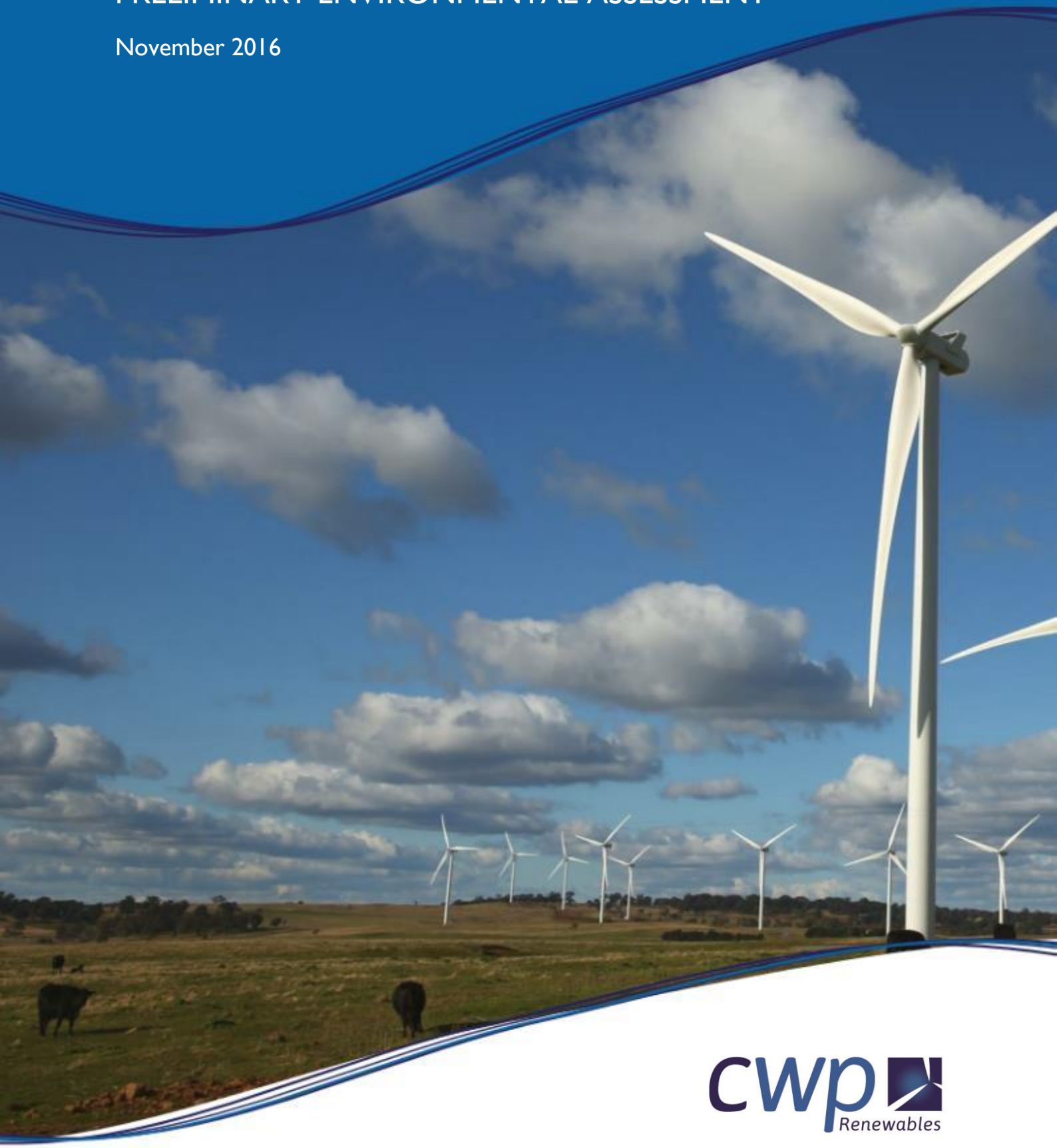
UUNGULA WIND FARM

PRELIMINARY ENVIRONMENTAL ASSESSMENT

November 2016



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Contents

PREFACE

CWP Renewables Pty Ltd (CWPR) has prepared this Preliminary Environmental Assessment (PEA) on behalf of Uungula Wind Farm Pty Ltd (the Proponent) to support a request for Secretary's Environmental Assessment Requirements (SEARs) for the Uungula Wind Farm (the Project).

The Proponent has previously received Director Generals Requirements (DGRs) under Part 3A of the Environmental Planning and Assessment Act 1979 (EP&A Act) in 2011. A draft Environmental Assessment (EA) was prepared and submitted to the Department of Planning and Environment (DPE) for adequacy review in May 2013. Due to the repeal of Part 3A of the EP&A Act, the Project was transitioned to the State Significant Development process under Part 4 of the EP&A Act in March 2014. A request for SEARs was originally made in August 2015 using the original PEA, however to date the SEARs have not been received. This PEA has been prepared in response to a request from DPE to provide an updated PEA so that agencies can provide relevant input to the SEARs.

This PEA provides a description of the development proposal and provides results of the preliminary studies which were undertaken as part of the draft EA submitted for adequacy review.

Prepared By	Proponent
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1. INTRODUCTION

The Proponent is proposing to construct and operate a wind farm of up to 249 wind turbines and associated infrastructure in the NSW Central Tablelands, 14 km east of Wellington and 20 km north-west of Mudgee, NSW (Figure 1). The associated infrastructure will include substation(s), access tracks, overhead and underground cables, crane hardstands, and temporary facilities such as site offices, concrete batch plants and rock crushing facilities, construction compounds, laydown areas and soil stockpiles.

The Project was publicly announced in March 2011, at the commencement of detailed feasibility studies and early stages of planning. This PEA provides a summary of the outcomes of stakeholder consultation undertaken to date, as well as the assessments and technical studies which were undertaken to prepare the draft EA. After the receipt of SEARs for the Project, further assessment may be undertaken to evaluate the potential impacts of the Project a part of the Project Application. The Project is a Controlled Action under the *Environment Protection & Biodiversity Conservation Act 1999 (EPBC Act)* and will be assessed by the Accredited process under the EP&A Act.

1.1 Project Justification

In 2007, the Australian government ratified the Kyoto Protocol and committed to cut greenhouse gas emissions to 108 percent of 1990 levels. This was a watershed decision and an important step in determining Australia's position on climate change in the international arena. In December 2012 Australia agreed to the Doha Amendment to the Kyoto Protocol and signed up to reduce emissions to 98 percent of levels they were in 2000 over the eight-year period 2013 to 2020 (UNFCCC 2012). The Australian Government has recently ratified the Paris Agreement in November 2016, committing to a target to reduce emissions by 26-28 per cent below 2005 levels by 2030, which builds on the 2020 target of reducing emissions by five per cent below 2000 levels.

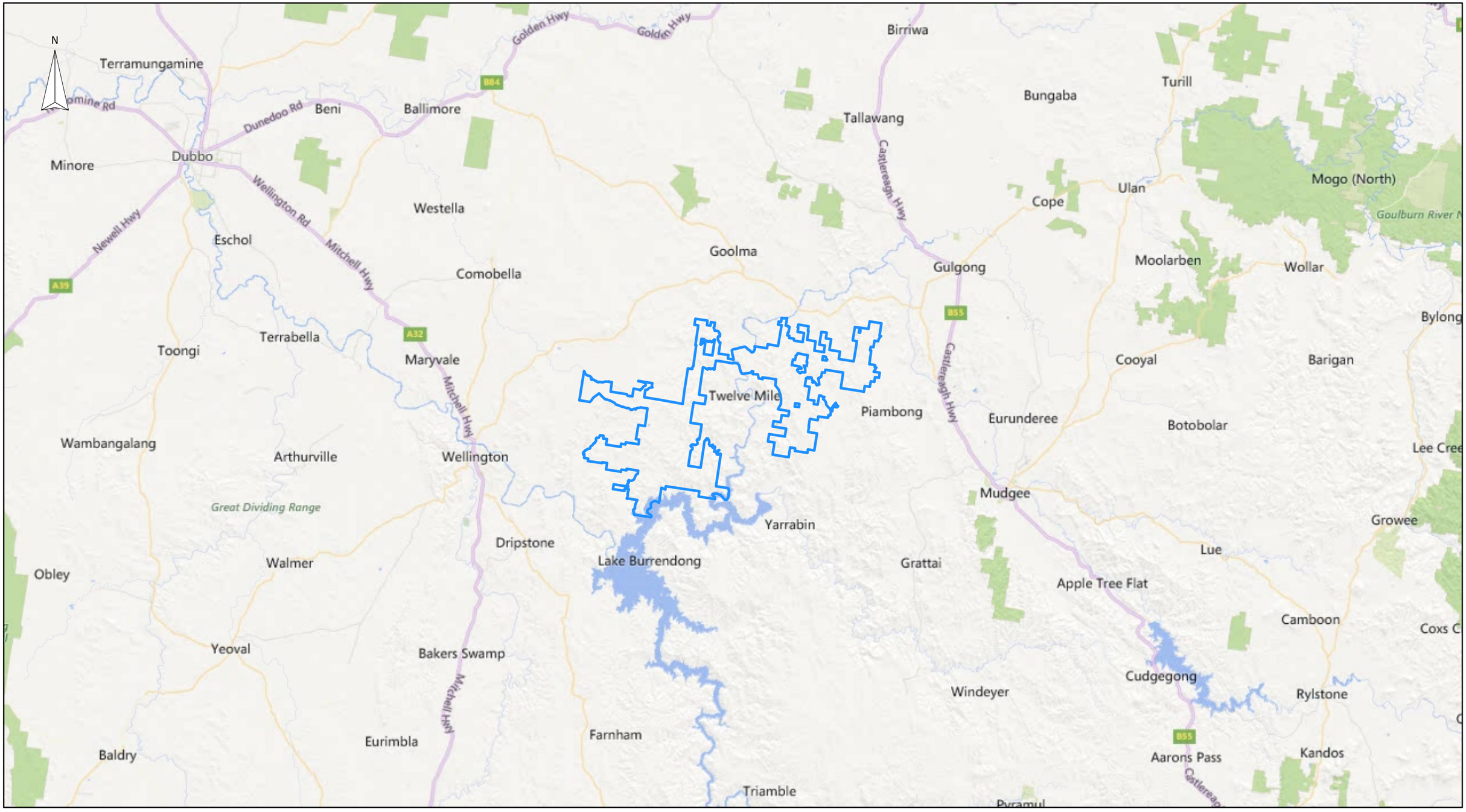
To affirm Australia's commitments under these agreements, the Renewable Energy Target was established and legislation was passed in Federal Parliament in August 2009. Initially a target of 20 percent or 41,000 GWh of Australia's electricity was legislated to be generated from large-scale renewable sources by 2020. In 2013 the RET was reviewed by the Abbott Government and the wind industry experienced a period of slow growth due to uncertain political for the RET. After two years of public debate, bipartisan support for a revised RET was reached in 2015, mandating that 33,000 GWh of renewable energy will be generated annually by 2020. Confirmation from the Turnbull Government that this target will not be reviewed until 2020 has provided the industry with the confidence required to reinvigorate investment in the renewable industry.

