research and the spatial distribution of recorded Aboriginal heritage sites, predictive modelling has indicated that there is potential for Aboriginal heritage sites to be located within the east corridor. These sites will likely be stone artefact sites containing silcrete (with chert and quartz present) and will mostly occur within landforms including slopes, crests, hillslopes, creek banks and associated rises and hilltops and within 300m of a water source.

Due to the east corridor being aligned parallel to an existing transmission line, there may be limited scope to avoid ground-truthed Aboriginal heritage values through refined siting for this option.

Landowners and Community

There are 10 existing dwellings in the vicinity of the 500m wide corridor, however no dwellings are sited, within the corridor. The corridor crosses 85 titled parcels of land.

Design Issues

The corridor traverses undulating terrain that will allow the transmission line design to achieve maximised pole spacing and minimised deviations (change in direction) therefore minimising the aesthetic and environmental impact. The corridor provides the opportunity to avoid proximity to dwellings.

Buildability and Maintainability

The east corridor traverses terrain on which a steel or concrete pole 132 kV line can be constructed. In general good access would be available along the line easement.

Access tracks and construction pads at pole locations may be necessary at some locations.

7.3 Summary

Two feasible route corridors have been identified for the Biala Wind Farm 132 kV network connection transmission line.

Both Option 1 West Corridor and Option 2 East Corridor are similar with respect to terrain, land use, design issues, landholder and community and buildability and maintainability.

Option 2 East Corridor potentially has significantly more vegetation clearing increasing the risk of environmental impacts whereas Option 1 – West Corridor is less vegetated and offers the potential for the line to route to minimise environmental impacts with the final route and line design avoiding significant environmentally sensitive areas.

Whilst similar constraints are identified for both route corridors based on the preliminary investigations Option 1 West corridor is the preferred route corridor.

Based on the investigations Newtricity have adopted the Option 1 West Corridor as the proposed route corridor and continue to engage with landowners and stakeholders to determine a final route.

8. Transmission Line Electric and Magnetic Fields

Electric and magnetic fields (EMF) are produced wherever electricity or electrical appliances or equipment are used. Electric fields are proportional to the voltage and magnetic fields are proportional to the current, or the amount of electricity flowing. Diagram 8.1 shows typical magnetic and electric fields.

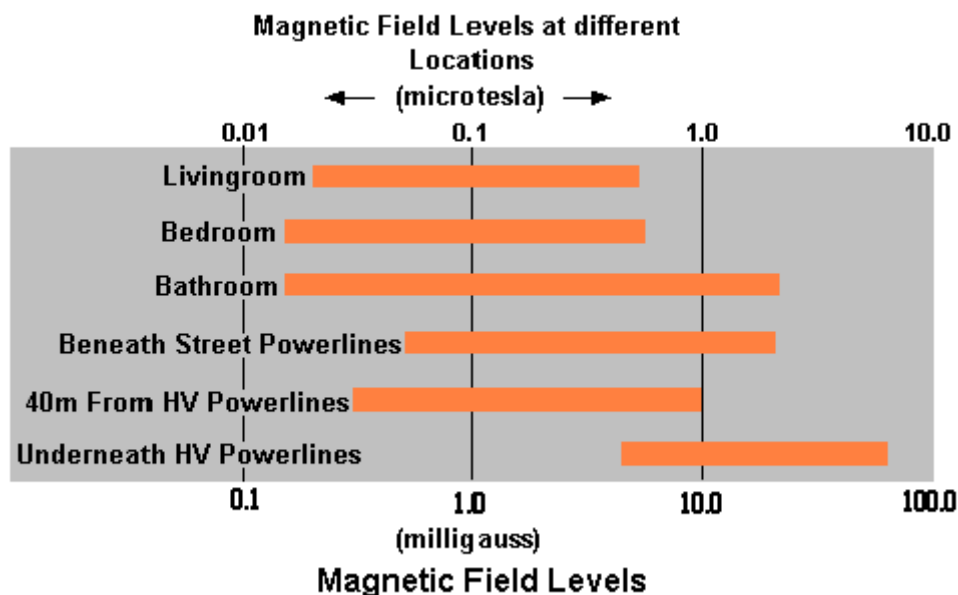


Figure 8.1

Typical magnetic field around common home electrical appliances and electricity network infrastructure (Source: ARPANSA)

The Australian Radiation Protection and Nuclear Safety Agency publishes data relating to recommended exposure limits for electric and magnetic fields.

Limits of exposure to 50/60 Hz Electric and Magnetic Fields		
Exposure Characteristic	Electric Field Strength kV/m (rms)	Magnetic Flux Density mT – (rms)
Occupational		
Whole working day	10	0.5
Short term	30	25 ^a
General Public		
Up to 24hrs/day ^b	5	0.1
Few hrs/day ^c	10	1

- Notes: (a) Maximum exposure is 2 hours per day
 (b) This restriction applies to open spaces in which members of the general public might reasonably be expected to spend a substantial part of the day, such as recreational areas, meeting grounds and the like.
 (c) These values can be exceeded for a few minutes per day provided precautions are taken to prevent direct coupling effects.
 (d) 1mT=10000mG)
 (Source: ARPANSA)

Electric and magnetic fields produced under or nearby a powerline are dependent on the height of conductors above the ground and the configuration of the conductors on the pole or tower.

Figures 8.2 and 8.3 show the typical electric and magnetic field plots for the 132 kV transmission line configuration proposed for the Biala Wind farm connection with a load of 80MW.

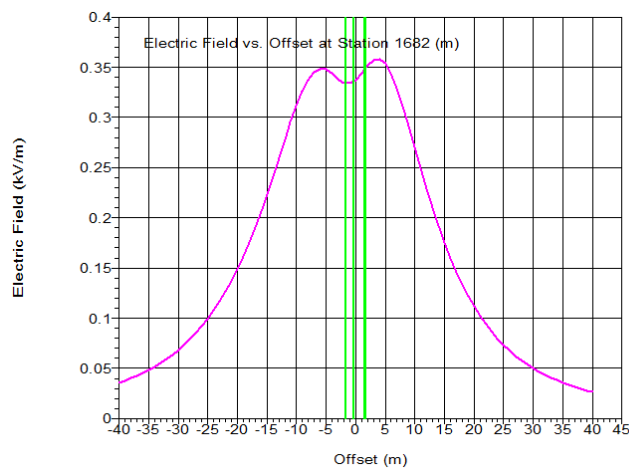


Figure 8.2

Typical 132 kV transmission line electric field plot

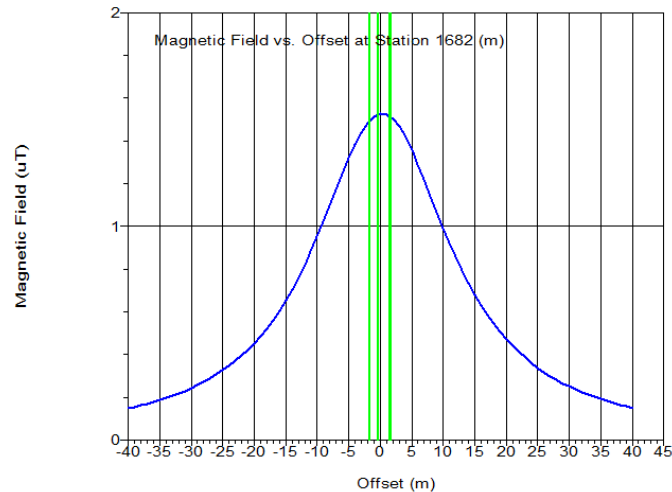


Figure 8.3
Typical 132 kV transmission line magnetic field plot
($1\mu\text{T}=10\text{mG}$)

Newtricity has the policy of ‘prudent avoidance’ and aims to keep the transmission line sufficiently away from dwellings to minimise any landowner risk concerns.

9. Landowner and Community Engagement

Community, landowner and stakeholder consultation commenced in October 2014. As privacy legislation prevents Councils from providing land owner details, Upper Lachlan Council was engaged by Clarence Consultants to identify the owners of the land parcels within the proposed western corridor and mail letters and information sheets on behalf of Newtricity. Council identified a total of 18 landholders along the western corridor.

Stakeholders and agencies have been contacted directly advising of the project and seeking comments.

The following stakeholders have been contacted and comments sought on the proposed transmission line connection

- Upper Lachlan Shire Council
- NSW Office of Environment and Heritage
- Federal Member - Angus Taylor-Member for Hume
- State Member - Katrina Hodgkinson-Member for Burrinjuck
- Roads and Maritime Services - Mittagong Works Depot
- NSW Department of Primary Industries- Fisheries

- Upper Lachlan Landcare
- Australian Rail Track Corporation (ARTC)
- Gunning and District Chamber of Commerce
- Transgrid Yass Regional Office
- South East Local Land Services
- Onerwal Local Aboriginal Lands Council

Examples of the letters and information sheets are included in Appendix G.

Not all landholders responded to the initial letter and Newtricity engaged Inclusive Engagement in January 2015 to assist in identifying all landholders and work with them to determine a final route for the line.

Newtricity held a community information session for the Biala Wind Farm and associated transmission line at Grabben Gullen Hall on 31 January 2015. The session provided an opportunity for Newtricity and its consultants to meet with a number of landholders and discuss the transmission line connection with them.

Landholder and stakeholder consultation to date has identified:

- Landholders that are open to further consultation;
- Landholders opposed to the transmission line;
- Some landholder interest in the provision of an 11 kV circuit on the 132 kV transmission line to make future supply available to properties that would be traversed by the transmission line. A potential 11 kV circuit had not been initially considered and has come about due to landholder interest expressed in the consultation process.
- Opportunity to expand the corridor further to the west to utilise Crown land and Council roads and traverse properties comprising larger areas.

Inclusive Engagement are continuing these discussions with the respective landholders both in person, via email and phone.

10. Conclusion

Whilst similar constraints are identified for both route corridors based on the preliminary investigations Option 1 West corridor is the preferred route corridor.

Based on the investigations Newtricity have adopted the Option 1 West Corridor as the proposed route corridor and continue to engage with landowners and stakeholders to determine a final route.

11. Disclaimer

This information provided in this report is based on documentation and information obtained by Clarence Consultants research and investigation and supplied by other organisations and agencies.

Clarence Consultants Pty Ltd accepts no responsibility for the future accuracy of the information in this report and advises readers and users of the report to familiarise themselves with the current Newtricity project scope and investigations and findings at the time to determine the relevance of this report to the current project scope.

12. References

Option 1 – West Corridor

References

Austral Archaeology (2005) **Archaeological Test Excavations at Proposed Gunning Wind Farm NSW, Test Excavation Report**. Report for Connell Wagner.

Austral Archaeology (2009) **Aboriginal Archaeological and Cultural Heritage Assessment – Gunning Wind Farm NSW: Additional Assessment Report**. Report to Acciona Energy.

JMCHM (2003) **Archaeological Survey for an Aboriginal Heritage Assessment. Gunning Wind Farm, NSW**. Report to Connell Wagner.

Option 2 – East Corridor

References

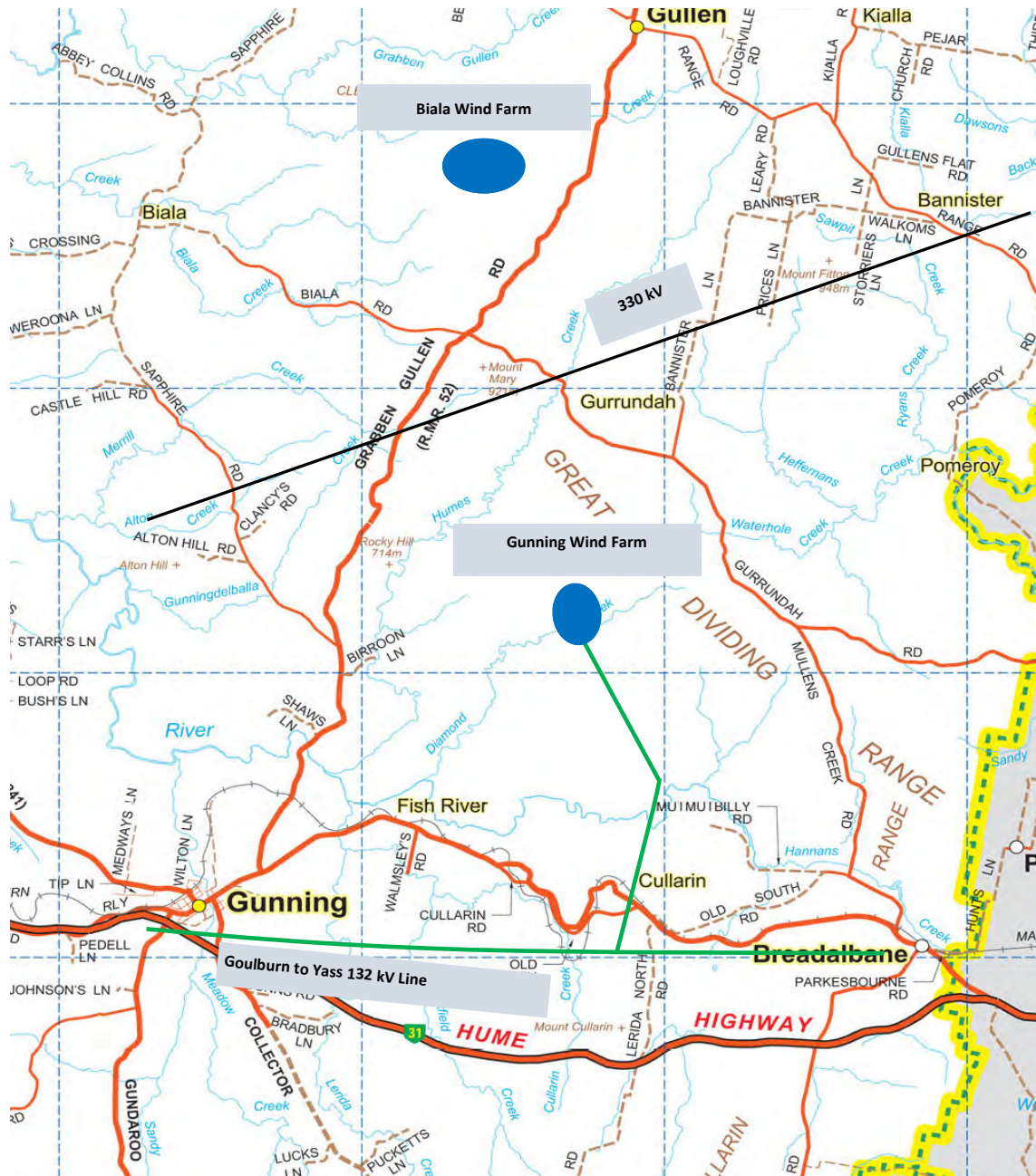
Austral Archaeology (2005) **Archaeological Test Excavations at Proposed Gunning Wind Farm NSW, Test Excavation Report**. Report for Connell Wagner.