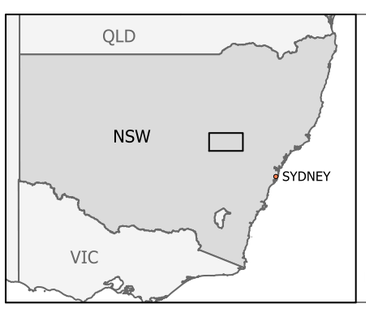
To meet the RET, approximately 6,000 MW of new renewable energy capacity is required to be built and connected to the National Electricity Market by 2020. Wind power is currently the cheapest form of new-build electricity available in the market and will form the bulk of this new generation capacity.

The proposed Project has been carefully positioned in a location, and designed at a scale, which balances the environmental, social and economic aspects of Australia's energy generation needs. The Project has been developed with the following considerations:

- Options for multiple reliable grid connections into the existing 330kV, 132kV and 66kV transmission network,
- An area of low population density which reduces the potential for noise and visual impacts at non-associated residences,
- Avoidance and mitigation of environmental impacts as identified in this PEA; and
- A quality wind resource confirmed by over 8 years of wind monitoring data.

FIGURE 1: PROJECT LOCALITY 2016





LEGEND

Project Boundary

Reserves, Reservoirs and Watercourses: derived from GEODATA Topo250K; Background imagery: Virtual Earth; All other data: WPCWP

COMPANY	UUNGULA WIND FARM PTY LTD
TITLE	FIGURE 1: PROJECT LOCALITY
DATE	15 NOV 2016
DRAWN BY	B KRONENBERG
CHECKED BY	M BRANSON
SIZE	A3
SHEET	1 OF 1
SCALE BAR	0 20 km
SCALE	1:500000

WIND PROSPECT CWP

Benefits of the proposal have been identified at a global, regional and local scale, including:

- Production of up to 1,323 GWh per annum of electricity, sufficient for the average consumption of 181,200 homes, contributing up to 4% of the RET;
- Displacement of up to 1,137,000 tonnes of CO2-e per annum;
- Provision of up to 250 local jobs during construction and around 20 jobs during operations;
- A Community Fund to benefit the local area near the Project;
- Injection of up to $625 million into the Australian economy during construction and $409 million during operation over the 25-year life of the Project; and
- Improved security of electricity supply through diversification in the regional generation sources and distribution of wind generators across the state.

The EIS will provide further justification for the Project based on the detailed environmental assessment.

1.2 The Proponent

The Project is being developed by Uungula Wind Farm Pty Ltd (the Proponent), a wholly owned subsidiary of CWP Renewables Pty Ltd.

CWP Renewables was born out of a Joint-Venture between two leading global renewable energy developers with over two decades of experience in the development of successful renewable energy projects; Wind Prospect Group and Continental Wind Partners. CWP Renewables has been developing and managing wind farms in Australia since 2007 and has offices in Adelaide, Newcastle and Canberra.

The development portfolio is primarily focussed on wind energy in NSW with over 1.4 GW of Projects under development. Additionally, the portfolio includes a number of solar assets in South Austraila, NSW and Queensland, including co-located solar and wind generation opportunities. CWP Renewables has full life cycle expertise from development to decommissioning, including expertise in the finance / banking industry and all technical aspects of development.

CWP Renewables is one of the most successful developers in Australia, having been involved in planning approval for 14 wind farms totalling over 1,750 MW, of which 837 MW is operating or under construction. The company's operational division, CWP Asset Management, is based in Canberra and is responsible for construction operation of wind farms, with over 490 MW currently under management.

1.3 Planning Context

The Project has been in the planning system since 2011. The NSW Department of Planning and Infrastructure (DoPI) issued the Project with Director-General's Requirements (DGRs) on 14th April 2011. The DGRs include key issues for the Proponent to address in the EIS with a focus on impacts, management and mitigation strategies. Supplementary DGRs were issued on 16th August 2011 to stipulate more detail and transparency in the consultation process.

A draft EA was prepared against these DGRs and submitted to DPE for adequacy review in May 2013. Adequacy comments were received from DPE and the relevant agencies and the proponent was to prepare a revised EA for exhibition. However in March 2014, due to the repeal of the Part 3A provisions under the EP&A Act, the Project was transitioned from Part 3A to Part 4 of the EP&A Act. Advice received from DPE indicated that the deadline for submission of an adequate EA was not reached.

A request for SEARs was made in August 2015 using the original PEA documentation, however to date the SEARs have not been received. This PEA has been prepared in response to a request from DPE in November 2016 to provide an updated PEA so that agencies can provide relevant input to the SEARs.

The Proponent also submitted a Referral of Proposed Action under the *EPBC Act* in June 2013. The Project was determined a Controlled Action in October 2013 pursuant to Section 75F(3) of the *EP&A Act,* to be assessed by Accreditation under the EP&A Act.

Upon receipt of the SEARs, the proponent intends to revise the proposed project layout based on recent advances in turbine technology, consultation with stakeholders, the revised NSW Wind Energy Framework (Draft for consultation or as updated by DPE) and further technical and environmental studies. An Environmental Impact Statement (EIS) will be prepared and submitted for approval.

1.4 Project Timeframe

The project timeframe below is provided in anticipation of receiving the SEARs prior to the end of 2016.

The Proponent intends to submit an EIS in mid-2017 for exhibition with the objective of receiving consent from both State and Commonwealth planning authorities in mid-2018. The Project would undergo a financing process with the intention of commencing construction in early 2019. Construction would commence following the completion of all pre-construction consent commitments and the awarding of the final construction contract. Assuming satisfactory progress of financing and construction works it is anticipated that the wind farm would start commissioning during the construction phase in 2019, becoming fully commissioned in 2020 (See Table 1).

The Project has an operational life expectancy of 25-30 years, after which the Project would be decommissioned, or refurbished with upgrades to generation infrastructure.

Table 1 – Potential Project Timeframe

Project Stage	Anticipated Date
SEARs issued	Dec 2016
Environmental Assessment submission	Mid 2017
Consent authority approval	Mid 2018
Financing and contract negotiations complete	Late 2018
Construction commencing	Early 2019
Fully commissioned	2020
Decommissioning or re-powering	2045-2050

1.5 Stakeholder Consultation

Public consultation for the Project commenced in April 2011 during the early stages of planning and feasibility assessment. Consultation was designed to inform the public, neighbouring residents, statutory regulators and other stakeholders of the Project, and to seek feedback in relation to issues which should be considered during project planning and design.

Consultation for the Project was conducted by way of letters of notification to stakeholders, face-to-face notification (or letter drop where necessary) with neighbouring residents, a public exhibition and ongoing consultation meetings with various stakeholders. The Project website (www.uungulawindfarm.com.au) presents an ongoing, active consultation medium for people to track the development of the Project and provide comment.

A number of consultees have responded, providing input or advice to the Project. The public exhibition held in February 2012, were attended by almost 100 people. Nominations were sought and received for a Community Consultative Committee (CCC) for the Project. An interim committee was established and held its first meeting on 11th February 2013, in line with existing Committees and *Draft NSW Planning Guidelines: Wind Farms* (Draft Guidelines), released on the 23rd December 2011 for public consultation. Two subsequent CCC meetings were held in June 2013 and September 2013.

Ongoing consultation at a lesser intensity has been undertaken with the host landowners and neighbouring landowners to the Project since 2013. The focus has been on informing residents of the status of the Project and the expected timeframes for submission of an EIS.

Upon the receipt of SEARs, the Project will reinvigorate the stakeholder consultation process, including meeting with neighbouring landowners and the re-establishment of CCC meetings. Neighbouring landowners will be contacted through local media, newsletters and door-knocking as required to discuss the Project, potential impacts, and neighbour agreements. Consultation with Mid-Western Regional Council and Wellington Councils will resume with respect to transport and traffic impacts, socio-economic impacts and voluntary planning agreements. Engagement with key agencies will also be undertaken regarding technical information to be provided in response to the SEARs.

2. PROJECT DESCRIPTION

The proposed Project development consists of the installation of up to 249 wind turbines, underground transmission line and control cables, overhead transmission lines and control cables, collector substations, switching stations, site compounds, access tracks, crane hardstand and assembly areas, up to six permanent wind monitoring masts (potentially including the retention of existing temporary monitoring masts), appropriate wind farm signage and ancillary features. Operation of the wind farm is to be carried out by a combination of remote computer control, local operations and maintenance staff.

The Project Site is shown in Figure 2 and is comprised of two sections; Wellington Section in the west (Figure 3) and Beryl Section in the east (Figure 4). The Project is over 10 km from the nearest nature reserve as shown in Figure 5.

Selection of a wind turbine model(s) will occur through a competitive tender process pending Development Approval. The model(s) selected for the project will also influence the number and location of proposed turbines. The wind turbines used for the Project will be three-bladed, semi-variable speed, pitch regulated machines with the rotor and nacelle mounted on a reducing cylindrical tower made out of either a welded steel shell or a concrete steel hybrid, fitted with an internal ladder or lift. Each wind turbine will have a maximum tip height of 200 m, with typical tower heights of between 80 and 140 m. Wind turbines under consideration for this Project vary in terms of generation capacity upwards of 1.5 MW.

Up to six permanent wind monitoring masts (potentially including the retention of existing temporary monitoring masts), up to hub height will be installed on-site. The purpose of the masts is to provide necessary information for the performance monitoring of the wind turbines. The wind monitoring masts would be of a guyed, narrow lattice or tubular steel design.

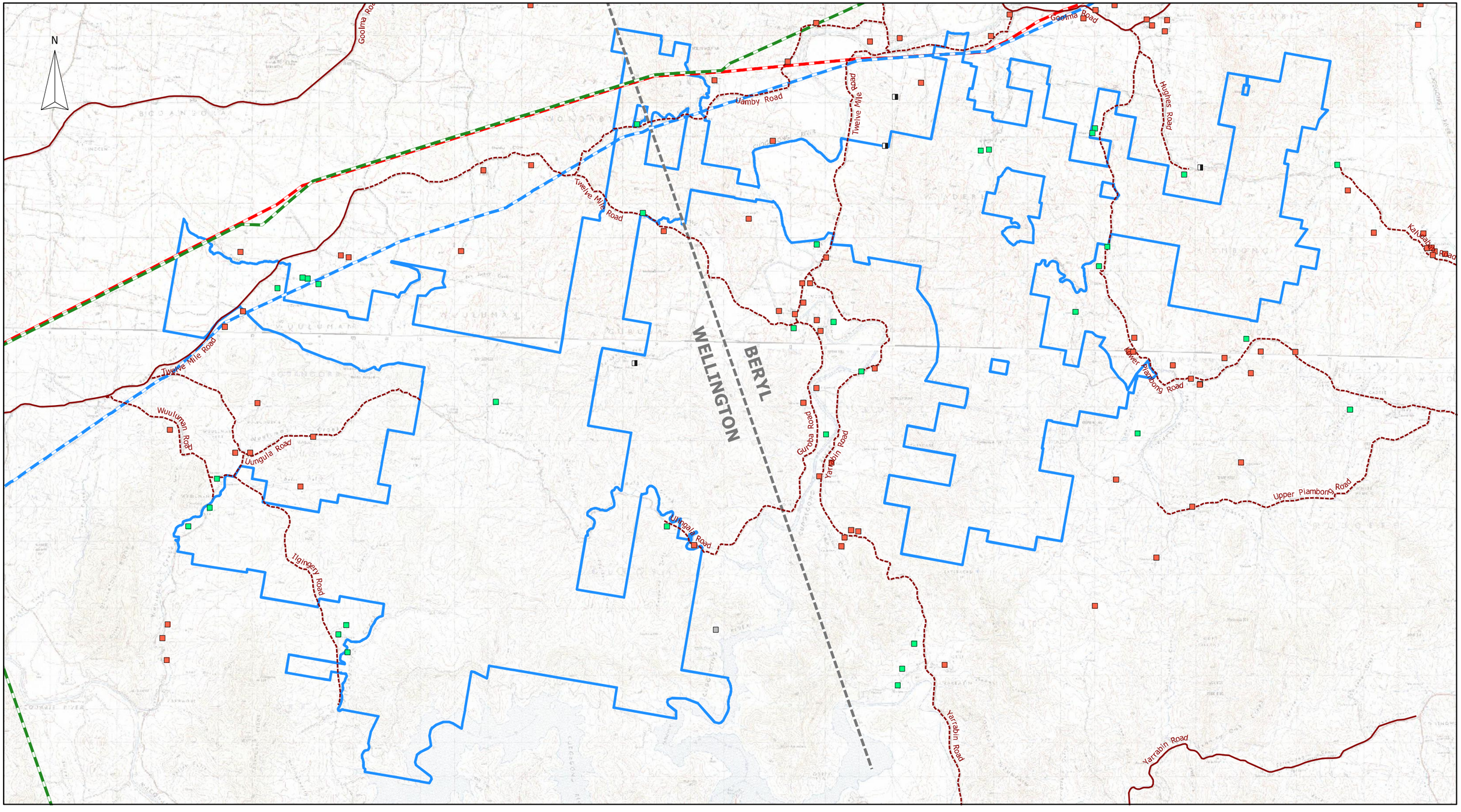
The electricity produced by each wind turbine generator would be transformed from low voltage up to 33 kilovolts (kV) by a transformer generally located within or adjacent to each wind turbine. Underground transmission line and control cables will be installed at a depth of up to 0.75 m below the ground surface to conduct the electricity from the wind turbines to a collector substation. The underground electrical cables will follow internal on-site access roads where practical. Sections of the proposed overhead transmission line may need to be placed underground subject to local requirements.

The collector substations and switching station sites are expected to require individual areas ranging from 2.3 to 3.5 hectares (ha) of land and will include standard grid connection infrastructure and buildings. The chosen locations minimise the visual impact of the wind farm by siting the infrastructure away from surrounding public viewpoints, and with vegetation screening, post construction, if warranted. This also allows for the Project's internal electrical infrastructure and grid connection to have a reduced visual impact.

To harness the energy produced, the Project has various options to connect into a 66 kV Essential Energy transmission line, 132 and 330 kV TransGrid transmission line north of the Project site.

Project management will be carried out by the Proponent, unless commercial or other arrangements change. All Project and construction management will comply with the appropriate company's Quality Assurance System and Environmental Management System, or equivalent, ensuring that relevant procedures, statutory requirements and operational standards are met.

FIGURE 2: LAYOUT OVERVIEW 2016



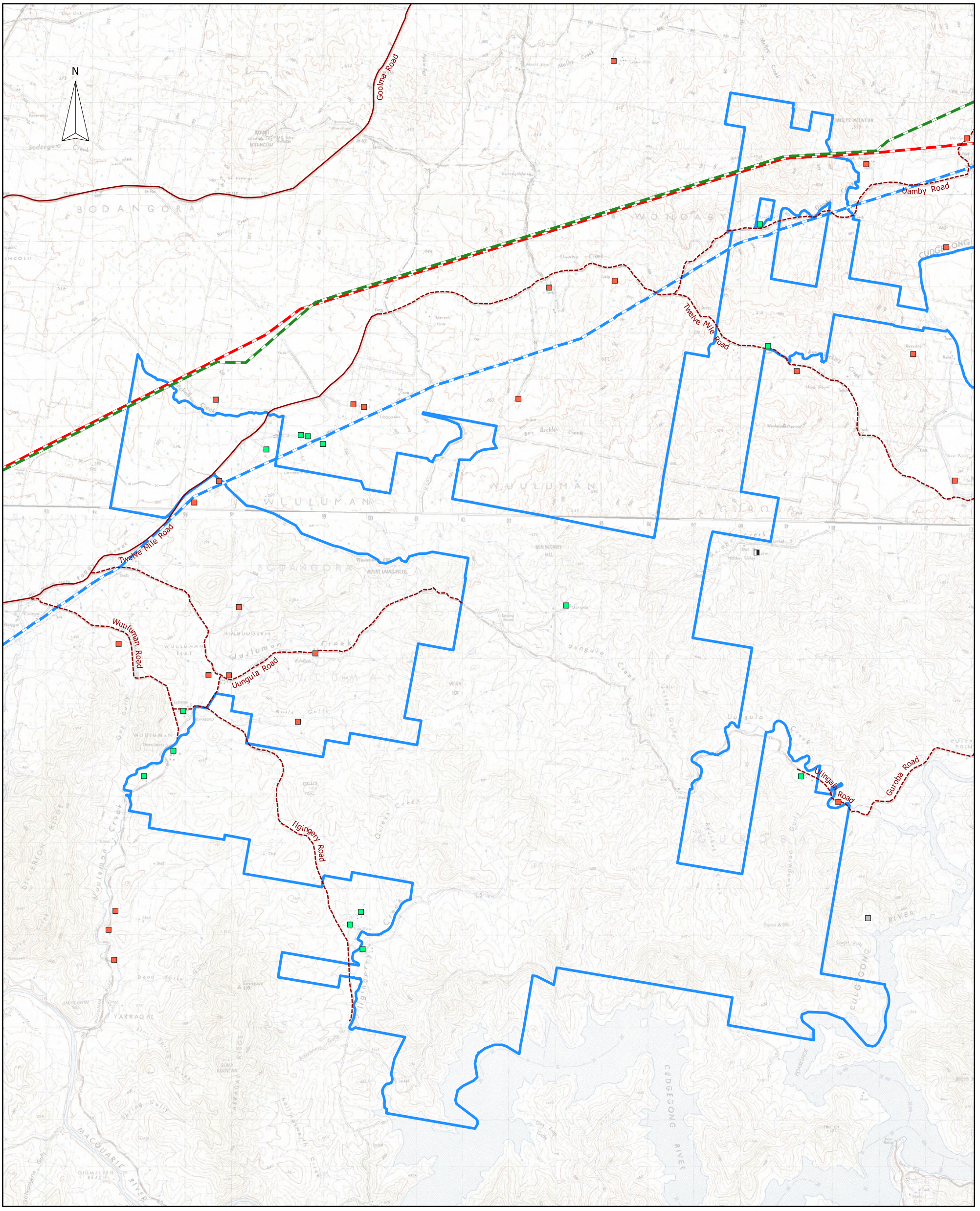
LEGEND

- Project Site
- Section
- 66 kV Transmission Line
- 132 kV Transmission Line
- 330 kV Transmission Line
- Unsealed Road
- Sealed Road
- **Residence**
- Seeking Agreement
- Involved Residence
- Uninvolved Residence