Austral Archaeology (2009) **Aboriginal Archaeological and Cultural Heritage Assessment – Gunning Wind Farm NSW: Additional Assessment Report**. Report to Acciona Energy.

JMCHM (2003) **Archaeological Survey for an Aboriginal Heritage Assessment. Gunning Wind Farm, NSW**. Report to Connell Wagner.

Appendix A

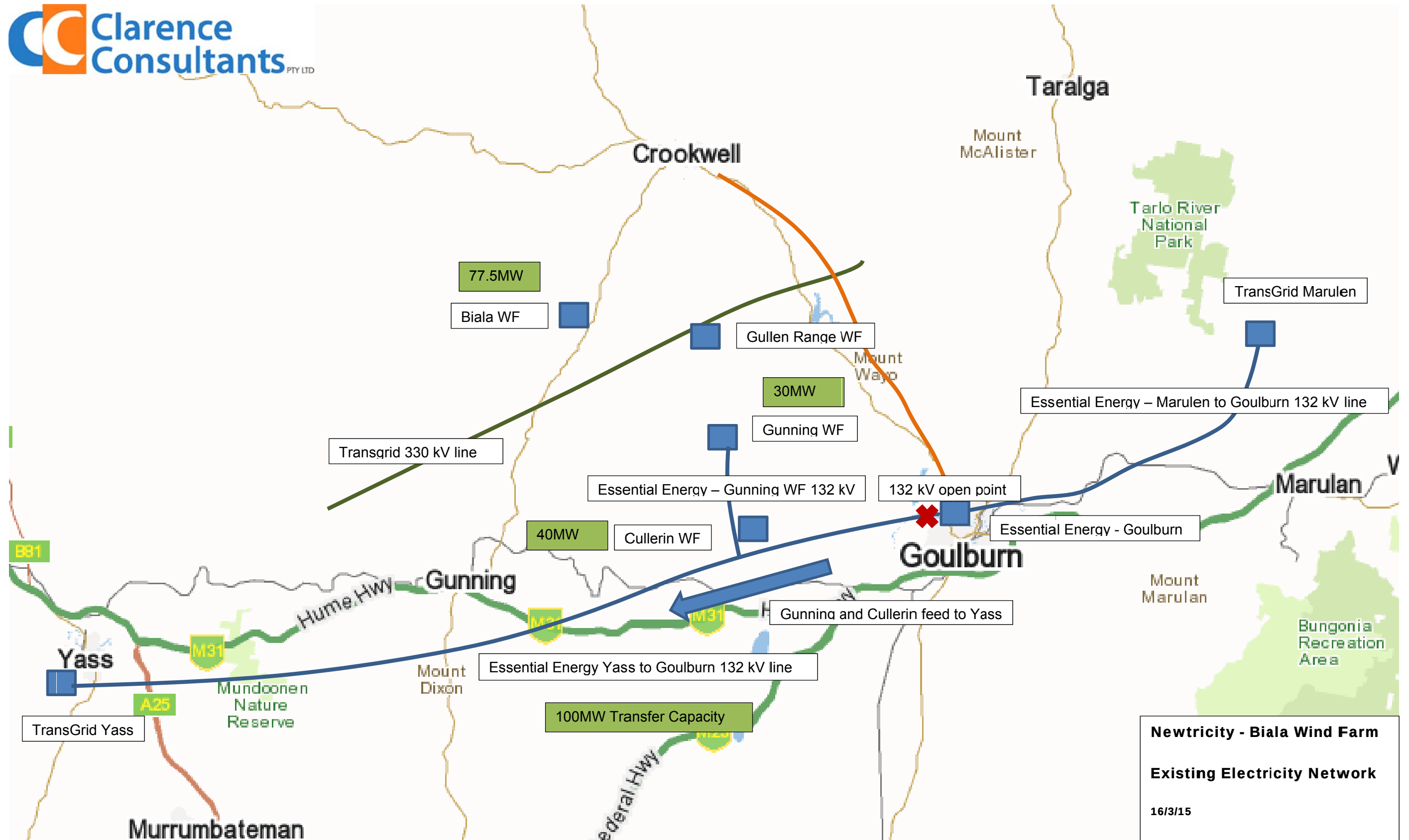
LOCATION PLAN

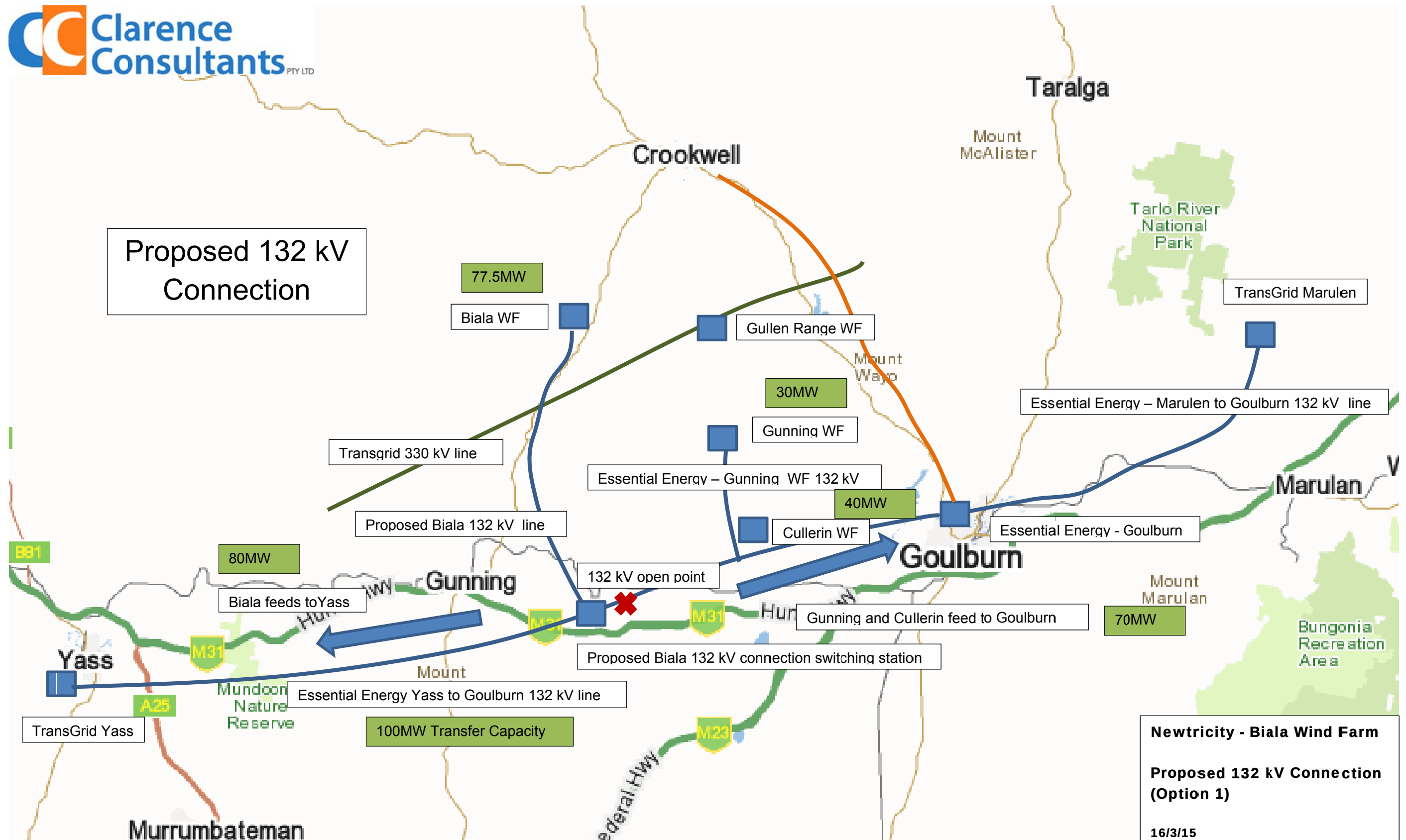


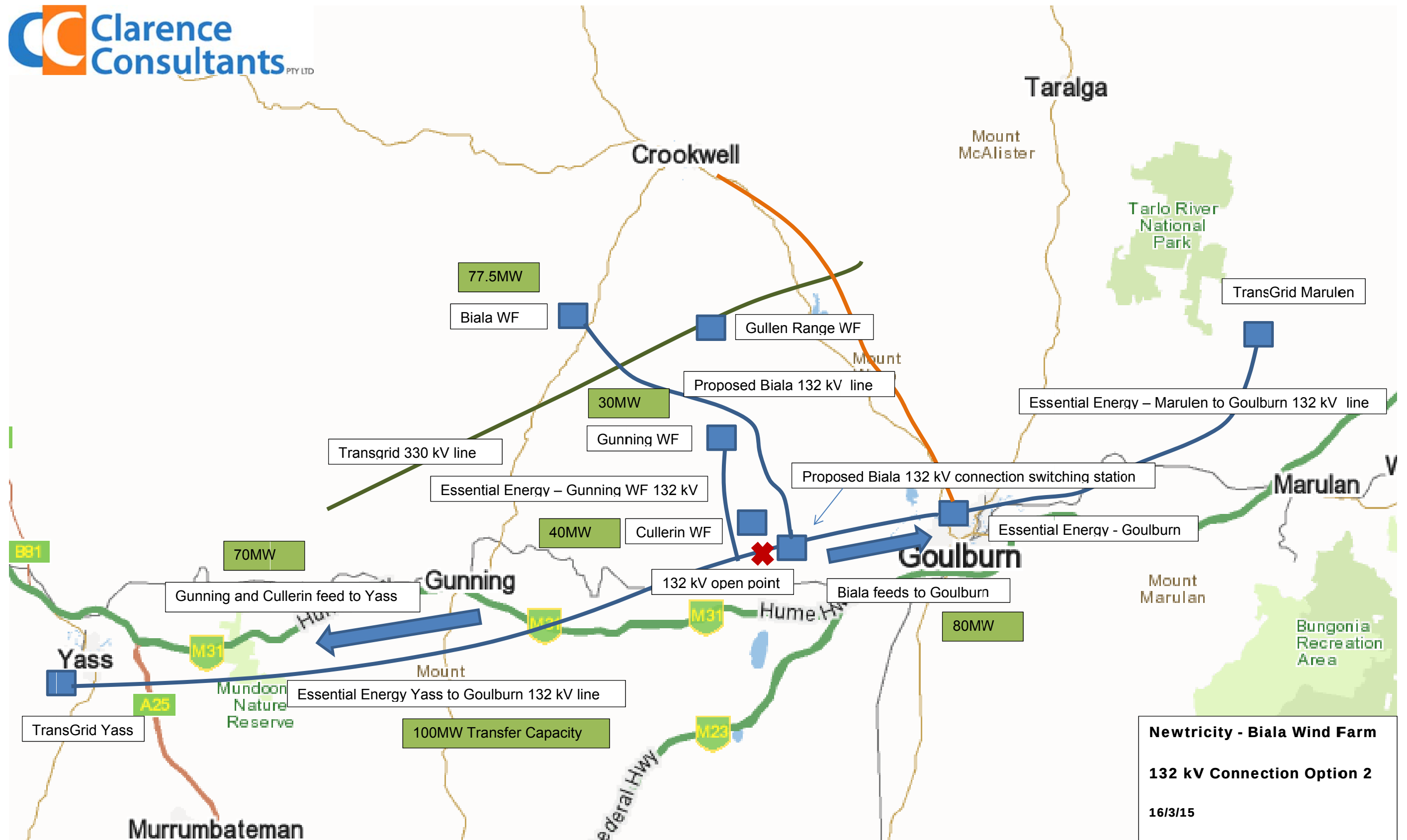
Location Plan

Appendix B

EXISTING 132 KV NETWORK AND 132 KV CONNECTION OPTIONS

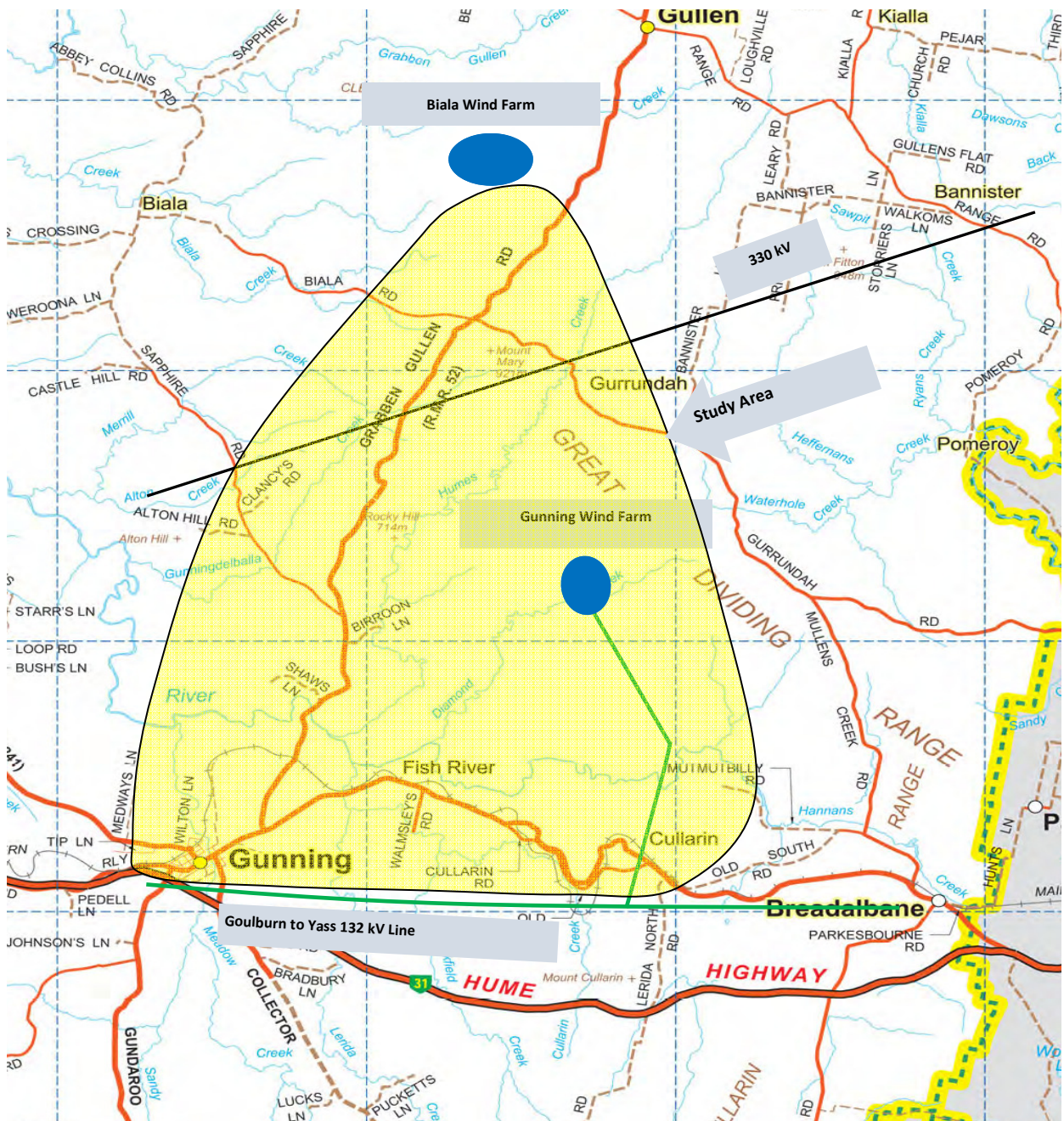






Appendix C

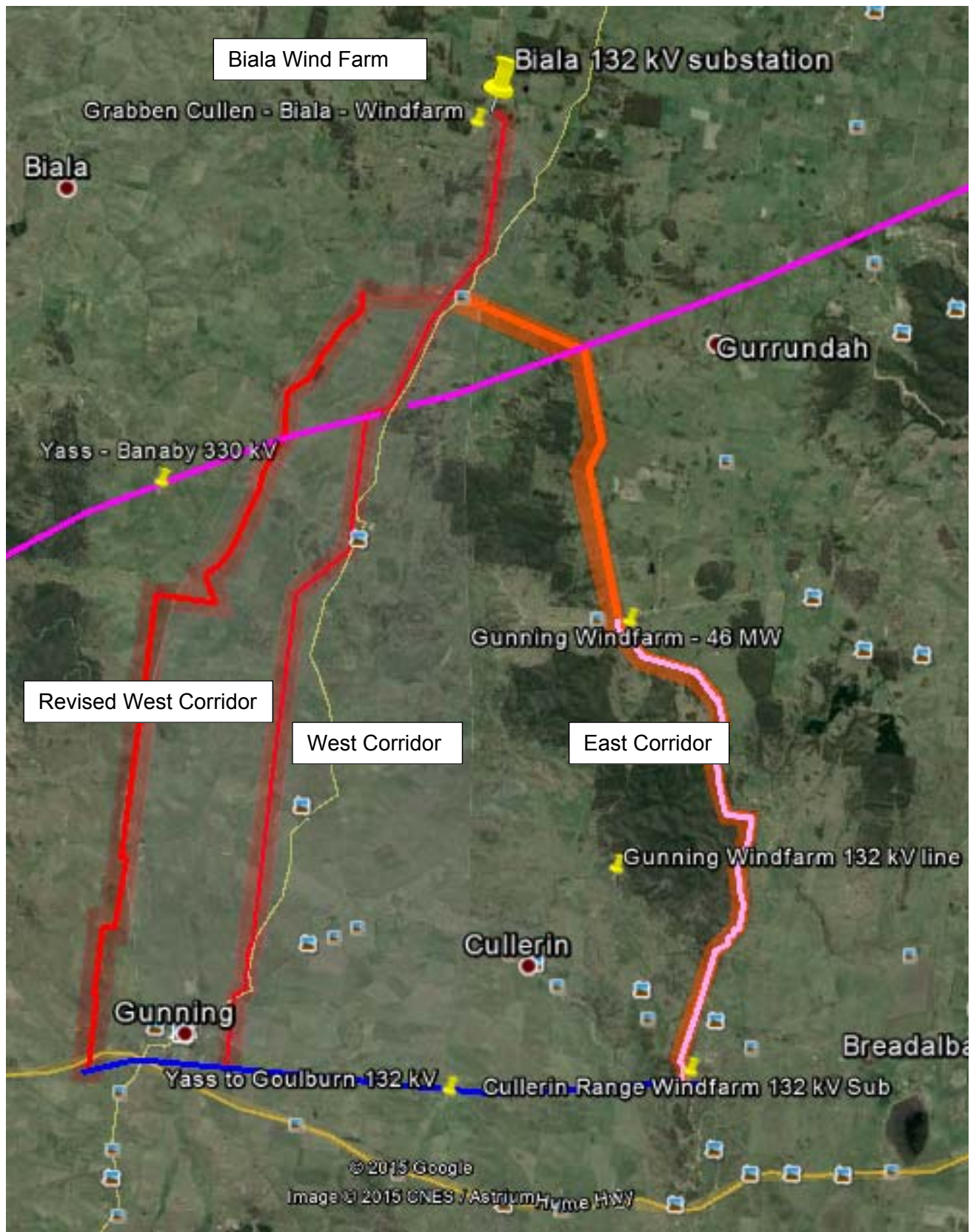
STUDY AREA



Study Area

Appendix D

CORRIDOR OPTIONS

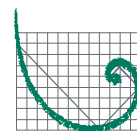


Corridor Options

Appendix E

PRELIMINARY ECOLOGY ASSESSMENT BY ERM

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From	Erin Dethridge, ERM	
Ref/Job Number	0178462	Telephone: +61 2 8584 8888 Facsimile: +61 2 9299 7502
Subject	Desktop Ecology Review of Biala Transmission Line Options	
Date	2 July 2015	



ERM

1. Introduction

Environmental Resources Management Australia Pty Ltd (ERM) has been engaged by Newtricity to undertake a high-level, desktop-based ecological assessment of the proposed transmission line options for the Biala Wind Farm to identify initial development constraints. The assessment focussed on threatened ecological communities, threatened species and migratory species listed under the *Threatened Species Conservation Act 1995* (TSC Act) or Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The following definitions have been used in this preliminary assessment:

- *Option 1 (West) Corridor*: 500 metre (m) corridor centred on proposed 132kV Transmission Line Option 1 alignment, as shown in *Figure 1 at Attachment A*;
- *Option 2 (East) Corridor*: 500 m corridor centred on proposed alignment 132kV Transmission Line Option 2 alignment, as shown in *Figure 1 at Attachment A*;
- *Locality*: a 10 km buffer to each transmission line.

2. Methodology

A desktop review was undertaken and included a literature and database review of ecological values of the transmission line option corridors. Data sources included:

- maps, aerial photograph and Geographic Information System (GIS) interpretations including information held in the Office of Environment and Heritage (OEH) Vegetation Information System (VIS);
- updated land use and extant distribution of native vegetation in the Lachlan and Central West Catchments (DEC 2008). This data is based on spatial vegetation data from diverse sources, standardised to broad vegetation types, and using abiotic data to predict vegetation in gaps in mapping. While the data is suitable for broadly identifying Environmentally Sensitive Areas it is not suitable for use at the property scale;

- Soil Landscape Mapping of Goulburn (Hird, 1990);
- Bureau of Meteorology (BoM) climate data for BoM Yass (Linton Hotel) Weather Observation Station from 1898 – 2011;
- the OEH Atlas of NSW Wildlife database (searches undertaken within the locality), including any threatened species listed under the TSC Act;
- the BirdLife Australia Atlas, which includes records of threatened and migratory species;
- the NSW Department of Primary Industries records viewer (search taken on a catchment-wide scale); and
- the Australian Government Department of the Environment (DoE) Protected Matters Search Tool (PMST) for Matters of National Environmental Significance (MNES) under the EPBC Act (search undertaken within the locality), including any threatened species and threatened ecological communities listed under the EPBC Act.

The likelihood of threatened ecological communities, threatened species and migratory species listed under the TSC Act or EPBC Act occurring within each corridor was assessed based on the criteria outlined in *Table 1*.

Table 1 Criteria for Determining Threatened Species Likelihood of Occurrence

Category	Description
Known	• the ecological community/species has been recorded in Biala Wind Farm Project Area during recent field surveys; or • database records demonstrate that the ecological community/species has been known to occur in the corridor within the last 10 year period.
Potential	• the species' known distribution includes the PA, and suitable habitat is present within the corridor, or, • database records demonstrate that the species has been known to occur in the Project Area, however has not been recorded within the last 10 years, or • the species is a wide ranging flying species which may 'fly-over' the corridor, regardless of the habitat types present and has been recorded within 10 km of the Project Area.
Unlikely	• the species has not been recorded within 10 km of the corridor and suitable habitat does not occur within the corridor, or • the Project Area is not within the species' s known distribution.

Note: No fieldwork has been undertaken to verify the information obtained during the desktop assessment, or to ground truth the regional vegetation mapping.

3. Results

Table 2 provides a summary of the environmental attributes of each transmission line option corridor. These attributes provide an understanding of the potential habitat types present within each transmission line option corridor to inform the threatened species likelihood of occurrence assessment. Greater detail of threatened species and ecological communities is provided below.

Table 2 Features of the Transmission Line Option Corridors

Attribute	Option 1	Option 2