Image, roads and residences: derived from GEODATA Topo250K; Transmission Lines: 132kV and 330kV - TransGrid, 66kV - Essential Energy; All other data: WPCWP

COMPANY	UUNGULA WIND FARM PTY LTD
TITLE	FIGURE 2: LAYOUT OVERVIEW
DATE	15 NOV 2016
DRAWN BY	B KRONENBERG
CHECKED BY	M BRANSON
SIZE	A3
SHEET	1 OF 1
SCALE BAR	0 5 km
SCALE	1:110000

WIND PROSPECT CWP



LEGEND

- Project Site
- Unsealed Road
- Sealed Road
- 66 kV Transmission Line
- 132 kV Transmission Line
- 330 kV Transmission Line

Residence

- Seeking Agreement
- Involved Residence
- Uninvolved Residence

Image, roads and houses: derived from GEODATA Topo250K; Transmission lines: 132kV and 330kV - TransGrid, 66kV - Essential Energy; All other data: WPCWP

COMPANY	UUNGULA WIND FARM PTY LTD
TITLE	FIGURE 3: WELLINGTON SECTION

DATE	DRAWN BY	CHECKED BY	SIZE	SHEET
15 NOV 2016	B KRONENBERG	M BRANSON	A3	1 OF 1

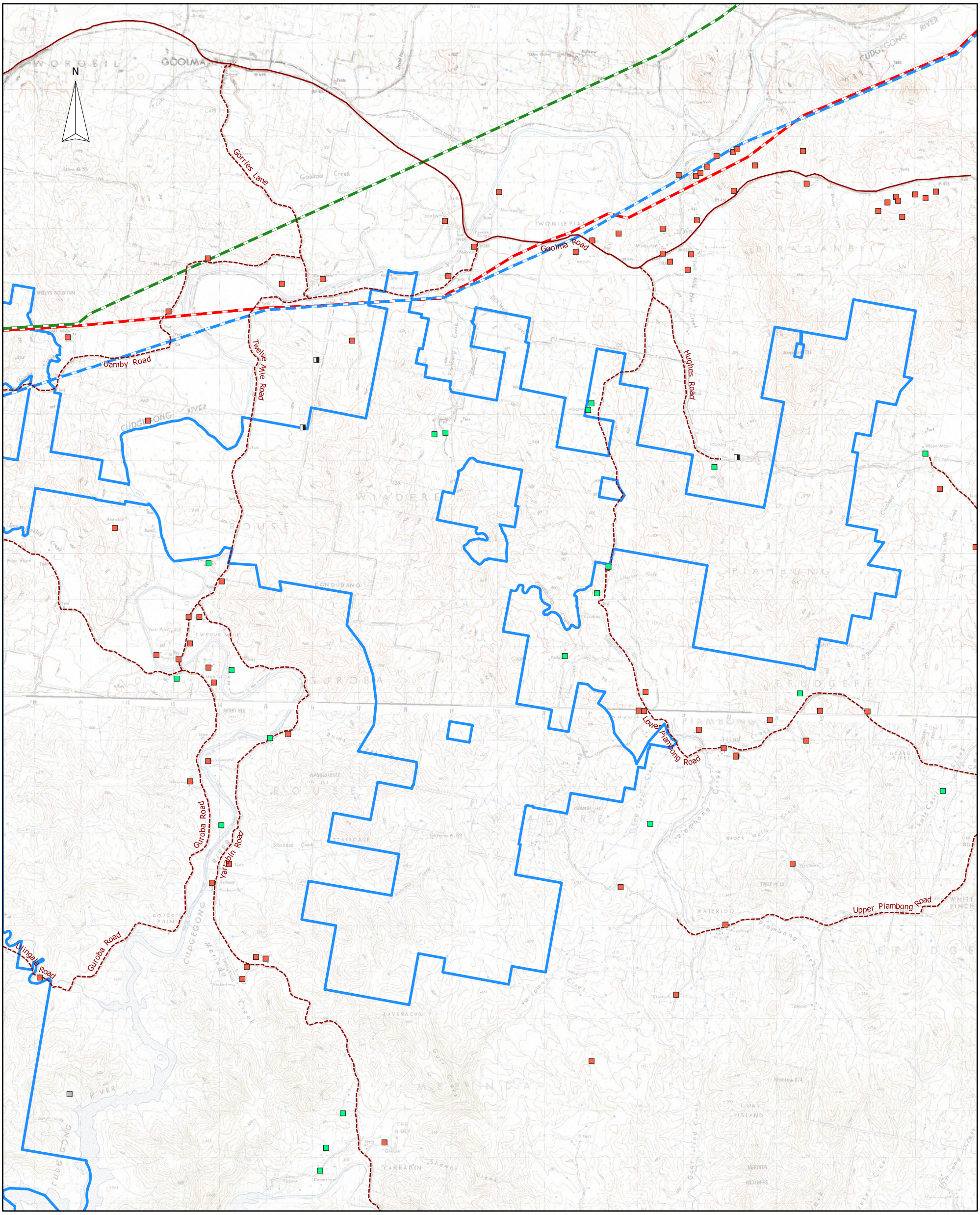
SCALE BAR: 0 — 2 km

SCALE: 1:80000

WIND PROSPECT CWP

FIGURE 3: WELLINGTON SECTION

2016



LEGEND

- Project Site
- Unsealed Road
- Sealed Road
- 66 kV Transmission Line
- 132 kV Transmission Line
- 330 kV Transmission Line
- **Residence**
- Seeking Agreement
- Involved Residence
- Uninvolved Residence

Image, roads and houses: derived from GEODATA Topo250K; Transmission lines: 132kV and 330kV - TransGrid, 66kV - Essential Energy; All other data: WPCWP

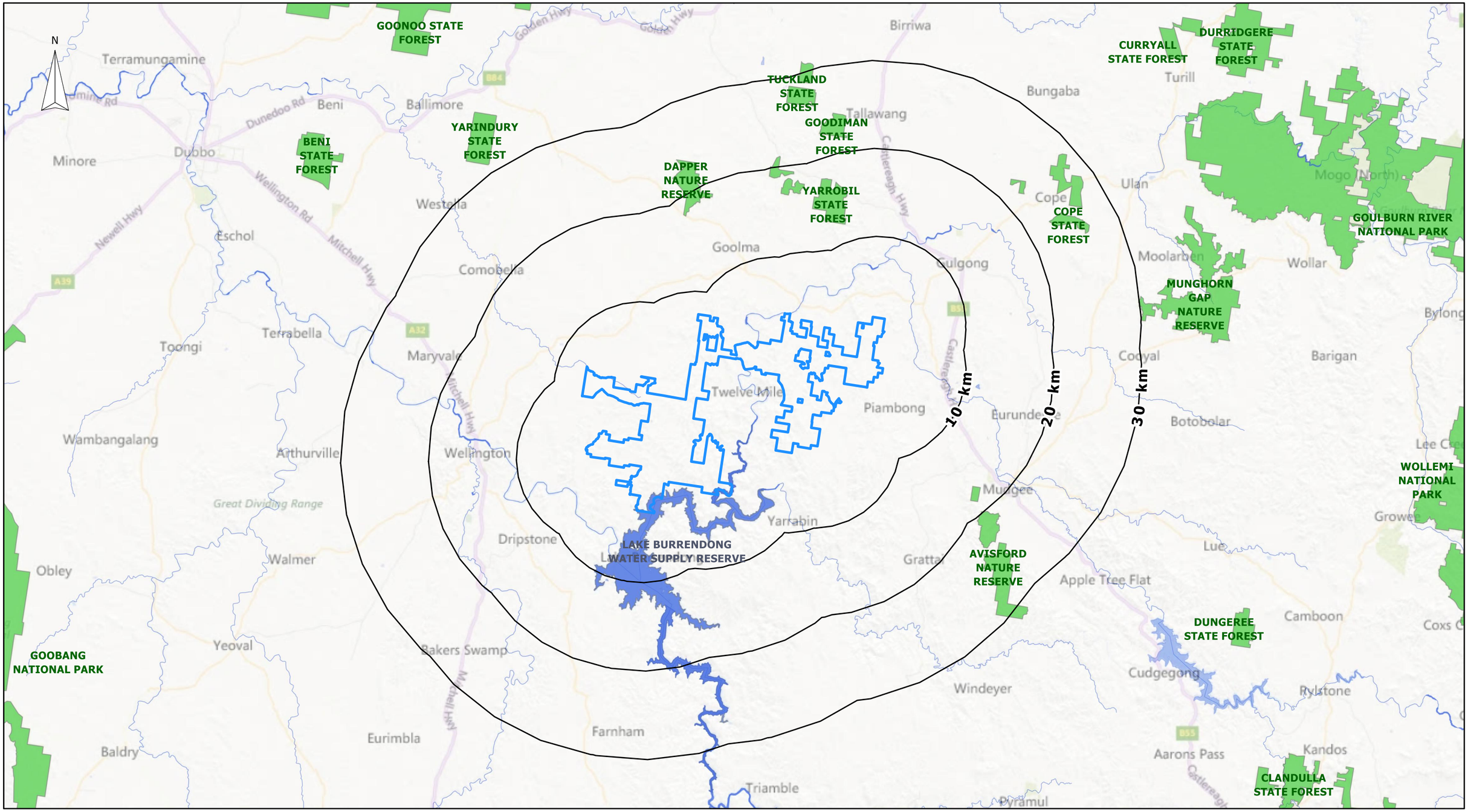
COMPANY: UUNGULA WIND FARM PTY LTD				
TITLE: FIGURE 4: BERYL SECTION				
DATE: 15 NOV 2016	DRAWN BY: B KRONENBERG	CHECKED BY: M BRANSON	SIZE: A3	SHEET: 1 OF 1
SCALE BAR: 0 — 2 km			SCALE: 1:80000	