Landscape context and required vegetation clearing	The Option 1 corridor is located within a largely cleared landscape and follows an existing road for a portion of the alignment. Aerial imagery indicates vegetation within and surrounding the Option 1 corridor is predominately cleared of trees. The corridor contains scattered trees, planted wind breaks, and stretches of trees within the road reserve. Canopy vegetation within the corridor does not appear to have any connectivity to woodland or forest communities. The nearest area of forest is approximately 1.5 km west of the corridor. Due to the land within and around this transmission line option being predominately cleared, it is likely that there would be opportunities to avoid mapped native vegetation communities, and particularly, avoid clearing in any threatened ecological communities identified through field surveys.	The Option 2 corridor is located along the eastern boundary of two large areas (1000 ha area in the north, and 1500 ha area in the south) of woodland/forest. Canopy vegetation within the Option 2 corridor has retained good connectivity to these large areas of woodland/forest. There are also some patches of woodland/forest to the east of the corridor. The southern portion of the corridor follows an existing transmission line located within the eastern edge of the 1500 ha areas of woodland/forest. Clarence Consultants indicated that this easement would need to be widened from 40 m to 60 m at this location. This widening would result in clearing of woodland/forest along approximately 5 km of the transmission line.
Broad vegetation types as mapped by DEC 2008	• Mountain Gum – Red Stringybark Open Forest at high altitudes; • Red Stringybark – Blakeley's Red Gum – Yellow Box Woodland; • Blakeley's Red Gum-Yellow Box Open Woodland; • Stringybark – Box – Gum Woodland.	• Mountain Gum – Red Stringybark open-forest at high altitudes; • Blakeley's Red Gum – Yellow Box open-woodland of the tablelands; • Stringybark – Box – Gum Woodland.
Soil/Geology	The Option 1 corridor comprises four mapped soil types: • Soloths; • Siliceous sands; • Yellow earths; and • Yellow podzolic soils (Hird 1990).	The Option 2 corridor comprises four mapped soil types: • Soloths; • Siliceous sands; • Chocolate soils (Brown dermosols); • Yellow podzolic soils • Yellow earths; and • Shallow soils (Hird 1990).
Waterbodies and watercourses	Numerous farm dams and drainage lines are visible on satellite imagery. The Option 1 corridor crosses the Lachlan River and a number of other watercourses. The Lachlan River is a perennial river with a number of significant wetlands along its length.	Numerous farm dams and drainage lines are visible on satellite imagery. The Option 2 corridor crosses the Lachlan River, and a number of other watercourses. The Lachlan River is a perennial river with a number of significant wetlands along its length.
Elevation	560m – 780m	700m – 900m
Climate (BoM 2014)	Mean maximum temperatures from 29.5°C in January to 11.6°C in July. Mean minimum temperatures range from 14.0°C in January and February to 1.1°C in July. The mean annual rainfall for the Yass (Linton Hotel) Weather Observation Station is 651.7 millimetres (mm) with the lowest monthly mean rainfall recorded during February with 45.5mm and the highest monthly mean rainfall recorded during October with 64.5mm.	

3.1 *Threatened and Endangered Ecological Communities*

The PMST identified two Threatened Ecological Communities listed under the EPBC Act as likely to occur within 10km of the transmission line option corridors:

- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered); and
- Natural Temperate Grassland of the Southern Tablelands of NSW and the Australian Capital Territory (Endangered).

Vegetation mapping by DEC (2008) shows areas mapped as woodland and open woodland communities containing the species Blakeley's Red Gum and Yellow Box within both the Option 1 corridor and Option 2 corridor (refer to *Figure 1 in Attachment 1*).

These communities may constitute the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland Threatened Ecological Community (as listed under the EPBC Act) and the White Box Yellow Box Blakely's Red Gum Woodland Endangered Ecological Community (as listed under the TSC Act). It is likely that areas of grassland within the immediate vicinity of this vegetation type are native grasslands derived from clearance of the Blakeley's Red Gum-Yellow Box Open Woodland and may be representative of the EPBC Act listed community.

It should be noted however, that the desktop mapping is indicative only, and field-based vegetation surveys of the Biala Wind Farm Project Area identified inaccuracies in the desktop mapping for that area. Inaccuracies may also exist in the vegetation mapping for the transmission line option corridors.

In addition, there is potential for grassland areas within the transmission line option corridors to represent the EPBC Act listed Natural Temperate Grassland of the Southern Tablelands of NSW and the Australian Capital Territory.

3.2 *Threatened and Endangered Ecological Communities*

The PMST identified a number of threatened and migratory species with potential to occur in the locality, and the BirdLife Australia Atlas and Atlas of NSW Wildlife identified a number of threatened species records in the locality. The search of the Department of Primary Industries records viewer did not return any threatened species records in the locality.

The likelihood of the species identified in database searches (refer to *Table 3*) occurring within each corridor option was assessed. Based on the species specific habitat preferences and current known distribution, the results of the assessment indicate that:

- for Option 1, 10 species are considered known to occur (recorded in the Biala Wind Farm Project Area or database records within the corridor) and 28 species are considered to have potential to occur; and
- for Option 2, nine species are considered known to occur and 32 species are considered to have potential to occur.