WIND PROSPECT CWP

FIGURE 4: BERYL SECTION

2016

FIGURE 5: PROXIMITY OF NATURE RESERVES AND STATE FORESTS TO THE PROJECT 2016



LEGEND

Nature Reserve / National Park / State Forest

Water Supply Reserve

Reserves, Reservoirs and Watercourses: derived from GEODATA Topo250K; Background imagery: Virtual Earth; All other data: WPCWP

COMPANY	UUNGULA WIND FARM PTY LTD
TITLE	FIGURE 5: PROXIMITY OF NATURE RESERVES AND STATE FORESTS TO THE PROJECT
DATE	15 NOV 2016
DRAWN BY	B KRONENBERG
CHECKED BY	M BRANSON
SIZE	A3
SHEET	1 OF 1
SCALE BAR	0 — 20 km
SCALE	1:500000

WIND PROSPECT CWP

2.1 Wind Farm Layout

The wind farm layout will be developed within the boundaries of the Project Site shown in Figure 2. The design of the turbine layout and associated infrastructure will be prepared to maximise utilisation of the available wind resource whilst gaining regulatory and broad community acceptance of the development. The planning and design stages of the wind farm layout will consider any potential environmental impacts on flora communities, fauna habitat, heritage aspects as well as the location of neighbouring residences, including new dwellings and Development Applications which have been approved since the draft EA was produced.

It is expected that some adjustment of the turbine locations will occur during the planning and assessment phase in response to stakeholder consultation and findings of the various planning studies. Access routes will be designed to achieve practical transport paths that minimise disruption to local traffic and environmental impacts. Initial options are currently being reviewed in preparation for consultation with Councils, landowners and local road users.

2.2 Construction Phase

The construction phase is expected to extend over twenty-four (24) months and will involve:

- Transport of equipment and materials to site;
- Daily movement of a small work force between the site and the local centres;
- Earthworks for access tracks, turbine footings, underground cables and a substation;
- Erection of turbines and substation structures and construction of a facilities building;
- Electrical connections within the wind farm and to the TransGrid transmission grid;
- Commissioning of the wind farm; and
- Restoration of any disturbed areas of land.

All construction would be undertaken in accordance with an appropriate Environmental Management System and monitoring of performance will be routinely undertaken.

The transport of materials and equipment to site during the construction phase will involve a temporary increase in the local traffic volume. Vehicles accessing the site will include a range of 'over-size' and 'over-mass' vehicles. Preliminary indications are that several access points from public roads will be needed to access the wind farm. The EIS will include a review of the suitability of roads that can be used to access the site and any potential impacts on road safety and local traffic movements. Where necessary, mitigation measures will be proposed and incorporated within a traffic management plan.

Initial site works will include establishment of a temporary construction site office, preparation of access tracks to turbines sites, excavation of footings for turbines and trenching for underground cables.

The potential for soil erosion and dust generation during construction will be assessed and measures identified to mitigate such impacts. Earthworks also have the potential to disturb any surface or shallow sub-surface heritage items. Accordingly, an assessment of indigenous and non-indigenous heritage values of the site will be undertaken by a specialist consultant in conjunction with relevant stakeholders, prior to the excavation of any earthworks.

Noise impacts can be associated with the construction phase arising from the transport of materials and equipment to site, as well as general construction activity. Controls will be incorporated in the environmental management plan and will include adoption of specific working hours and use of compliant equipment appropriate to the development.

Site restoration following construction works will focus on revegetation of disturbed ground, reduction of weed development and control of any erosion and sedimentation.

Construction contractors will, in consultation with the RFS, implement fire prevention procedures during the wind farm construction phase. Firefighting equipment will be located on site and all site vehicles will have diesel engines to minimise fire risk. Construction activities will be modified to suit any fire bans when appropriate to do so.

2.3 Operational Phase

Once constructed and commissioned the wind farm will operate for a period of 25 to 30 years. A regular maintenance program will be an integral part of the operation and any repairs will be undertaken as required. The operation of the wind farm may have various impacts, which are assessed in the assessment of key issues in Section 3.

3. ASSESSMENT OF KEY ISSUES

A range of environmental issues will be considered in detail in the EIS. The key environmental issues which were assessed in the draft EA, in accordance with the DGRs originally provided for the Project, are outlined below. After receipt of the SEARs, the assessments will be updated to provide relevant information to address potential impacts in line with the SEARs. The following sections summarise the potential impacts of the Project on key environmental attributes.

The draft EA was based on a proposed layout of up to 249 turbines. It is likely that the number of turbines proposed in the EIS will differ to those presented in the draft EA due to advances in turbine technology, as well as new social and environmental considerations. It is therefore important to note that conclusions and results from the assessments below are also likely to change.

3.1 Landscape and Visual Assessment

The Proponent commissioned Moir Landscape Architecture Pty Ltd to prepare a Landscape and Visual Impact Assessment (LVIA) for the Project. The LVIA involved a comprehensive evaluation of the visual character of the landscape in which the Project would be located, and an assessment of the potential landscape and visual impacts that may result from the construction and operation of the Project, considering appropriate mitigation measures.

In terms of overall landscape sensitivity, the LVIA determined that of 83 viewpoints surrounding the Project, 22 will have a low visual impact, 21 will have a moderate visual impact and 29 will have a high visual impact.

The LVIA also determined that the Project is likely to be an acceptable development within the viewshed, which in a broader context also contains built elements such as roads, agricultural industry, aircraft landing strips, communication and transmitter towers and transmission lines.

There are several potential visual effects associated with the wind farm, including glinting, which experience suggests is relatively rare and shadow flicker effects which are likely to be experienced at ten residences. Night time lighting has the potential to be visible from surrounding receptors, however the level of visual impact would diminish over distance and when screened by landform or vegetation. The Project will have some degree of visual influence; however it is unlikely that wind farm projects will ever conform, or be acceptable to all points of view.

Overall, the cumulative visual effect of the Project would not result in any significant 'direct', 'indirect' or 'sequential' cumulative impacts when considered against any existing or proposed projects.

The LVIA will be updated in accordance with the NSW Wind Energy Framework and the Visual Impact Assessment Bulletin (Draft for consultation or as otherwise updated by DPE) and include consideration of current information relating to new residences and/or Development Applications which have arisen since the LVIA in the draft EA was undertaken.

3.2 Noise Assessment

An acoustic assessment was carried out by Sonus Pty Ltd, to predict the likely noise levels for comparison with the South Australian Environmental Protection Authority (SA EPA) *Noise Guidelines for Wind Farms 2003* (SA EPA Guidelines). Wind turbine noise was predicted and assessed against relevant criteria prescribed by the SA EPA Guideline and World Health Organisation (WHO) guidelines and the Draft Guidelines where appropriate.

The operation of the Project was considered against the stringent SA EPA Guidelines based on the Acciona AW77 wind turbine with a hub height of 80 m for Scenario 1 and the Vestas V112 wind turbine with a hub height of 120 m for Scenario 2. These wind turbines were chosen based on the likely "worst case" (highest sound power level) wind turbine selection available to the Proponent at the time of the assessment. The process included consideration of several potential wind turbines of different sizes and subsequent selection of wind turbines that would result in the highest noise level scenario. Based on predictions, the noise from the wind turbines is predicted to adhere to the SA EPA Guidelines at all residences for both scenarios.

Based on the above, for any wind turbine model with sound power levels and hub heights that are equal to or less than those assessed for the Acciona AW77 and Vestas V112, the wind farm layout can achieve the stringent requirements of the SA EPA Guidelines.

Once the final wind turbine model has been selected, the noise assessment will be re-run to demonstrate compliance with the SA EPA Guidelines and DGRs. Should there prove to be any exceedances at this stage, they will be resolved through micro-siting wind turbine positions, the removal of wind turbines, landowner agreements, or the reduction of wind turbine operational noise, whichever is deemed the most acceptable and appropriate solution to achieve compliance.

Construction noise impact, blasting impact and vibration levels have been assessed and the 'worst case' scenarios modelled and found to be generally acceptable. Construction traffic noise impact has also been assessed and the 'worst case' maximum construction traffic generation considered It is predicted that at 10 m from the road side the criterion can be achieved for ten passenger vehicle movements and three heavy vehicle movements in one hour. The number of vehicle movements can double for every doubling of distance from the roadside and continue to achieve the 55 dB(A) criterion. That is, the noise level of 20 passenger vehicles and six heavy vehicle movements could be accommodated in an hour at a residence that is 20 m from the roadside.

The noise assessment will be updated in accordance with the NSW Wind Energy Framework and the Noise Assessment Bulletin (Draft for consultation or as otherwise updated by DPE) and include consideration of current information relating to new residences and/or Development Applications which have arisen since the noise assessment in the draft EA was undertaken.

3.3 Ecological Assessment

Eco Logical Australia Pty Ltd (ELA) was commissioned to undertake an ecological assessment of the area proposed to be affected by the Project. The assessment methodology comprised a literature review, site reconnaissance, vegetation mapping and detailed flora and fauna surveys.