Table 3 Threatened Species Likelihood of Occurrence

				Option 1		Option 2	
Species	TSC Act Status	EPBC Act Status	Habitat Requirements	Source (records)	Likelihood of Occurrence	Source (records)	Likelihood of Occurrence
FLORA							
<i>Lepidium hyssopifolium</i> Basalt Pepper-cress	E	E	Generally, the Basalt Pepper-cress is known to establish on open, bare ground with limited competition from other plants. The Basalt Pepper-cress was previously recorded from Eucalypt woodland with a grassy ground cover, low open Casuarina woodland with a grassy ground cover and tussock grassland. Recently recorded localities have predominantly been in weed-infested areas of heavy modification, high degradation and high soil disturbance such as road and rail verges, on the fringes of developed agricultural land or within small reserves in agricultural land. Soils at known sites are light to heavy clay loams that are often friable (DOE 2015).	NA	NA	PMST, No records	Potential – there are no records of the species within 10 km of the Option 2 corridor, however the species has potential to occur due to its generalist habitat requirements.
<i>Leucochrysum albicans</i> subsp. <i>albicans</i> var. <i>tricolor</i> Hoary Sunray	-	E	The Hoary Sunray occurs in a wide variety of grassland, woodland and forest habitats, generally on relatively heavy soils. Plants are found in natural or semi-natural vegetation and grazed or ungrazed habitat. Bare ground is required for germination. Generally associated with an overstorey of Yellow Box (<i>Eucalyptus melliodora</i>), Blakely’s Red Gum (<i>Eucalyptus blakelyi</i>), Red Box (<i>Eucalyptus polyanthemos</i>), Brittle Gum (<i>Eucalyptus mannifera</i>) or Snow Gum, and a midstorey of <i>Beyeria viscosa</i> , <i>Pultenaea</i> spp., <i>Acacia rubida</i> , <i>Acacia genistifolia</i> , <i>Cassinia longifolia</i> , <i>Allocasuarina</i> spp. and <i>Kunzea parvifolia</i> (DOE 2015).	PMST, No records	Potential - there are no records of the species within 10 km of the Option 1 corridor, however grassland and woodland, particularly the Blakeley’s Red Gum Yellow Box woodland may provide suitable habitat.	PMST, NSW Atlas (3)	Potential - There are three records of the species from 2007 and 2009. Grassland and woodland, particularly the Blakeley’s Red Gum Yellow Box woodland, may provide suitable habitat.

Species	TSC Act Status	EPBC Act Status	Habitat Requirements	Option 1		Option 2	
				Source (records)	Likelihood of Occurrence	Source (records)	Likelihood of Occurrence
<i>Pelargonium</i> spp. <i>Striatellum</i> Omeo Stork's-bill	E	E	Known from only three locations in NSW, with two on lake-beds on the basalt plains of the Monaro and one at Lake Bathurst. It has a narrow habitat that is usually just above the high-water level of irregularly inundated or ephemeral lakes, in the transition zone between surrounding grasslands or pasture and the wetland or aquatic communities. It sometimes colonises exposed lake beds during dry periods.	PMST, No records	Unlikely – there is no evidence of habitat (ephemeral lakes) within the Option 1 corridor, and there are no records of the species within 10km of the Option 1 corridor.	PMST, No records	Unlikely – there is no evidence of habitat (ephemeral lakes) within the Option 2 corridor, and there are no records of the species within 10km of the Option 2 corridor.
<i>Rutidosia leptorrhynchoidea</i> Button Wrinklewort	E	E	Local populations at Goulburn, in the Canberra - Queanbeyan area and at Michelago. Occurs in Box-Gum Woodland, secondary grassland derived from Box-Gum Woodland or in Natural Temperate Grassland; and often in the ecotone between the two communities. Grows on soils that are usually shallow, stony red-brown clay loams; tends to occupy areas where there is relatively less competition from herbaceous species (either due to the shallow nature of the soils, or at some sites due to the competitive effect of woodland trees). Exhibits an ability to colonise disturbed areas (e.g. vehicle tracks, bulldozer scrapings and areas of soil erosion).	PMST, No records	Unlikely – while suitable vegetation occurs in Corridor Option 1, the preferred soil types do not. Further, there are no records of the species within the locality.	PMST, No records	Potential – there are no records of the species, however Box Gum woodland on shallow soils may provide suitable habitat.
<i>Thesium australe</i> Austral Toadflax	V	V	Scattered distribution across eastern NSW, along the coast, and from the Northern to Southern Tablelands where it occurs in grassland or grassy woodland. Often found in damp sites in association with Kangaroo Grass (<i>Themeda australis</i>) (OEH 2015).	PMST, No records	Potential – there are no records of the species in the locality, however grassland and woodland may provide suitable habitat.	PMST, No records	Potential – there are no records of the species in the locality, however grassland and woodland may provide suitable habitat.

				Option 1		Option 2	
Species	TSC Act Status	EPBC Act Status	Habitat Requirements	Source (records)	Likelihood of Occurrence	Source (records)	Likelihood of Occurrence
INSECTS							
<i>Synemon plana</i> Golden Sun Moth	E	CE	The Golden Sun Moth's NSW populations are found in the area between Queanbeyan, Gunning, Young and Tumut. Occurs in Natural Temperate Grasslands and grassy Box-Gum Woodlands where groundcover is dominated by Wallaby Grasses. Habitat may contain several Wallaby Grass species, which are typically associated with other grasses particularly spear-grasses (<i>Austrostipa</i> spp.) or Kangaroo Grass (<i>Themeda australis</i>). Larvae feed on the roots of the wallaby grass plant.	PMST, No records	Potential - there are no records of the species in the locality, however grassland and box gum woodlands may provide suitable habitat.	PMST, No records	Potential - there are no records of the species in the locality, however grassland and box gum woodlands may provide suitable habitat.
FISH							
<i>Maccullochella peelii</i> Murray Cod	-	V	The Murray Cod is found in a wide range of warm water habitats, from clear, rocky streams to slow-flowing turbid rivers and billabongs (McDowall 1996, cited in DOE 2015). Generally, they are found in waters up to 5 m deep and in sheltered areas with cover from rocks, timber or overhanging banks (Kearney & Kildea 2001, cited in DOE 2015).	PMST, No records	Potential - there are no records of the species in the locality, however watercourses that intersect the Proposed Corridor may provide suitable habitat.	PMST, No records	Potential - there are no records of the species in the locality, however watercourses that intersect the Proposed Corridor may provide suitable habitat.
<i>Macquaria australasica</i> Macquarie Perch	-	E	The Macquarie Perch is a riverine, schooling species. It prefers clear water and deep, rocky holes with lots of cover. As well as aquatic vegetation, additional cover may comprise of large boulders, debris and overhanging banks. Spawning occurs just above riffles (shallow running water) (DOE 2015).	PMST, No records	Potential - there are no records of the species in the locality, however watercourses that intersect the Proposed Corridor may provide suitable habitat.	PMST, No records	Potential - there are no records of the species in the locality, however watercourses that intersect the Proposed Corridor may provide suitable habitat.

				Option 1		Option 2	
Species	TSC Act Status	EPBC Act Status	Habitat Requirements	Source (records)	Likelihood of Occurrence	Source (records)	Likelihood of Occurrence
<i>Bidyanus bidyanus</i> Silver Perch	V	CE	Silver Perch formerly utilised a diversity of habitats within the Murray-Darling system. Silver perch are consistently reported by anglers and researchers to show a general preference for faster-flowing water, including rapids and races, and more open sections of river, throughout the Murray-Darling Basin (TSSC 2013).	PMST, No records	Potential - there are no records of the species in the locality, however watercourses that intersect the Proposed Corridor may provide suitable habitat.	PMST, No records	Potential - there are no records of the species in the locality, however watercourses that intersect the Proposed Corridor may provide suitable habitat.
AMPHIBIANS							
<i>Litoria booroolongensis</i> Booroolong Frog	E	E	Restricted to NSW and north-eastern Victoria. Live along permanent streams with some fringing vegetation cover such as ferns, sedges or grasses. Adults occur on or near cobble banks and other rock structures within stream margins. They shelter under rocks or amongst vegetation near the ground on the stream edge. Sometimes bask in the sun on exposed rocks near flowing water during summer. Breeding occurs in spring and early summer and tadpoles metamorphose in late summer to early autumn. Eggs are laid in submerged rock crevices and tadpoles grow in slow-flowing connected or isolated pools.	PMST, No records	Potential - there are no records of the species in the locality, however creeks and riparian corridors within the Option 1 Corridor may provide suitable habitat.	PMST, No records	Potential - there are no records of the species in the locality, however creeks and riparian corridors within the Option 2 Corridor may provide suitable habitat.
<i>Litoria raniformis</i> Growling Grass Frog	E	V	This species is found mostly amongst emergent vegetation, including <i>Typha</i> sp. (bullrush), <i>Phragmites</i> sp. (reeds) and <i>Eleocharis</i> sp.(sedges), in or at the edges of still or slow-flowing water bodies such as lagoons, swamps, lakes, ponds and farm dams. The Growling Grass Frog can also inhabit agricultural and higher rainfall pastoral lands so long as permanent and non-permanent water sites are available with dense emergent or fringing vegetation (DoE 2015).	NA	NA	PMST, No records	Potential - there are no records of the species in the locality, however some farm dams may provide suitable habitat.

				Option 1		Option 2	
Species	TSC Act Status	EPBC Act Status	Habitat Requirements	Source (records)	Likelihood of Occurrence	Source (records)	Likelihood of Occurrence
REPTILES							
<i>Aprasia parapulchella</i> Pink-tailed Legless Lizard	V	V	Only known from the Central and Southern Tablelands, and the South Western Slopes. Inhabits sloping, open woodland areas with predominantly native grassy groundlayers, particularly those dominated by Kangaroo Grass (<i>Themeda australis</i>). Sites are typically well-drained, with rocky outcrops or scattered, partially-buried rocks (OEH 2015).	PMST, No records	Potential - there are no records of the species in the locality, however open woodland areas may provide suitable habitat where rocky outcrops and surface rocks occur.	PMST, No records	Potential - there are no records of the species in the locality, however open woodland areas may provide suitable habitat where rocky outcrops and surface rocks occur.
<i>Delma impar</i> Striped Legless Lizard	V	V	Within NSW, occurs in the Southern Tablelands, the South West Slopes and possibly on the Riverina. Populations are known in the Goulburn, Yass, Queanbeyan, Cooma and Tumut areas. Found mainly in Natural Temperate Grassland but has also been captured in grasslands with a high exotic component. Also found in secondary grassland near Natural Temperate Grassland and occasionally in open Box-Gum Woodland. Habitat is where grassland is dominated by perennial, tussock-forming grasses such as Kangaroo Grass (<i>Themeda australis</i>), Spear-grasses (<i>Austrostipa</i> spp.), Poa tussocks (<i>Poa</i> spp.) and occasionally Wallaby Grasses (<i>Austrodanthonia</i> spp.). Sometimes found in grasslands with significant amounts of surface rocks, which are used for shelter (OEH 2015).	PMST, No records	Potential - there are no records of the species in the locality, however open woodland and grassland areas may provide suitable habitat.	PMST, No records	Potential - there are no records of the species in the locality, however open woodland and grassland areas may provide suitable habitat.
BIRDS							
<i>Anthochaera phrygia</i> Regent Honeyeater	CE	E	Mainly found on the inland slopes of south-east Australia in dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River She-oak which support a significantly high abundance and species richness of bird species. These woodlands have significantly large	PMST, NSW Atlas (2), BirdLife Atlas (2)	Potential - there are four records of the species in the locality (from 1995 and 1998). Although this species has not been	NSW Atlas (2)	Potential - there are two records of the species in the locality (from 1980 and 1981). Although this species has not been

Species	TSC Act Status	EPBC Act Status	Habitat Requirements	Option 1		Option 2	
				Source (records)	Likelihood of Occurrence	Source (records)	Likelihood of Occurrence
			numbers of mature trees, high canopy cover and abundance of mistletoes. Key eucalypt species include Mugga Ironbark (<i>Eucalyptus sideroxylon</i>), Yellow Box (<i>E. melliodora</i>), Blakely's Red Gum (<i>E. blakelyi</i>), White Box (<i>E. albens</i>) and Swamp Mahogany (<i>E. robusta</i>). A shrubby understorey is an important source of insects and nesting material. Nest in horizontal branches or forks in tall mature eucalypts and sheoaks and also nest in mistletoe haustoria (OEH 2015).		recorded in the locality for over 15 years, woodland may provide suitable habitat.		recorded in the locality for over 30 years, woodland may provide suitable habitat.
<i>Botaurus poiciloptilus</i> Australasian Bittern	E	E	The Australasian Bittern occurs in terrestrial freshwater wetlands and, rarely, estuarine habitats. It favours wetlands with tall, dense vegetation, where it forages in still, shallow water up to 0.3 m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water. A complexity of habitat is required in order for foraging and breeding to occur in one location (DoE 2015).	NA	NA	PMST No records.	Potential - there are no records of the species in the locality, however farm dams may provide suitable habitat.
<i>Chthonicola sagittata</i> Speckled Warbler	V	-	Has a patchy distribution throughout south-eastern Queensland, the eastern half of NSW and into Victoria. The species is most frequently reported from the hills and tablelands of the Great Dividing Range. Lives in a wide range of Eucalyptus dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat includes scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area. Pairs are sedentary and occupy a breeding territory of about ten hectares, with a slightly larger home-range when not breeding (OEH 2015).	NSW Atlas (2), BirdLife Atlas (16)	Potential - the species has been recorded in the locality and the larger patch of Blakeley's Red Gum-Yellow Box Open Woodland may provide suitable habitat.	NSW Atlas (1)	Potential - there is one record of the species in the locality and the larger areas of woodland may provide suitable habitat for the species.

Species	TSC Act Status	EPBC Act Status	Habitat Requirements	Option 1		Option 2	
				Source (records)	Likelihood of Occurrence	Source (records)	Likelihood of Occurrence
<i>Climacteris picumnus victoriae</i> Brown Treecreeper (eastern subspecies)	V	-	Found in eucalypt woodlands and dry open forest of the inland slopes and plains inland of the Great Dividing Range. Mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species. Fallen timber is an important habitat component for foraging, and hollows in standing dead or live trees and tree stumps are essential for nesting (OEH 2015).	NSW Atlas (1), BirdLife Atlas (20)	Potential - woodland in the Proposed Corridor may provide suitable habitat although this species has not been recorded in the locality for over 20 years.	NA	NA
<i>Daphoenositta chrysoptera</i> Varied Sittella	V	-	Distribution in NSW is nearly continuous from the coast to the far west. Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland (OEH 2015).	NSW Atlas (6)	Known - This species has been recently recorded from the Biala Wind Farm Project Area, and woodland in the Proposed Corridor may provide suitable habitat.	NSW Atlas (2)	Known - This species has been recently recorded from the Biala Wind Farm Project Area, and woodland in the Proposed Corridor may provide suitable habitat.
<i>Grantiella picta</i> Painted Honeyeater	V	-	Inhabits Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus <i>Amyema</i> (DOE 2015).	BirdLife Atlas (4)	Potential - the species has been recorded in the locality, and Box-Gum woodland may provide suitable habitat.	NA	NA
<i>Hieraetus morphnoides</i> Little Eagle	V	-	Found throughout the Australian mainland except for the most densely forested parts of the Dividing Range escarpment. Inhabits open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees in remnant vegetation (OEH 2015).	NSW Atlas (1), BirdLife Atlas (1)	Known - This species has been recently recorded from the Biala Wind Farm Project Area, and woodland in the Proposed Corridor may provide suitable habitat.	NSW Atlas (2)	Known - This species has been recently recorded from the Biala Wind Farm Project Area, and woodland in the Proposed Corridor may provide suitable habitat.