Targeted surveys for threatened species were undertaken across the study area between October 2008 and September 2011. Vegetation mapping, flora quadrats and an assessment using the Biobanking methodology were also undertaken. The vegetation mapping produced for the study area during the draft EA is provided in Figure 6.

The study area was found to support sixteen threatened fauna species and one Endangered Ecological Community (EEC). Potential habitat exists for seven threatened flora species, however only one was found on-site, as well as one Rare or Threatened Australian Plant (RoTAP).

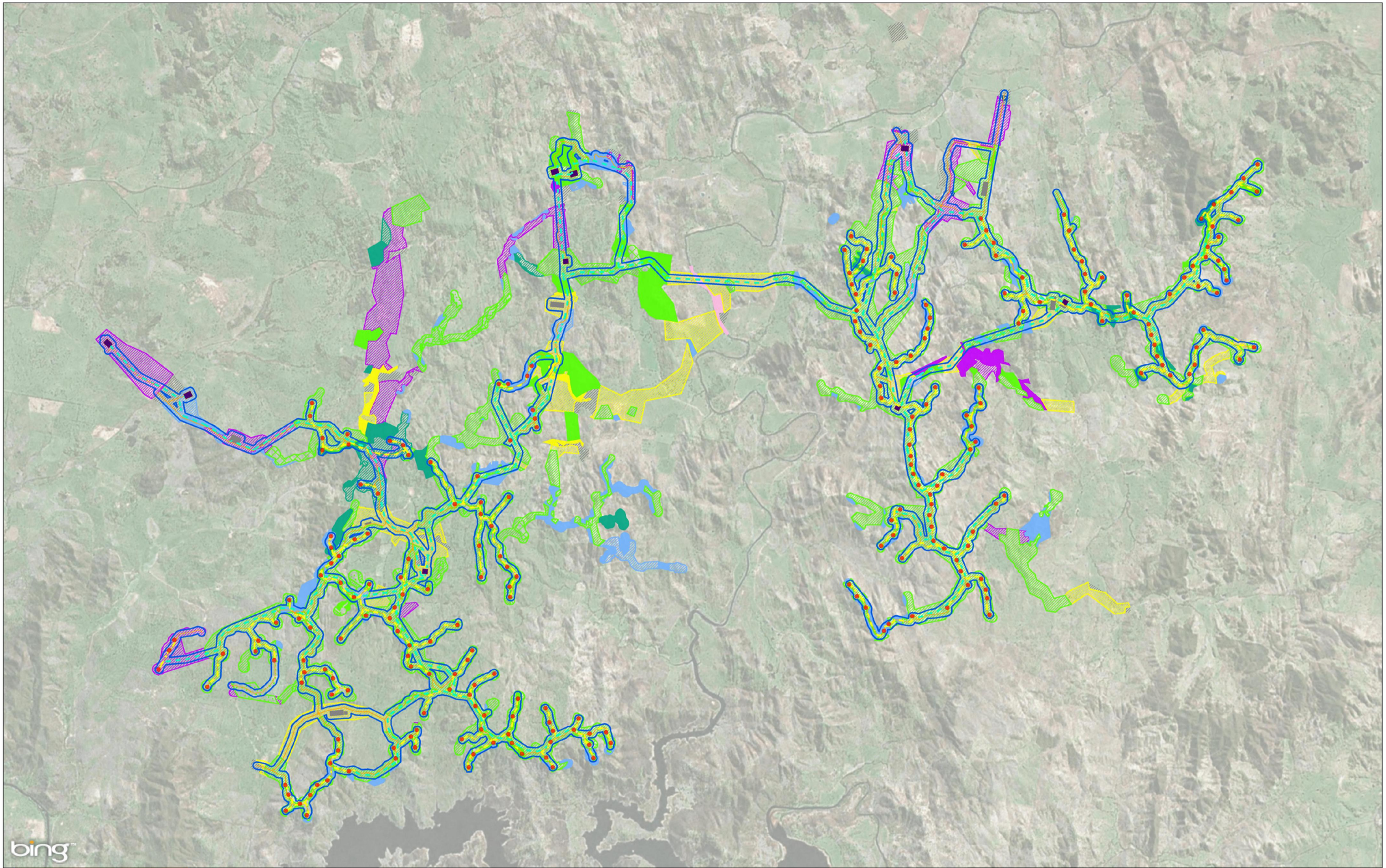
Threatened species and endangered ecological communities recorded during the surveys include:

- CW209 White Box – Blakely's Red Gum – Yellow Box (Box Gum Woodland equivalent);
- *Swainsona recta* (Small Purple-pea);
- *Discaria pubescens* (Hairy Anchor Plant);
- Brown Treecreeper (*Climacteris picumnus victoriae*);
- Diamond Firetail (*Stagonopleura guttata*);
- Hooded Robin (*Melanodryas cucullata cucullata*);
- Little Lorikeet (*Glossopsitta pusilla*);
- Scarlet Robin (*Petroica boodang*);
- Speckled Warbler (*Pyrrholaemus saggitatus*);
- Sugar Glider (*Petaurus breviceps*);
- Common Ringtail Possum (*Pseudocheirus peregrines*);
- Common Brushtail Possum (*Trichosurus vulpecular*);
- Koala (*Phascolarctos cinereus*);
- Large-eared Pied Bat (*Chalinolobus dwyeri*);
- Little Pied Bat (*Chalinolobus picatus*);
- Eastern Bentwing-bat (*Miniopterus orianae oceanensis*);
- Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*);
- Greater (Eastern) Long-eared Bat (*Nyctophilus corbeni* (*N. timoriensis*)); and
- Eastern Cave Bat (*Vespadelus troughtoni*);

Ten migratory species were identified from the EPBC Act Protected Matter Search Tool however no species were recorded during the surveys.

A Referral under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) was submitted to the Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) in November 2011 addressing the likely impacts of the Project on matters of National Significance including Box-Gum Woodland (BGW) within the Project Site of which some meets the criteria for the Critically Endangered community under the EPBC Act. The Project was designated a Controlled Action under the *EPBC Act* on the 29th February 2012 and will be assessed by Accredited process under the EP&A Act.

The avoidance measures that were incorporated in the draft EA to minimise impacts on the ecological integrity of the site whilst maintaining the engineering and economic feasibility of the wind farm are summarised below:



Legend

- Bakely's Red Gum - Yellow Box grassy woodland of the NSW South Western Slopes Bioregion - Mod_Good - Mod CW112MGM
- Bakely's Red Gum - Yellow Box grassy woodland of the NSW South Western Slopes Bioregion - Mod_Good - Poor_Grslnd CW112MGPG
- Red Stringybark woodland of the dry slopes of the South Western Slopes Bioregion - Mod_Good - Mod CW177MGM
- Red Stringybark woodland of the dry slopes of the South Western Slopes Bioregion - Mod_Good - Poor_Grslnd CW177MGPG
- Red Stringybark woodland of the dry slopes of the South Western Slopes Bioregion - Moc_Good - Poor_Weedy CW177MGPW
- River Red Gum riverine woodlands and forests in the Nandewar and Brigalow Belt South Bioregions - Mod_Good - Mod CW184MGM
- Tumbledown Red Gum - Black Cypress Pine - Red Box low woodland of hills of the South Western Slopes - Mod_Good - Mod CW202MGM
- Tumbledown Red Gum - Black Cypress Pine - Red Box low woodland of hills of the South Western Slopes - Mod_Good - Poor_Grslnd CW202MGPG
- White Box - Rough-barked Apple alluvial woodland on the NSW western slopes - Mod_Good - Mod CW211MGM
- White Box - Rough-barked Apple alluvial woodland on the NSW western slopes - Mod_Good - Poor_Grslnd CW211MGPG
- White Box - Tumbledown Gum woodland on fine-grained sediments on the NSW central western slopes - Mod_Good - Mod CW212MGM
- White Box - Tumbledown Gum woodland on fine-grained sediments on the NSW central western slopes - Mod_Good - Poor_Grslnd CW212MGPG
- White Box - Tumbledown Gum woodland on fine-grained sediments on the NSW central western slopes - Moc_Good - Poor_Weedy CW212MGPW
- White Box - Tumbledown Gum woodland on fine-grained sediments on the NSW central western slopes - Low - Poor_Weedy CW212LPW
- Non-native vegetation
- Dam
- Study Area
- Wind Turbines
- Overhead Elecrtical Lines
- Underground Elecrtical Lines
- Access Tracks and Wind Turbine Footings
- Substations
- Infrastructure Areas

Wind Farm Layout: Wind Prospect CWP
Basemap: Bing Maps

N

0 0.5 1 1.5Km

1:100,000 at A3

Client:	Wind Prospect CWP Pty Ltd	
Drawing No:	0170898hv_UEIA_G010a_R0.mxd	
Date:	15/05/2013	Drawing Size: A3
Drawn By:	TC	Reviewed By: MB

This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

Figure 5.4 - Vegetation Map of the Study Area and Environs (Overview)

Uungula Wind Farm Ecological Impact Assessment

Environmental Resources Management ANZ

Auckland, Brisbane, Canberra, Christchurch, Hunter Valley, Melbourne, Perth, Port Macquarie, Sydney

ERM

Source: Environmental Resource Management ANZ

- Access roads will be designed around tracks and roads that currently exist within the study area, where practicable, to avoid additional vegetation clearance for access;
- Turbines will be placed in cleared, treeless or low tree density areas, where practicable, to minimise the need for additional or excessive tree clearance and hollow loss;
- Where turbines are to be placed in woodland areas, they will be situated in areas where ground layer disturbance has previously taken place (e.g. sown areas);
- Construction compounds, collector substations, switching stations and rock crushing facilities will be located outside ecologically sensitive areas where practicable;
- The Project was designed such that native tree removal is minimised wherever practicable and will be further minimised during the detailed design phase. Where practicable, wind turbines will be placed at least 30 m from hollow-bearing trees;
- Access tracks and powerline routes will be re-aligned to minimise the impact on the EEC, with disturbance occurring only for the installation of the external transmission line, where only the canopy will be removed, ensuring the understorey remains;
- Where necessary, transmission line poles will be realigned within the powerline easement to ensure there are no impacts on *Swainsona recta*, avoiding loss of all recorded individuals of this species; and
- Electrical reticulation will be placed underground and within the road footprint where practicable to allow for temporary rather than permanent disturbance. Electrical reticulation will pass overhead across gullies and waterways to reduce impacts.