				Option 1				Option 2			
Species	TSC Act Status	EPBC Act Status	Habitat Requirements	Source (records)	Likelihood of Occurrence			Source (records)	Likelihood of Occurrence		
<i>Lathamus discolor</i> Swift Parrot	E	E, Ma	Migrating in the autumn and winter months to south-eastern Australia. In NSW, mostly occurs on the coast and south west slopes in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations (OEH 2015). On the western slopes Mugga Ironbark (<i>Eucalyptus sideroxylon</i>) and Grey Box (<i>Eucalyptus microcarpa</i>) woodlands are used. Swift Parrots show very high site fidelity, returning to sites that have previously been used on a cyclic basis (DOE 2015).	PMST, No records	Unlikely - Desktop vegetation mapping indicates suitable woodland is not present.			PMST, No records	Unlikely - Desktop vegetation mapping indicates suitable woodland is not present.		
<i>Ninox connivens</i> Barking Owl	V	-	Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g. western NSW) due to the higher density of prey on these fertile soils (OEH 2015).	BirdLife Atlas (1)	Potential - while the Option 1 corridor only contains patches of disconnected vegetation, woodland and open forest in the corridor may form part of an individual's broader range.			NA	NA		
<i>Polytelis swainsonii</i> Superb Parrot	V	V	The Superb Parrot is found throughout eastern inland NSW. On the South West Slopes nest trees can be in open Box-Gum Woodland or isolated paddock trees. Species known to be used are Blakely's Red Gum, Yellow Box, Apple Box and Red Box. May forage up to 10km from nesting sites, primarily in grassy box woodland. Feed in trees and understorey shrubs and on the ground and their diet consists mainly of grass seeds and herbaceous plants. Also eaten are fruits, berries, nectar, buds, flowers, insects and grain.	PMST, No records	Potential - the species has not been recorded within the locality, however Blakeley's Red Gum-Yellow Box Open Woodland may provide suitable habitat.			PMST, NSW Atlas (1)	Potential - while the species has not been recorded in the locality for over 30 years, Blakeley's Red Gum-Yellow Box Open Woodland may provide suitable habitat.		
<i>Rostratula australis</i> Australian	E	V, Mi, Ma	In NSW, many records are from the Murray-Darling Basin including the Paroo wetlands, Lake Cowal, Macquarie Marshes, Fivebough Swamp and more recently, swamps near	PMST, No records	Potential - the species has not been recorded within the locality, however dams			PMST, No records	Potential - the species has not been recorded within the locality,		

Species	TSC Act Status	EPBC Act Status	Habitat Requirements	Option 1		Option 2	
				Source (records)	Likelihood of Occurrence	Source (records)	Likelihood of Occurrence
Painted Snipe			Balldale and Wanganella. Other important locations with recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys. Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds. Forages nocturnally on mud-flats and in shallow water (OEH 2015).		in the Proposed Corridor may provide suitable habitat.		however dams in the Proposed Corridor may provide suitable habitat.
<i>Stictonetta naevosa</i> Freckled Duck	V	-	Occurs in permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds (OEH 2015).	NA	NA	BirdLife Atlas (1)	Potential – there is one record of the species within the locality, and dams in the Proposed Corridor may provide suitable habitat
<i>Petroica boodang</i> Scarlet Robin	V	-	In NSW, it occurs from the coast to the inland slopes. After breeding, some Scarlet Robins disperse to the lower valleys and plains of the tablelands and slopes. The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat. In autumn and winter many Scarlet Robins live in open grassy woodlands, and grasslands or grazed paddocks with scattered trees.	ERM, BirdLife Atlas (17)	Known - This species has been recently recorded from the Biala Wind Farm Project Area, and there are numerous database records of the species in the locality. Woodland in the Proposed Corridor may provide suitable habitat.	NSW Atlas (1); BirdLife Atlas (5)	Known - This species has been recently recorded from the Biala Wind Farm Project Area, and woodland in the Proposed Corridor may provide suitable habitat.

Species	TSC Act Status	EPBC Act Status	Habitat Requirements	Option 1		Option 2	
				Source (records)	Likelihood of Occurrence	Source (records)	Likelihood of Occurrence
<i>Petroica phoenicea</i> Flame Robin	V	-	Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. The groundlayer of the breeding habitat is dominated by native grasses and the shrub layer may be either sparse or dense. Occasionally occurs in temperate rainforest, and also in herbfields, heathlands, shrublands and sedgeland at high altitudes. In winter, birds migrate to drier more open habitats in the lowlands (i.e. valleys below the ranges, and to the western slopes and plains) (OEH 2015).	BirdLife Atlas (2)	Potential – there are two records of the species in the locality and forest and woodland within the Option 1 corridor may provide suitable habitat.	BirdLife Atlas (7)	Potential – there are seven records of the species in the locality and forest and woodland within the Option 2 corridor may provide suitable habitat.
<i>Melanodryas cucullata</i> Hooded Robin	V	-	Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses.	BirdLife Atlas (7)	Potential – while the species has not been recorded in the locality in almost 15 years, areas of open woodland may provide suitable habitat for the species.	BirdLife Atlas (1)	Potential – while the species has not been recorded in the locality for the last 15 years, areas of open woodland may provide suitable habitat for the species.
<i>Oxyura australis</i> Blue-billed Duck	V	-	The Blue-billed Duck is endemic to south-eastern and south-western Australia. It is widespread in NSW, but most common in the southern Murray-Darling Basin area. Birds disperse during the breeding season to deep swamps up to 300km away. The Blue-billed Duck prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation. The species is completely aquatic, swimming low in the water along the edge of dense cover. They feed on the bottom of swamps eating seeds, buds, stems, leaves, fruit and small aquatic insects such as the larvae of midges, caddisflies and dragonflies. Blue-billed Ducks are partly migratory, with short-distance movements between breeding swamps	ERM	Known - This species has been recently recorded from the Biala Wind Farm Project Area, and dams and swampy areas in the Proposed Corridor may provide suitable habitat.	ERM	Known - This species has been recently recorded from the Biala Wind Farm Project Area, and dams and swampy areas in the Proposed Corridor may provide suitable habitat.

Species	TSC Act Status	EPBC Act Status	Habitat Requirements	Option 1		Option 2	
				Source (records)	Likelihood of Occurrence	Source (records)	Likelihood of Occurrence
			and overwintering lakes with some long-distance dispersal to breed during spring and early summer (OEH 2015).				
<i>Calyptorhynchus lathami</i> Glossy Black-Cockatoo	V	-	The species is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (<i>Allocasuarina littoralis</i>) and Forest Sheoak (<i>A. torulosa</i>) are important foods. Dependent on large hollow-bearing eucalypts for nest sites. A single egg is laid between March and May (OEH 2015).	ERM.	Known - This species has been recently recorded from the Biala Wind Farm Project Area, and woodland in the Proposed Corridor may provide suitable habitat.	ERM	Known - This species has been recently recorded from the Biala Wind Farm Project Area, and woodland in the Proposed Corridor may provide suitable habitat.
<i>Epthianura albifrons</i> White-fronted Chat	V	-	The White-fronted Chat is found across the southern half of Australia, from southernmost Queensland to southern Tasmania, and across to Western Australia as far north as Carnarvon. Found mostly in temperate to arid climates and very rarely sub-tropical areas, it occupies foothills and lowlands up to 1000 m above sea level. In NSW, it occurs mostly in the southern half of the state, in damp open habitats along the coast, and near waterways in the western part of the state (OEH 2015).	BirdLife Atlas (3)	Known - This species has been recently recorded from the Project Area and woodland in the Proposed Corridor may provide suitable habitat.	BirdLife Atlas (6)	Known - This species has been recently recorded from the Project Area and woodland in the Proposed Corridor may provide suitable habitat.
<i>Ninox strenua</i> Powerful Owl	V	-	Within NSW, this species is widely distributed throughout the eastern forests from the coast inland to the tablelands with scattered, historical records from the western slopes and plains. Inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. Breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. Generally requires large tracts of forest or woodland habitat	ERM	Known - This species has been recently recorded from the Biala Wind Farm Project Area and woodland in the Proposed Corridor may provide suitable foraging habitat.	NSW Atlas (1)	Known - This species has been recently recorded from the Biala Wind Farm Project Area and woodland in the Proposed Corridor may provide suitable foraging habitat.

				Option 1		Option 2	
Species	TSC Act Status	EPBC Act Status	Habitat Requirements	Source (records)	Likelihood of Occurrence	Source (records)	Likelihood of Occurrence
			but can occur in fragmented landscapes as well. Nest in large tree hollows (at least 0.5m deep), in large eucalypts (DBH of 80-240cm) that are at least 150 years old. As most prey species (e.g. possums, gliders, birds, flying-fox) require hollows and a shrub layer, these are important habitat components (OEH 2015).				
<i>Stagonopleura guttata</i> Diamond Firetail	V	-	It is widely distributed in NSW, with a concentration of records from the Northern, Central and Southern Tablelands, the Northern, Central and South Western Slopes and the North West Plains and Riverina. Not commonly found in coastal districts, though there are records from near Sydney, the Hunter Valley and the Bega Valley. This species has a scattered distribution over the rest of NSW, though is very rare west of the Darling River. Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum (<i>Eucalyptus pauciflora</i>) Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland. Has been recorded in some towns and near farm houses (OEH 2015).	BirdLife Atlas (16)	Known - there is one Diamond Firetail record within the corridor from 2012 (Bird Life Australia Atlas). Woodland and grassland throughout the Proposed Corridor may provide suitable habitat.	BirdLife Atlas (1)	Potential - although the species has not been recorded in the locality for over 15 years, woodland and grassland throughout the Proposed Corridor may provide suitable habitat.
MAMMALS							
<i>Dasyurus maculatus</i> Spotted-tailed Quoll	V	E	This subspecies has been recorded from a wide range of habitats, including: rainforests, wet sclerophyll forest, open and closed eucalypt woodland, inland riparian forests and dry 'rainshadow' woodland. The Spotted-tailed Quoll has a preference for mature wet forest habitat, especially in areas with rainfall 600 mm/year. Unlogged forest or forest that has been less disturbed by timber harvesting is also	PMST, No records	Unlikely - there are no records of the species in the locality and the Option 1 corridor is not considered to provide suitable habitat, due to limited connectivity to large areas of intact	PMST, No records	Potential - while the species has not been recorded in the locality, large tracts of forest in the south of the Option 2 corridor, which the southern portion of the

				Option 1		Option 2	
Species	TSC Act Status	EPBC Act Status	Habitat Requirements	Source (records)	Likelihood of Occurrence	Source (records)	Likelihood of Occurrence
			preferable. Habitat requirements include suitable den sites such as hollow logs, tree hollows, rock outcrops or caves. Individuals require an abundance of food, such as birds and small mammals, and large areas of relatively intact vegetation through which to forage (DOE 2015).		vegetation.		corridor passes through, may provide suitable habitat.
<i>Falsistrellus tasmaniensis</i> Eastern False Pipistrelle	V	-	This species is found in tall, mature, wet forest. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings (OEH 2015).	NA	NA	NSW Atlas (1)	Potential – there is one record of the species from 2009 in the locality, and forest in the Option 2 corridor may provide suitable habitat.
<i>Phascolarctos cinereus</i> Koala	V	V	In NSW, mainly occurs on the central and north coasts with some populations in the western region where it inhabits eucalypt woodlands and forests and feeds on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species (OEH 2015).	PMST, NSW Atlas (2)	Unlikely – the species has not been recorded in the locality for over 45 years. However, woodland and open forest in the Option 1 corridor may support potential feed trees.	NSW Atlas (2)	Unlikely – the species has not been recorded in the locality for 45 years. However, woodland and open forest in the Option 2 corridor may support potential feed trees.
<i>Miniopterus schreibersii oceanensis</i> Eastern Bentwing-bat	V	-	Hunt in forested areas, catching moths and other flying insects above the tree tops. Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures.	ERM	Known –there is a probable record of the species within Biala Wind Farm Project Area. Woodland and open forest in the Proposed Corridor may provide suitable foraging habitat.	NSW Atlas (1)	Known – the species has been recorded in the locality, and there is a probable record within Biala Wind Farm Project Area. Woodland and open forest in the Proposed Corridor may provide suitable foraging habitat.

				Option 1		Option 2	
Species	TSC Act Status	EPBC Act Status	Habitat Requirements	Source (records)	Likelihood of Occurrence	Source (records)	Likelihood of Occurrence
<i>Scoteanax rueppellii</i> Greater Broad-nosed Bat	V	-	Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings. Open woodland habitat and dry open forest suits the direct flight of this species as it searches for beetles and other large, slow-flying insects; this species has been known to eat other bat species. The Greater Broad-nosed Bat is found mainly in the gullies and river systems that drain the Great Dividing Range, from north-eastern Victoria to the Atherton Tableland. It extends to the coast over much of its range. In NSW it is widespread on the New England Tablelands, however does not occur at altitudes above 500 m (OEH 2015).	NA	NA	NSW Atlas (1)	Unlikely - OEH (2015) state that the species does not occur at altitudes above 500m.
<i>Myotis macropus</i> Southern Myotis	V	-	Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, and storm water channels, buildings, under bridges and in dense foliage. Forage over streams and pools catching insects and small fish by raking their feet across the water surface. Found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100km inland, except along major rivers.	ERM	Known - Probable record within Biala Wind Farm Project Area. Woodland and open forest in the Proposed Corridor may provide suitable foraging and roosting habitat.	ERM	Known - Probable record within Biala Wind Farm Project Area. Woodland and open forest in the Proposed Corridor may provide suitable foraging and roosting habitat.
MIGRATORY BIRDS							
<i>Apus pacificus</i> Fork-tailed Swift	-	Mi, Ma	The Fork-tailed Swift is almost exclusively aerial, flying from less than 1m to at least 300m above ground and probably much higher. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They are also found at treeless grassland and sandplains covered with spinifex, open	PMST, No records	Potential - the species has not been recorded within the locality, however due to the species' broad habitat requirements, the Option 1 corridor may	PMST, No records	Potential - the species has not been recorded within the locality, however due to the species' broad habitat requirements, the

Species	TSC Act Status	EPBC Act Status	Habitat Requirements	Option 1		Option 2	
				Source (records)	Likelihood of Occurrence	Source (records)	Likelihood of Occurrence
			farmland and inland and coastal sand-dunes. They sometimes occur above rainforests, wet sclerophyll forest or open forest or plantations of pines (DOE 2015).		contain suitable habitat.		Option 2 corridor may contain suitable habitat.
<i>Haliaeetus leucogaster</i> White-bellied Sea-Eagle	-	Mi, Ma	The White-bellied Sea-Eagle is found in coastal habitats (especially those close to the sea-shore) and around terrestrial wetlands in tropical and temperate regions of mainland Australia and its offshore islands. The habitats occupied by the sea-eagle are characterised by the presence of large areas of open water (larger rivers, swamps, lakes, the sea). Birds have been recorded in (or flying over) a variety of terrestrial habitats (DOE 2015).	PMST, No records	Potential - the species has not been recorded within the locality, and the Option 1 corridor does not contain large areas of open water, however the species may fly over the corridor.	PMST, No records	Potential - the species has not been recorded within the locality, and the Option 2 corridor does not contain large areas of open water, however the species may fly over the corridor.
<i>Hirundapus caudacutus</i> White-throated Needletail		Mi, Ma	In Australia, the White-throated Needletail is almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground. Because they are aerial, it has been stated that conventional habitat descriptions are inapplicable, but there are, nevertheless, certain preferences exhibited by the species. Although they occur over most types of habitat, they are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland (DOE 2015).	PMST, BirdLife Atlas (1).	Potential - the species has been recorded within the locality, and due to the species' broad habitat requirements, the Option 1 corridor may contain suitable habitat.	PMST, No records	Potential - the species has not been recorded within the locality, however due to the species' broad habitat requirements, the Option 2 corridor may contain suitable habitat.
<i>Merops ornatus</i> Rainbow Bee-eater	-	Mi, Ma	The Rainbow Bee-eater occurs mainly in open forests and woodlands, shrublands, and in various cleared or semi-cleared habitats, including farmland and areas of human habitation (DOE 2015).	PMST, NSW Atlas (1)	Potential - the species is wide-ranging and has generalist habitat requirements.	PMST, NSW Atlas (1)	Potential - the species is wide-ranging and has generalist habitat requirements.

				Option 1		Option 2	
Species	TSC Act Status	EPBC Act Status	Habitat Requirements	Source (records)	Likelihood of Occurrence	Source (records)	Likelihood of Occurrence
<i>Monarcha melanopsis</i> Black-faced Monarch	-	Mi, Ma	The Black-faced Monarch mainly occurs in rainforest ecosystems, including semi-deciduous vine-thickets, complex notophyll vine-forest, tropical (mesophyll) rainforest, subtropical (notophyll) rainforest, mesophyll (broadleaf) thicket/shrubland, warm temperate rainforest, dry (monsoon) rainforest and (occasionally) cool temperate rainforest (DOE 2015).	PMST, No records	Unlikely – the species has not been recorded in the locality and, due to the absence of rainforest in or near the corridor, the Option 1 corridor does not provide suitable habitat.	PMST, No records	Unlikely – the species has not been recorded in the locality and, due to the absence of rainforest, or nearby rainforest, the Option 2 corridor does not provide suitable habitat.
<i>Myiagra cyanoleuca</i> Satin Flycatcher	-	Mi, Ma	Satin Flycatchers inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, and on migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests. They sometimes also occur in dry sclerophyll forests and woodlands, usually dominated by eucalypts such as Blakely's Red Gum, <i>E. blakelyi</i> , Mugga Ironbark, <i>E. sideroxylon</i> , Yellow Box, White Box, <i>E. albens</i> , Manna Gum or stringybarks, including Red Stringybark, <i>E. macrorhyncha</i> and Broad-leaved Stringybark, usually with open understorey (DOE 2015).	PMST, No records	Potential – the species has not been recorded in the locality, however woodland and open forest in the Option 1 corridor may provide suitable habitat.	PMST, No records	Potential – the species has not been recorded in the locality, however woodland and open forest in the Option 2 corridor may provide suitable habitat.
<i>Rhipidura rufifrons</i> Rufous Fantail	-	Mi, Ma	In east and south-east Australia, the Rufous Fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts such as Tallow-wood (<i>Eucalyptus microcorys</i>), Mountain Grey Gum (<i>E. cypellocarpa</i>), Narrow-leaved Peppermint (<i>E. radiata</i>), Mountain Ash (<i>E. regnans</i>), Alpine Ash (<i>E. delegatensis</i>), Blackbutt (<i>E. pilularis</i>) or Red Mahogany (<i>E. resinifera</i>); usually with a dense shrubby understorey often including ferns. When on passage, they are sometimes recorded in drier sclerophyll forests and woodlands, including Spotted Gum (<i>Eucalyptus maculata</i>), Yellow Box (<i>E. melliodora</i>), ironbarks or stringybarks, often with a shrubby or	PMST, No records	Potential – the species has not been recorded in the locality, however woodland and open forest in the Option 1 corridor may provide suitable habitat while the species is on passage.	PMST, No records	Potential – the species has not been recorded in the locality, however woodland and open forest in the Option 2 corridor may provide suitable habitat while the species is on passage.

				Option 1		Option 2	
Species	TSC Act Status	EPBC Act Status	Habitat Requirements	Source (records)	Likelihood of Occurrence	Source (records)	Likelihood of Occurrence
			heath understorey. They are also recorded from parks and gardens when on passage (DOE 2015).				
<i>Ardea alba</i> Great Egret	-	Mi, Ma	The Eastern Great Egret has been reported in a wide range of wetland habitats. These include swamps and marshes; margins of rivers and lakes; damp or flooded grasslands, pastures or agricultural lands; reservoirs; sewage treatment ponds; drainage channels; salt pans and salt lakes; salt marshes; estuarine mudflats, tidal streams; mangrove swamps; coastal lagoons; and offshore reefs.	PMST, No records	Potential - the species has not been recorded in the locality in almost 20 years, however dams and watercourses may provide suitable habitat, and grasslands may provide suitable habitat after rain.	PMST, BirdLife Australia (11)	Potential - there are 11 records of the species in the locality (most recently in 2013). Dams and watercourses may provide suitable habitat, and grasslands may provide suitable habitat after rain.
<i>Ardea ibis</i> Cattle Egret	-	Mi, Ma	The Cattle Egret occurs in tropical and temperate grasslands, wooded lands and terrestrial wetlands. High numbers have been observed in moist, low-lying poorly drained pastures with an abundance of high grass; it avoids low grass pastures. It uses predominately shallow, open and fresh wetlands including meadows and swamps with low emergent vegetation and abundant aquatic flora. They have sometimes been observed in swamps with tall emergent vegetation (DOE 2015).	PMST, No records	Potential - the species has not been recorded in the locality, however areas of grassland may provide suitable habitat after rain.	PMST, No records	Potential - the species has not been recorded in the locality, however areas of grassland may provide suitable habitat after rain.
<i>Gallinago hardwickii</i> Latham's Snipe	-	Mi, Ma	In Australia, Latham's Snipe occurs in a wide variety of permanent and ephemeral wetlands. They usually occur in open, freshwater wetlands that have some form of shelter (usually low and dense vegetation) nearby. They generally occupy flooded meadows, seasonal or semi-permanent swamps, or open waters, but various other freshwater habitats can be used including bogs, waterholes, billabongs, lagoons, lakes, creek or river margins, river pools and floodplains (DOE 2015).	PMST, No records	Potential - the species has not been recorded in the locality, however dams and watercourses may provide suitable habitat, and grasslands may provide suitable habitat after rain.	PMST, No records	Potential - the species has not been recorded in the locality, however dams and watercourses may provide suitable habitat, and grasslands may provide suitable habitat after rain.

				Option 1		Option 2	
Species	TSC Act Status	EPBC Act Status	Habitat Requirements	Source (records)	Likelihood of Occurrence	Source (records)	Likelihood of Occurrence
<i>Pandion cristatus</i> Eastern Osprey	-	Mi	Eastern Ospreys occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They are mostly found in coastal areas but occasionally travel inland along major rivers, particularly in northern Australia. They require extensive areas of open fresh, brackish or saline water for foraging (DOE 2015).	PMST, No records	Potential – this species has not been recorded in the locality, and, based on Atlas of Living Australia records, does not appear to typically occur in the region. However, the species may infrequently fly over or temporarily enter the proposed corridor.	NA	NA
<i>V = vulnerable; E = endangered; CE = critically endangered; Mi = Migratory; Ma = Marine</i> <i>PMST = Protected Matters Search Tool</i>							

4. Conclusion

The impact of the selected transmission line option on ecological values will need to be assessed under the TSC Act and EPBC Act, including potential impacts to threatened ecological communities, and threatened and migratory species identified as known, or having potential to occur within the corridor (refer *Table 3*).

Based on the desktop information available, both transmission line options have the potential to impact on:

- areas that may constitute the TSC Act and EPBC Act listed community, White Box Yellow Box Blakely's Red Gum Woodland;
- other threatened ecological communities which are not accurately reflected in the available desktop vegetation mapping; and
- threatened species and their habitats.

It appears that Option 1 may require less tree clearing than Option 2, as development of Option 2 would require widening of an existing easement along approximately 5 km of the alignment located within forest/woodland. However, regardless of avoidance of trees, disturbance to Natural Temperate Grassland, or the derived grassland form of White Box-Yellow Box-Blakeley's Red Gum Grassy Woodland, would result in removal of an area of threatened ecological community. Ground-truthing will be required to delineate any areas of threatened ecological communities within the selected corridor, including derived native grassland forms, to verify that threatened ecological communities can be avoided.

Due to the Option 1 corridor requiring establishment of a new easement, there may be greater flexibility to avoid disturbance to ground-truthed threatened ecological communities or threatened species habitat features than for Option 2, which is aligned parallel to an existing transmission line.

References

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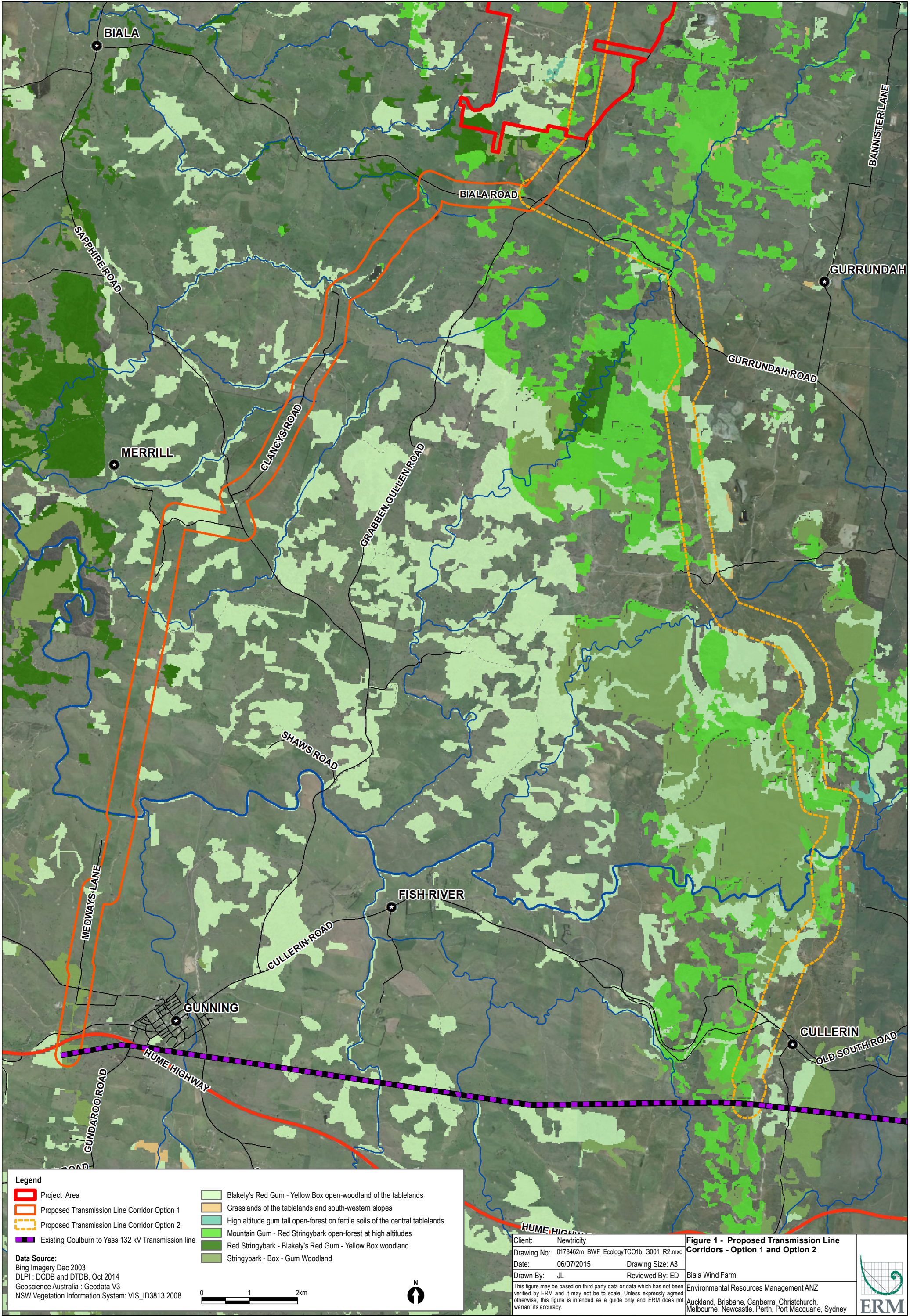
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ATTACHMENT A

Figures



Appendix F

PRELIMINARY HERITAGE ASSESSMENT BY ERM

**External
Memo**

Level 15, 309 Kent Street
Sydney NSW 2000
AUSTRALIA

To Michael Brennan, Clarence Consultants Locked Bag 3012, Australia Square
NSW 1215 AUSTRALIA

CC Annmaree Lavery, Newtricity www.erm.com

From Erin Dethridge, ERM

Ref/Job Number 0178462 Telephone: +61 2 8584 8888
Facsimile: +61 2 8584 8800

Subject Desktop Heritage Review of Biala Transmission Line Options

Date 2 July 2015



1. Introduction

Environmental Resources Management Australia Pty Ltd (ERM) has been engaged by Newtricity to undertake a high-level, desktop-based heritage assessment of the proposed transmission line options for the Biala Wind Farm to identify initial development constraints. The assessment focussed on known and potential Aboriginal and historic heritage values.

The following definitions have been used in this preliminary assessment:

- *Option 1 (West) Corridor*: 500 metre (m) corridor centred on proposed 132kV Transmission Line Option 1 alignment, as shown in *Figure 1* at *Attachment A*; and
- *Option 2 (East) Corridor*: 500 m corridor centred on proposed 132kV Transmission Line Option 2 alignment, as shown in *Figure 1* at *Attachment A*.

2. Methodology

A desktop review was undertaken and included a literature and database review of heritage values of the transmission line corridor options. Data sources included:

- topographic, soil and geological maps and aerial photography;
- Office of Environment and Heritage (OEH) Aboriginal Heritage Information Management System (AHIMS) database;
- Australian Heritage Database (including the Register of the National Estate, the Commonwealth Heritage List, the World Heritage List and the National Heritage List);
- State Heritage Register;
- Upper Lachlan Local Environmental Plan (LEP) 2010;
- Historic Heritage Information Management System (HHIMS); and

- The Register of the National Trust of Australia.