The Proponent will continue to review options to minimise and avoid impacts on the ecological values of the site. Mitigation measures were proposed in the draft EA to ameliorate unavoidable impacts on ecological values, and will be further reviewed to ensure the final proposed layout limits the potential impacts of the Project.

There are seven properties considered as potential environmental offset options, with three properties having been verified as having equivalent vegetation types to and being in equivalent or better condition than the impact sites. These properties will be assessed for their potential to provide a biodiversity offset for the proposed project.

3.4 Cultural Heritage Assessment

New South Wales Archaeology Pty Ltd was commissioned in July 2012 to undertake an archaeological and cultural heritage assessment, comprising of a literature review and field surveys, to collect data.

The assessment identified three differing Wiradjuri groups who lived in reasonable proximity to the Project site, the Bathurst, Mudgee and Wellington 'tribes' (Connor 2002). There is limited information about the pattern of movements of the Wiradjuri over a year, however major watercourses would have formed the core of a groups territory and land use would have varied according to season. The early 1800's saw changes in the traditional land use of Aboriginal people with the introduction of European settlement, in particular the founding of the township of Bathurst.

Field surveys were conducted with the assistance from representatives of the Registered Aboriginal Parties, in accordance with the *Draft Guidelines For Aboriginal Cultural Heritage Impact Assessment And Community Consultation* (NSW DEC 2005) and OEH's *Aboriginal Cultural Heritage Consultation Requirements For Proponents 2010* (NSW DECCW 2010b).

The assessment report determined that the archaeological resource across the Project site is of low significance, given the nature and density of the artefact locales recorded in the area, and their low scientific significance rating. However, the construction of the Project will result in substantial physical impacts to any Aboriginal objects which may be located within direct impact areas irrespective of their

archaeological significance. That is, any Aboriginal object situated within an area of direct impact will be comprehensively disturbed and / or destroyed during construction.

A total of 51 Aboriginal object locales were recorded on-site, all of which were of low archaeological significance. Given the nature and density of the artefact locales recorded in the Study Area and the low scientific significance rating they have been accorded, a strategy of impact avoidance is not warranted regarding these locales. Following preliminary discussions with the Registered Aboriginal Parties for the Project, it was decided that a programme of Aboriginal artefact salvage should be given consideration as an appropriate form of impact mitigation. Two European items were recorded during the survey, with neither site satisfying heritage listing criteria.

Ground disturbance will occur predominantly during the construction phase of the Project with the potential to cause direct impacts to any Aboriginal objects or Non-Aboriginal items which may be present on-site. Aboriginal objects (stone artefacts) can be expected to extend in a relatively continuous, albeit very low to low density distribution across the broader landscape encompassed by the Project. Overall the proposed impacts are predicted to be discrete in nature due to the relatively small footprint of construction activities and, therefore, impacts to the archaeological resource across the landscape can be considered only partial in nature.

3.5 Traffic and Transport Assessment

Samsa Consulting was commissioned to undertake a Traffic and Transport Assessment for the proposed Project. The study was conducted in accordance with the NSW Roads and Traffic Authority (RTA) *Guide to Traffic Generating Developments* and the DGRs, and provided a technical appraisal of the traffic and safety implications arising from the Project. The assessment will be revisited in view of Roads and Maritime Services (RMS) accepted methodologies so that the traffic and transport assessment is based on current guidelines.

Traffic generation predictions used for this assessment range from a moderate (average) scenario to a conservative (high) scenario. A moderate scenario is likely to occur for the great majority of the 18 month to two years' construction period, while a conservative scenario assumes that peak construction periods will occur simultaneously.

It was estimated that, because of the Project, under a conservative scenario an additional 198 vehicles per day (calculated as two way trips) would be expected along the eastern access route and 206 vehicles per day along the western access routes. It is more likely that the moderate scenario would occur, contributing only a third of that conservative traffic volume. These impacts could have a significant impact on existing road users for up to two years along both the eastern and western access routes during the construction period. This would especially be the case on the minor and unsealed roads if the preferred consolidated site access locations were not achievable. These higher than normal impacts, however, are expected only during the construction and decommissioning periods, with only minor increases to traffic volumes during the operational phase.

A range of management and mitigation strategies will be proposed during the construction, operation and decommissioning phases of the Project to minimise traffic impacts, reduce community disruption and the risk of traffic incidents. In turn this will facilitate minimum disruption to existing traffic conditions.

3.6 Aviation Assessment

Existing aviation activity in the locality of the Project site was identified during planning and design through consultation with the Department of Defence (DoD), Civil Aviation Safety Authority (CASA),

Airservices Australia (AsA), Aerial Agricultural Association of Australia (AAAA), the Royal Flying Doctors Service (RFDS), NSW Rural Fire Service, recreational aviation operators and the local community.

There are two certified aerodromes within the vicinity of the Project Study area; Dubbo Airport, 61 km north-west and Mudgee Airport, 19.5 km south-east. There are also two Aeroplane Landing Areas (ALA); Wellington ALA, 14.7 km north-west and Gulgong ALA, 18km north-east. According to the Aviation Impact Statement carried out by REHBEIN Airport Consulting (REHBEIN), the Project would not impact the OLS, but would penetrate the PANS OPS in one instance at Mudgee Airport. The Project would also penetrate the surface of the Instrument Flight Rules air route. The Project will consult further with Airservices Australia in relation to the Lowest Safe Altitude (LSALT) where proposed turbines impact on the LSALT.

Agricultural aerial spraying activity occurs for pest management and pasture top-dressing. Pest management spraying is unlikely to be affected by the Project. Top-dressing activity will require care by pilots applying the material to properties along the ridgelines.

Some private landing strips are present within the Project locality as shown in Figure 7. The aviation assessment will be updated following further consultation with the relevant agencies and airstrip owners to determine the potential impacts based on the final proposed layout, and mitigation measures will be developed to address those impacts.

3.7 Communication Assessment

Electromagnetic signals (or radio waves) are transmitted throughout the country as part of telecommunication systems by a wide range of operators. Such systems are used for radar, radio broadcast, television, mobile phones and mobile and fixed radio transmitters. Electromagnetic signals generally work best if a clear path exists between the transmitting and receiving locations, known as line of sight (LOS).

There is the potential for interference from any large structure, including wind turbines, which occur within or close to the signal path. Signals can be interfered with or reflected by the rotating blades of a wind turbine, which could degrade the performance of the signal (Bacon 2002). Electromagnetic emissions from generators and other machinery also have the potential to affect signals; however, with modern wind turbine generators and strict International Electrotechnical Commission (IEC) regulations for manufacturers, there are now negligible emissions from wind turbines (Auswind 2006).

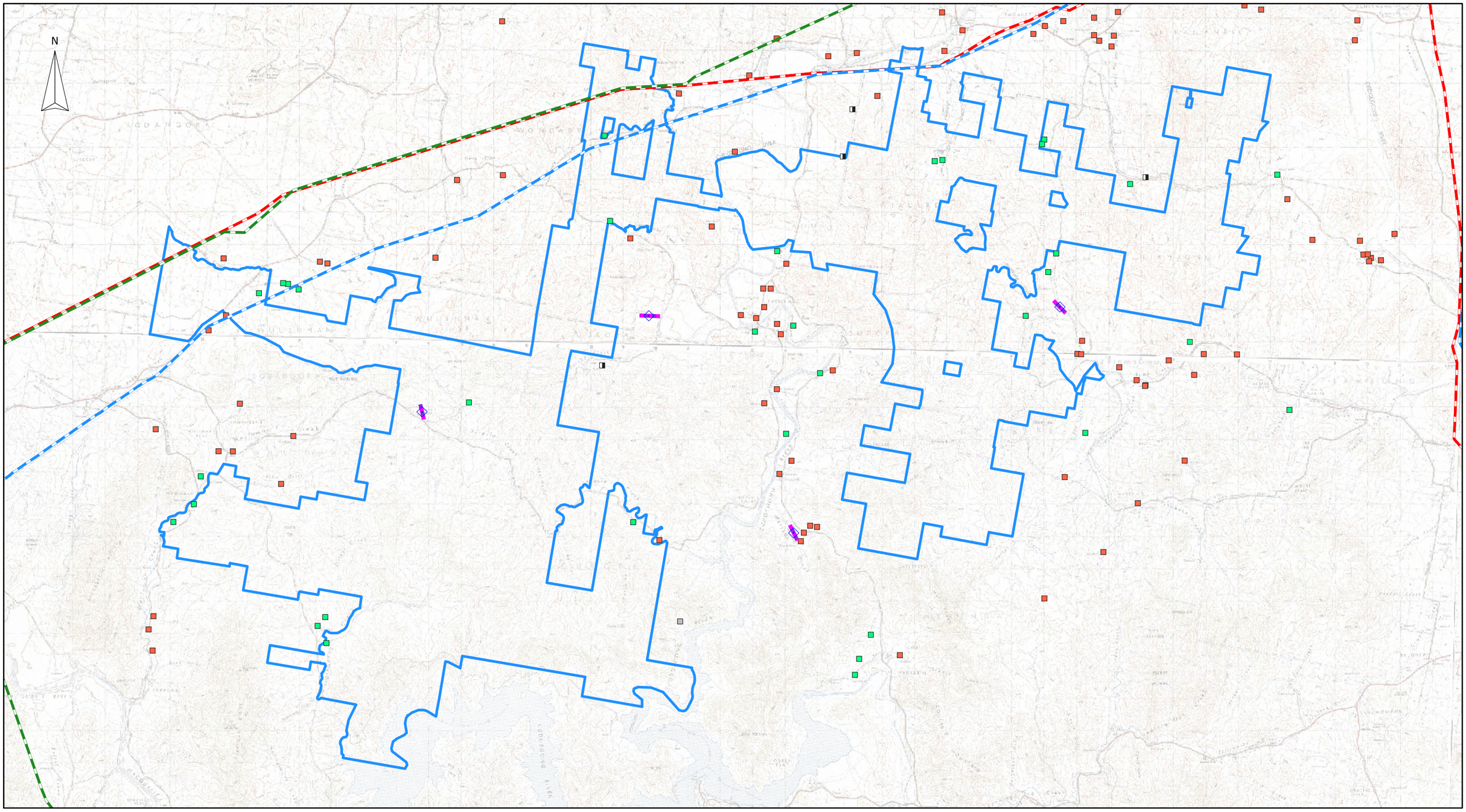
There are several point-to-point links and omni-directional services which occur across and near to the Project as shown in Figure 8. Assessment of these links by Lawrence Derrick & Associates has predicted that no impacts will occur on communications because of the Project. A similar assessment will be undertaken for the revised Project layout. If the Project does cause any interference to any links, the Proponent will investigate with the afflicted parties and implement a suitable solution to the problem.