3. Results

Results of the desktop review for the proposed transmission line options are provided in the table below. Information obtained from this review was used to identify known heritage values, and to develop a predictive model for heritage values to occur within each of the proposed transmission line options.

3.1 *Aboriginal Heritage*

Attribute	Option 1	Option 2
Topography	According to definitions outlined by Speight (2009), topographic mapping indicates that the Option 1 corridor is comprised of several landforms that include crests, ridges, open depressions, simple slopes, upper, mid and lower slopes and flats (Speight 2009).	During previous assessments of the proposed Option 2 corridor, Austral Archaeology (2009) defined the corridor as traversing a variety of landforms including flat to gently sloping terrain, moderate to steeply inclining rolling hills and a ridgeline.
Hydrology	The Lachlan River, a large and permanent water course, dissects the southern portion of the proposed corridor. Several tributaries of the Lachlan River also dissect the proposed corridor to the south including Merrill and Martin creeks to the north, and Merrill and Gunningdelbulla creeks further north. There are also numerous smaller unnamed water courses that also dissect the proposed corridor.	The proposed Option 2 corridor also traverses the Lachlan River and several of its tributaries. The proposed corridor traverses tributaries of Diamond Creek and Humes Creek to the north. There are also numerous smaller unnamed water courses that also dissect the proposed corridor.
Soil/Geology	The Option 1 corridor predominantly overlies geological deposits associated with the Gunning Granite formation (porphyritic hornblende granodiorite with biotite, magnetite, allanite, apatite, zircon and relict calcic cores in plagioclase; minor aplite and miarolitic leucogranite soda granite (Branagan et al 1967)). Mapped soil types include Soloths (acid soils with strong texture contrast between pale topsoil and clay subsoil with coarse blocky or columnar structure), Siliceous sands; Chocolate soils (Brown dermosols); and Yellow podzolic soils (Hird 1990).	The Option 2 corridor predominantly overlies geological deposits associated with the Abercrombie Formation (brown and buff to grey thinly to thickly bedded fine to coarse grained mic quartz sandstone, interbedded with laminated siltstone and mudstone. Discrete chert rich packages occur' (Johnston et al 2008)). A portion of the Option 2 corridor also runs within proximity to the Grabben Gullen fault (Johnston et al 2008). Mapped soil types include Soloths (acid soils with strong texture contrast between pale topsoil and clay subsoil with coarse blocky or columnar structure); Siliceous sands; Chocolate soils (Brown dermosols); Yellow podzolic soils, Yellow earths and Shallow soils (Hird 1990).

Attribute	Option 1	Option 2
Previously Recorded Sites	No previously recorded Aboriginal heritage sites were identified by an AHIMS database search within or in proximity to the length of the Option 1 corridor. The nearest previously recorded site is located approximately 1.4 m west of the proposed corridor. This site comprises a stone artefact scatter adjacent to the Lachlan River (AHIMS Site ID # 51-5-0062). The limited number of sites identified by the AHIMS search is likely a reflection of limited investigation in this area, rather than the actual archaeological record.	Thirty-six Aboriginal Heritage Sites were identified by an AHIMS database search of the proposed transmission corridor including 32 stone artefact sites (89%) (divided into 21 isolated finds (58%) and 11 stone artefact scatters (31%)), three potential archaeological deposits (8%) and one culturally modified tree (3%). A large number of these sites are located within or in close proximity to the proposed transmission line (refer to <i>Figures 2 and 3 at Attachment A</i>).
Previous Research	Aboriginal heritage sites within the wider region have been identified predominantly associated with the heritage work for Gunning Wind Farm (GWF 1 – 38) (JMCHM 2003; Austral Archaeology 2005; 2009). These sites are mostly stone artefact sites including open camp sites with some scarred trees (GWF 10; GWF 35) and a quarry site also observed (GWF 1). These sites have been identified within landforms including slopes and crests, creek banks and gentle rises above them, hilltops and on the banks of streams (Austral Archaeology 2009).	The southern portion of the corridor follows an existing transmission line that has been previously assessed as part of archaeological investigations for Gunning Wind Farm (Austral Archaeology 2009). This assessment identified 25 Aboriginal heritage sites including 13 artefact scatters, 9 isolated finds, 2 areas of PADs and a scarred tree. These sites were mostly recorded within 300 m of a water course and within landforms including slopes and a crest of a ridge landform (30%), hillslopes (46%), creek banks and associated rises (12%) and hilltops (9%) (Austral Archaeology 2009). Silcrete was the dominant lithology present, with lower amounts of quartz, fine grained siliceous material and mudstone also present (Austral Archaeology 2009). As part of the subsequent development of this transmission line, a number of these sites were subject to Section 87/90 Consents, and have been subsequently salvaged and relocated.
Predictive Model	Based on the environmental context of the Option 1 corridor, previous archaeological research and the spatial distribution of recorded Aboriginal heritage sites the following predictions can be made: • There are numerous landform units within the proposed corridor that are associated with previously recorded sites including slopes, crests, creek banks,	Based on the environmental context of the Option 2 corridor, previous archaeological research and the spatial distribution of recorded Aboriginal heritage sites the following predictions can be made: • Aboriginal heritage sites occurring within the proposed corridor will likely be stone artefact sites; • Stone artefacts found will likely be made

Attribute	Option 1	Option 2
	gentle rises, hilltops and stream banks; • It is likely that sites will be located within proximity to a water source; • The Lachlan River is a key landscape feature within the wider region which would have been an attractive location for camping and utilisation of various subsistence resources; and • Aboriginal heritage sites will likely be stone artefact sites, though other sites may be found including scarred trees, quarries, stone arrangements, burial sites, art sites, shelter sites, middens and grinding grooves.	of silcrete, with smaller amounts of quartz present; • Aboriginal heritage sites will most likely occur within landforms including slopes, crests, hillslopes, creek banks and associated rises and hilltops; and • Sites will likely be found within 300m of a water source.

3.2 *Historic Heritage*

The region of the Option 1 and Option 2 corridors was first explored by Hamilton Hume, Charles Throsby, James Meehan and John Oxley between 1817 and 1820. This initial exploration indicated that the area had a good potential for grazing. Subsequently the area was settled in the 1820s.

In 1851 the region flourished as a result of the Australian Gold Rush. Towns in the region expanded rapidly as miners set up one room houses in urbanised villages between the 1850s and 1900. These houses were often constructed simply of materials such as bark, weatherboard and iron sheet. Remnants of mining activities remain in the landscape today and include mine shafts, tunnels, spoil heaps and structural infrastructure (NSW NPWS 2003). There was also a copper rush from the 1840s to the late 1890s which was focused predominantly within the northern portion of the South Eastern Highlands Bioregion.

Remnants of mining activities remain in the landscape today and include mine shafts, tunnels, spoil heaps and structural infrastructure (NSW NPWS 2003). There was also a copper rush from the 1840s to the late 1890s which was focused predominantly within the northern portion of the South Eastern Highlands Bioregion.

Desktop research has revealed that there are three historic heritage items within and in close proximity to the proposed Option 1 corridor. These items are listed within the Upper Lachlan LEP 2010 and include:

- Building known as ‘Collingwood’ (LEP ID # I113);
- Baltinglass Homestead (LEP ID # I97); and
- Boureong (LEP ID # I91).

The heritage curtilages of the ‘Collingwood’ building and Baltinglass Homestead are partially located within the proposed Option 1 corridor. The Boureong heritage item is located approximately 700 m east of the proposed corridor.

Desktop research shows no historic heritage items within, or in close proximity to the Option 2 corridor. However, the historical development of the location of this corridor and the surrounding region has been such that there may be some evidence of early agricultural activities, timber harvesting, domestic dwelling remains and associated features, gold mining activities, the division of land for the establishment of towns and subsequent transport links, and mines.

4. Conclusion

Based on the desktop information available, both transmission line options have the potential to impact on both Aboriginal and historic heritage values. While no Aboriginal heritage sites have previously been recorded within the Option 1 corridor, this is likely a reflection of a lack of previous investigation, rather than the archaeological record. Predictive modelling has demonstrated that both transmission line options traverse landforms that have the potential to contain Aboriginal heritage sites, and that these sites would most likely be in the form of stone artefacts or culturally modified trees (other sites such as quarries, stone arrangements, burial sites, art sites, shelter sites, middens and grinding grooves may also be present however).

No historic heritage sites have been previously recorded within the Option 2 corridor. Three heritage items listed on the Upper Lachlan LEP 2010 have been identified within or in proximity of the Option 1 corridor. The heritage curtilages of two of these items are partially located within the proposed corridor. The installation of the transmission line within or adjacent to the curtilages of the 'Collingwood' building and Baltinglass Homestead may result in impacts to the heritage values of these items. Further assessment would be required to determine the nature and extent of these impacts to seek approval from council (such as the preparation of a Statement of Heritage Impact).

The landscape has been historically used for agricultural purposes, and activities such as gold mining have occurred within the region. There is a potential for historic heritage items associated with agricultural activities and settlement across the region to be located within both of the proposed corridor options. Evidence of activities associated with the gold rush in the region such as mine shafts or pits may also be present.

Ground-truthing will be required to identify Aboriginal and historic heritage items and areas of archaeological potential within the Option 1 and Option 2 corridors.

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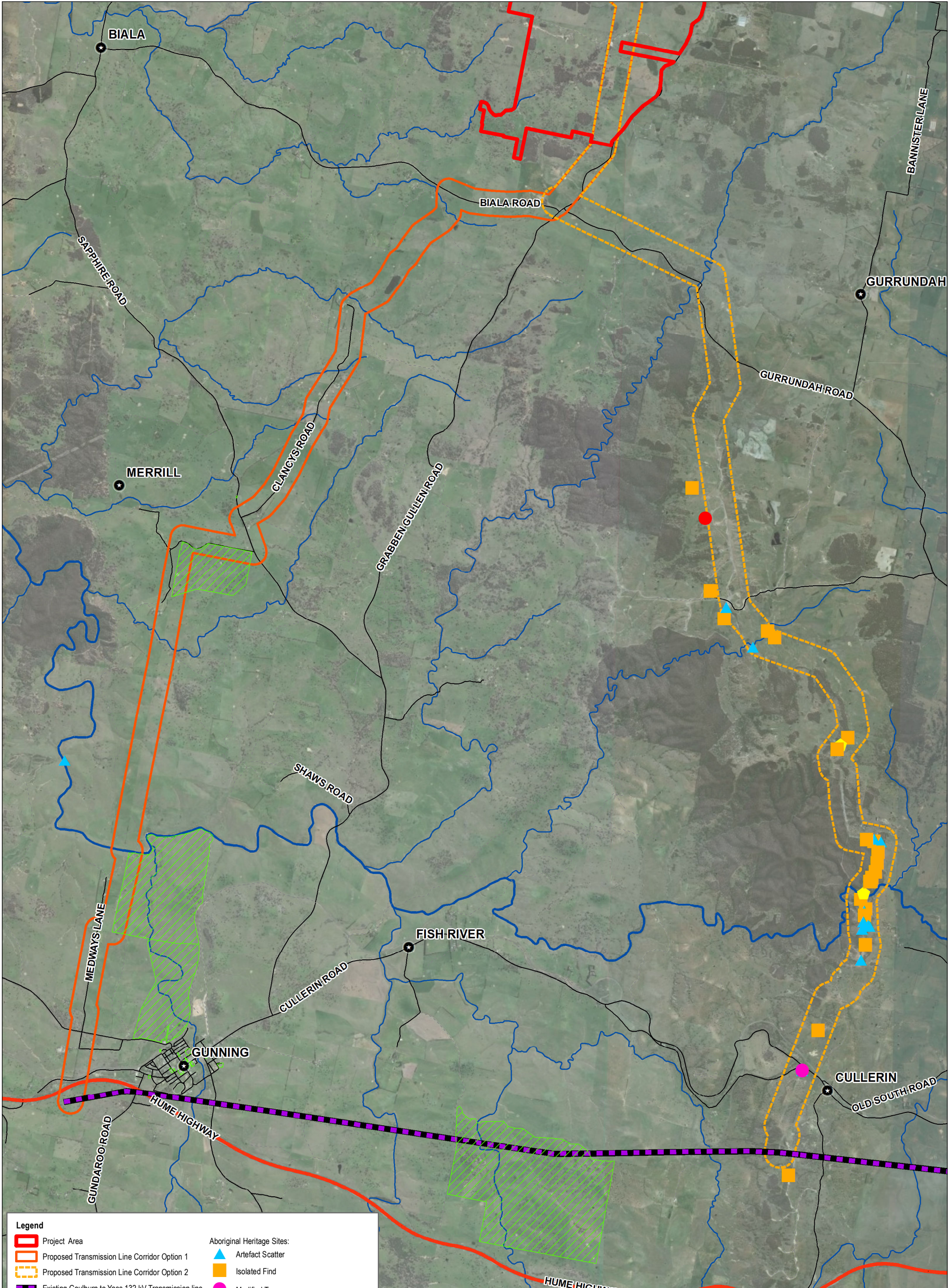
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ATTACHMENT A

Figures



Legend

Project Area

Proposed Transmission Line Corridor Option 1

Proposed Transmission Line Corridor Option 2

Existing Goulburn to Yass 132 kV Transmission line

Historic Heritage Site

Aboriginal Heritage Sites:

Artefact Scatter

Isolated Find

Modified Tree

Potential Archaeological Deposit

Potential Archaeological Deposit (PAD) : 1

Data Source:
Bing Imagery Dec 2003
DLPI : DCDB and DTDB, Oct 2014

Geoscience Australia : Geodata V3
NSW Vegetation Information System:
VIS_ID3813 2008

0

0.5

1km

N

Client: Newtricity

Drawing No: 0178462m_BWF_HERI_G001_R2.mxd

Date: 06/07/2015

Drawn By: JM

Drawing Size: A3

Reviewed By: ED

Figure 1 - Proposed Transmission Line Corridors - Option 1 and Option 2

Biala Wind Farm

Environmental Resources Management ANZ

Auckland, Brisbane, Canberra, Christchurch, Melbourne, Newcastle, Perth, Port Macquarie, Sydney

Appendix G

LANDOWNER AND COMMUNITY ENGAGEMENT

Ref:

30 September 2014

Xxxxx
Xxx
Xxx
Xxx

Dear Landowner,

**Re: Newtricity Biala Wind Farm
Electricity Network Connection**

Newtricity is proposing to construct the Biala Wind farm comprising up to 40 wind turbine generators, a 132kV powerline and ancillary infrastructure. The wind farm development will be located approximately 24km North of Gunning township.

Clarence Consultants have been engaged by Newtricity to investigate the powerline required to connect the windfarm to the existing electricity network. We have identified a feasible route for the powerline that crosses land owned by you. We are writing to you to provide you with information about the project, the process and initiate discussions in regard to the powerline.

Privacy legislation makes it difficult for us to initially identify and contact landowners and Upper Lachlan Shire Council are assisting us by sending this correspondence on our behalf to all potentially involved landowners.

To assist us in continuing ongoing contact we will appreciate you advising us of your contact details. Written advice is preferred. We can be contacted at:

email: biala@clarenceconsultants.com.au

fax: 02 6642 4868

mail: PO Box 1261, Grafton NSW 2460

phone: 02 6642 7239

Grafton

Level 1

53 Victoria St,

PO Box 1261

GRAFTON 2460

Ph: 02 6642 7239

Fax: 02 6642 4868

Coffs Harbour

Ph: 02 6652 4855

Information on the investigations and outcomes to date is provided in the Information Sheets accompanying this letter. We invite you to read the information and email or write to us with your comments, concerns or suggestions.

Planning for the powerline is still in an early phase and Newtricity and Clarence Consultants do need your input into the project to ensure that the final route for the powerline addresses as many landholder and stakeholder concerns and issues as possible.

We thank you for your help in this and look forward to your input.

Yours sincerely



Michael Brennan M.I.E. Aust CPEng. RPEQ RBP(Vic)
Director



Ref:

30 September 2014

Xxxxx
Xxx
Xxx
Xxx

Dear xxxxx,

**Re: Newtricity Biala Wind Farm
Electricity Network Connection**

Newtricity is proposing to construct the Biala Wind farm comprising up to 40 wind turbine generators, a 132kV powerline and ancillary infrastructure. The wind farm development will be located approximately 24km North of Gunning township.

Clarence Consultants have been engaged by Newtricity to investigate the powerline required to connect the windfarm to the existing electricity network. We have identified a feasible route and we are writing to you to provide you with information about the project, the process and seek your comments on this preliminary route.

Information on the investigations and outcomes to date is provided in the Information Sheets accompanying this letter. We invite you to read the information and email or write to us with your comments. .

Planning for the powerline is still in an early phase and Newtricity and Clarence Consultants do need your input into the project to ensure that the final route for the powerline addresses as many landholder and stakeholder concerns and issues as possible.

We thank you for your help in this and look forward to your input.

Yours sincerely

Grafton

Level 1
53 Victoria St,
PO Box 1261
GRAFTON 2460
Ph: 02 6642 7239
Fax: 02 6642 4868

Coffs Harbour

Ph: 02 6652 4855

Michael Brennan M.I.E. Aust CPEng. RPEQ RBP(Vic)
Director

Biala Wind Farm Electricity Network Connection

Information Sheet 1 - Proposed Powerline Route
September 2014



Introduction

Newtricity is proposing to construct the Biala Wind Farm comprising up to 40 Wind Turbine Generators, a powerline to connect the wind farm to the electricity network and ancillary infrastructure. The wind farm development will be located approximately 24km North of Gunning township (Fig 1).

Clarence Consultants is assisting Newtricity in determining a route for the powerline to connect the wind farm to the existing electricity network.

Landowner and Stakeholder Consultation

The engagement of landowners and stakeholders early in the planning and investigations is key in establishing a final route that addresses as many concerns and issues as possible.

Landowners and stakeholders along the proposed route are invited to contribute to the ongoing development of the final route and alignment of the powerline.

This is the first of a number of communications with landowners and stakeholders.

Network Connection

The wind farm has a proposed output of 80MW and with this capacity it must be connected to the high voltage electricity network. Network connection option studies identified two possible connection points. They were:

- Transgrid 330kV near the Goldwind Wind Farm, or
- Essential Energy 132 kV Goulburn to Yass 132 kV line.

The 330 kV connection requires the construction of a 330 kV to 132 kV substation and associated 330kV transmission line works. The 132kV connection requires a 132kV powerline and a 132kV switching station at the existing network point of connection.

Newtricity have investigated both options for technical and commercial feasibility and have concluded a connection to the existing Goulburn to Yass 132 kV line is technically less complex than the 330 kV connection and better suited to the scale of the Biala Wind Farm.

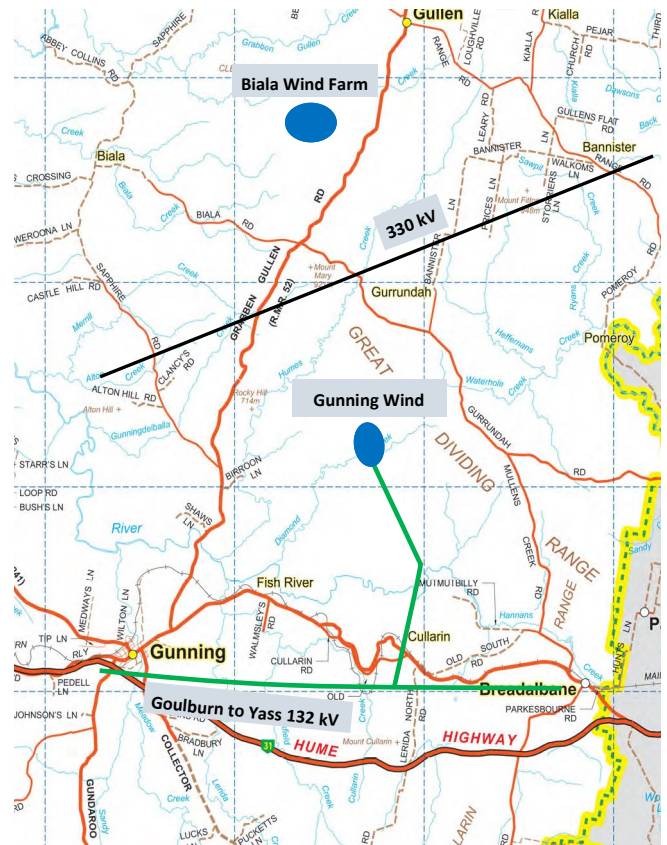


Figure 1—Site Locality

Line Route Investigation

The line route investigation identified a study area and two possible corridors within the study area. Both corridors will require the construction of a new 132 kV line between the Biala Wind Farm and the Goulburn to Yass 132 kV line.

There is an existing 132 kV line between the Gunning Wind Farm and the Goulburn to Yass 132 kV line, however, the line was constructed specifically for that wind farm and does not have sufficient capacity for use by the Biala Wind Farm. It is not feasible to upgrade the line, necessitating the construction of a new dedicated line for the Biala Wind Farm.

The “west” corridor has been assessed as having less environmental impact and is considered less constrained with respect to construction and maintenance.

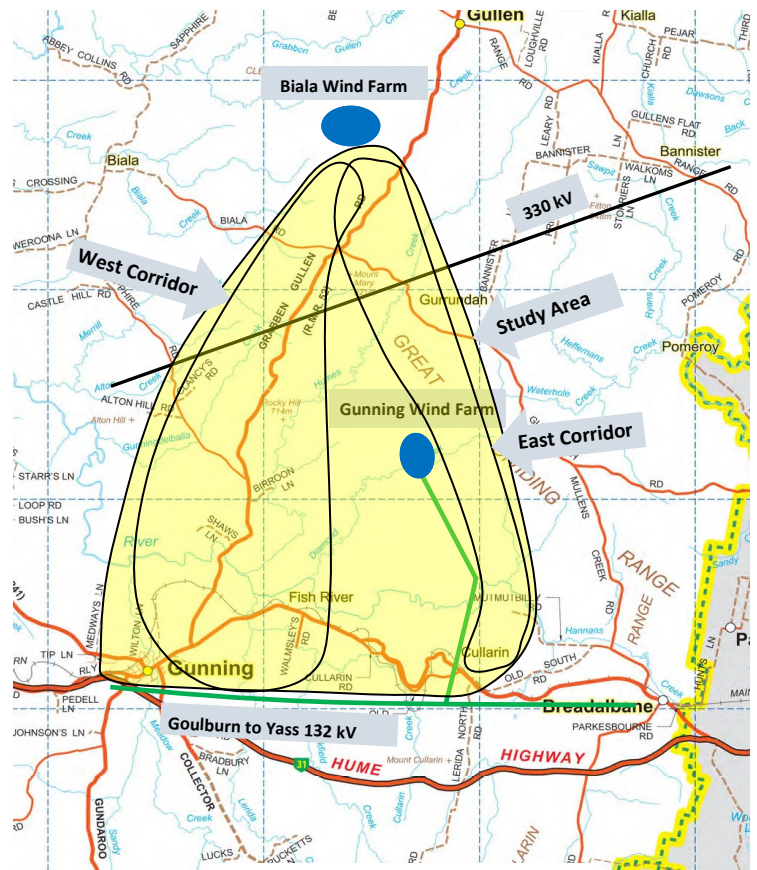


Figure 2—Study Area & Corridors

Proposed Route

A feasible route has been identified in the west corridor as shown in Figure 3.

The route is a 500m to 600m wide strip with a degree of flexibility in the final alignment for the new line.

Feedback on the Route

At this stage, there is flexibility in the final alignment for the route and we seek your comments and input on the proposed route, in particular the impact it may have on your property and opportunities to locate the line within the route to avoid conflicts and minimise the impact.

Contact Us

We can be contacted by
email: biala@clarenceconsultants.com.au
mail: PO Box 1261, Grafton NSW 2460
phone: 02 6642 7239

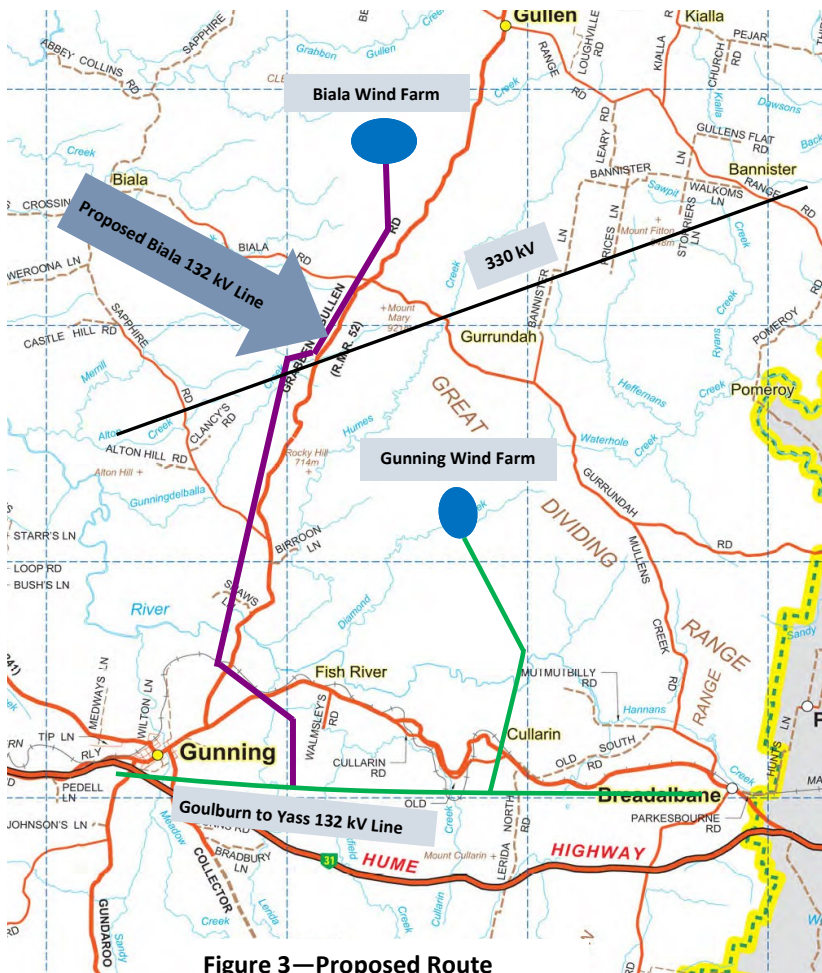


Figure 3—Proposed Route

Biala Wind Farm

Electricity Network Connection

Information Sheet 2 - Proposed Powerline Configuration

September 2014



Introduction

Newtricity is proposing to construct the Biala Wind farm comprising up to 40 Wind Turbine Generators, a powerline to connect to the electricity network and ancillary infrastructure. The wind farm development will be located approximately 24km North of Gunning township.

Clarence Consultants is assisting Newtricity in determining a route for the powerline to connect the wind farm to the existing electricity network.

This Information Sheet has been prepared to assist landholders and community to understand details of the powerline.

132 kV Line Configuration

The proposed 132 kV powerline will comprise concrete or steel poles, typically 18 to 20 metres in height, spaced up to 200m apart. The poles will generally be 'direct buried' in the ground avoiding the use of large concrete pads at the base of the pole.

The conductors (wires) will be aluminium and will be designed to be a minimum 8 metres above the ground at maximum operating temperature. There will be 4 wires, one of which will be an earth shield wire, protecting the line from lightning strikes.

The line will ideally have a minimum of deviations as they necessitate 'backstays' to support the conductor tension. Minimising backstays reduces the impact on the cropping and machinery operation in the vicinity of the poles.



Powerline Ownership

The powerline will be designed and constructed to Essential Energy standards and after construction will be 'gifted' to Essential Energy. Essential Energy will own and operate the powerline.

Easements

The powerline will be centred on a 40m wide easement registered in favour of Essential Energy. The terms of the easement will be in accordance with Essential Energy requirements. Clarence Consultants can provide copies of the Essential Energy easement policies and procedures to landholders on request.

The terms of the easement will restrict some activities within the easement. These include planting and growing trees, the construction of buildings, erection of antennas and masts. These restrictions are necessary to ensure that safety clearances are maintained from the conductors. The use of the land for agricultural and farming activities is normally not restricted.

Newtricity understand that the powerline will have an impact on properties and will work with landowners to minimise impacts.

EMF

Alternating current electrical circuits produce electromagnetic fields. The EMF issue is a complex one and has involved much debate and scientific research over many years.

Newtricity maintain a strict policy of prudent avoidance which means that they try to locate powerlines away from the most number of people as possible. The powerline configuration and location in relation to dwellings will ensure that the maximum level of magnetic field produced by the line will remain well within the National Health and Medical Research Council guidelines.

More information can be obtained from the Australian Radiation Protection and Nuclear Safety agency at www.arpana.gov.au.



Environmental Assessment

A comprehensive Review of Environmental Factors will be undertaken in accordance with the requirements of the Environmental Assessment and Protection Act.

Examples of issues to be addressed in the REF include:

- Flora and fauna impacts
- Access
- Economic/social costs and benefits
- Indigenous heritage
- Cultural heritage
- Agricultural impacts

The final route will be determined considering the environmental investigations and landholder, community and stakeholder consultation.