3.8 Electromagnetic Field Assessment

Electric and magnetic fields (EMFs) are associated with a wide range of sources and occur both naturally and because of human activity. Naturally occurring EMFs are those associated with lightning or the Earth's magnetic field. Human induced EMFs occur wherever electricity is present, meaning we are constantly exposed to EMFs in our home and work environments.

Wind farms create EMFs from operational electrical equipment, such as transmission lines, substations and the electrical components found within the wind turbines. This equipment has the potential to

FIGURE 7: KNOWN LANDING GROUNDS WITHIN THE PROJECT LOCALITY 2016



LEGEND

- Project Site
- 66 kV Transmission Line
- 132 kV Transmission Line
- 330 kV Transmission Line

Residence

- Seeking Agreement
- Involved Residence
- Uninvolved Residence

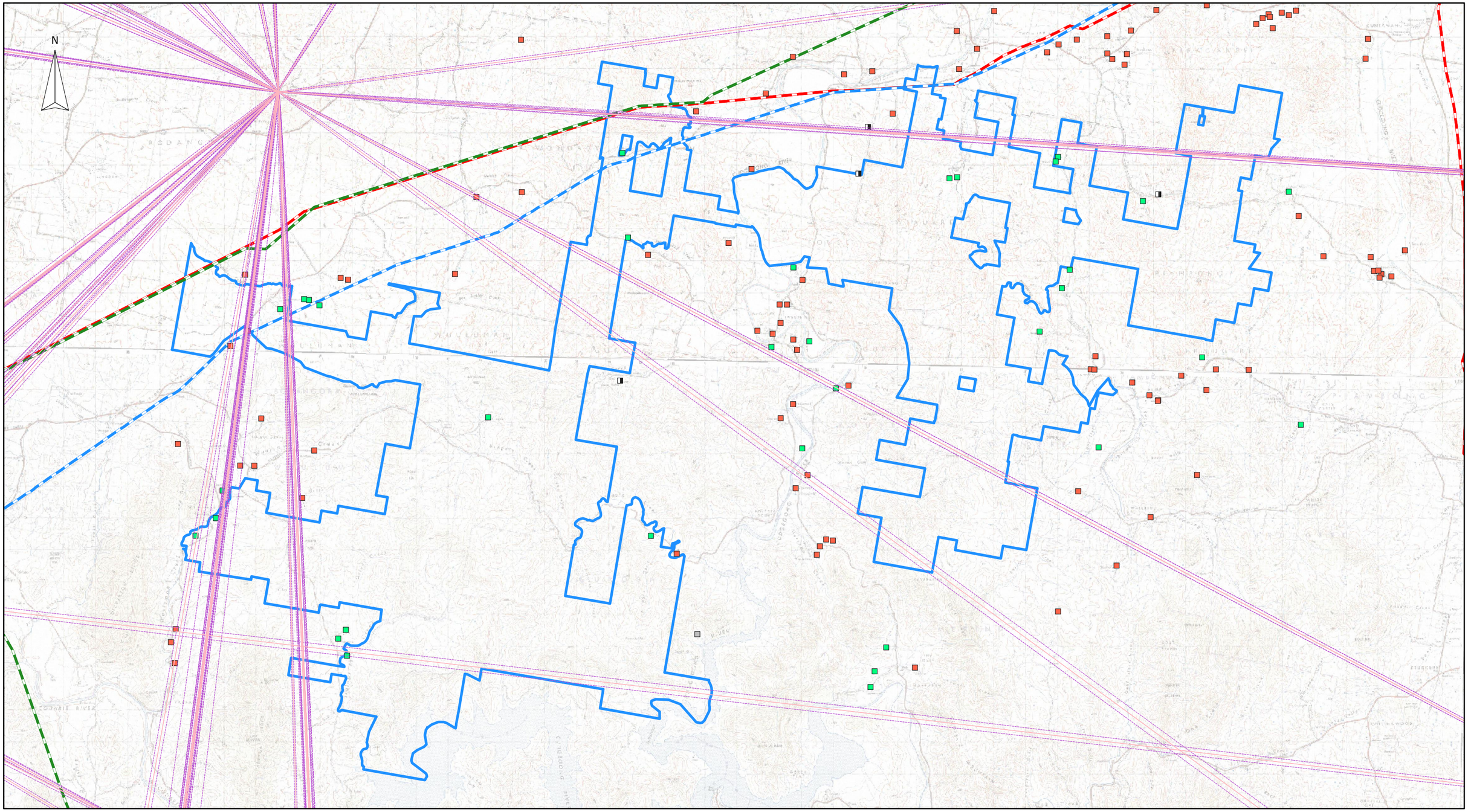
- Runway Centre Line
- Landing Ground

Image, landing grounds, roads and residences: derived from GEODATA Topo250K; Transmission Lines: 132kV and 330kV - TransGrid, 66kV - Essential Energy; All other data: WPCWP

COMPANY	UUNGULA WIND FARM PTY LTD
TITLE	FIGURE 7: KNOWN LANDING GROUNDS WITHIN THE PROJECT LOCALITY
DATE	15 NOV 2016
DRAWN BY	B KRONENBERG
CHECKED BY	M BRANSON
SIZE	A3
SHEET	1 OF 1
SCALE BAR	0 5 km
SCALE	1:110000

WIND PROSPECT CWP

FIGURE 8: COMMUNICATION LINKS ACROSS THE PROJECT SITE 2016



LEGEND

Project Site

66 kV Transmission Line
132 kV Transmission Line
330 kV Transmission Line

Residence
Seeking Agreement
Involved Residence
Uninvolved Residence

ACMA Link
2nd Fresnel Zone

Image and residences: derived from GEODATA Topo250K; Transmission Lines: 132kV and 330kV - TransGrid, 66kV - Essential Energy; Communication Links - ACMA; All other data: WPCWP

COMPANY	UUNGULA WIND FARM PTY LTD
TITLE	FIGURE 8: COMMUNICATION LINKS ACROSS THE PROJECT SITE
DATE	15 NOV 2016
DRAWN BY	B KRONENBERG
CHECKED BY	M BRANSON
SIZE	A3
SHEET	1 OF 1
SCALE BAR	0 5 km
SCALE	1:120000

WIND PROSPECT CWP

produce Extremely Low Frequency (ELF) EMFs, which means the current will alternate direction between 30 and 300 times per second, or at 30 to 300 Hertz (Hz).

The measurements of electromagnetic fields can vary within a wind farm, depending on the placement of equipment such as wind turbines, substations and internal electrical cables.

The typical strategy for reducing electromagnetic fields is distance from the source. Other strategies also include burying cables and placing cables together to cancel the emitted fields. As most of the wind turbine electrical equipment is encased within the wind turbine, in housing at the base of the tower or located up to 120 m above ground level, the distance and shielding from electromagnetic fields decreases the impact from emitting sources.

Electromagnetic fields can have the highest recorded levels at substations; however, appropriate fencing and remote placement of the substation within the landscape can greatly reduce any exposure to electromagnetic fields.

3.9 Fire and Bushfire

Fire and bushfire impacts of the Project on human life and property were assessed in accordance with the DGRs and the *Rural Fires Act 1997*.

By basing the risk management process on the AS/NZS ISO 31000:2009 *Risk Management – Principles and guidelines* (Standards Australia 2009) and the National Inquiry on Bushfire Mitigation and Management (Council of Australian Governments (COAG) 2004), an analysis and evaluation of bushfire risk and acceptable risk treatments were developed.

The Project is in an area of low to medium bushfire risk due to the vegetation and agricultural practices in the area. The construction of a wind farm has potential benefits in tackling bushfires which occur close to and within the Project area, including improved access from new tracks, fire breaks and reduced lightning strike to vegetation. By reviewing the possible ignition sources from the wind farm and analysing bushfire risk assessments on life and property, it is possible to create mitigation and management strategies to minimise the Project's impact on fire and bushfire risk during all Project phases.

Through implementing these strategies in an Emergency Response Plan it is possible to increase the awareness of the procedures of bushfire emergencies, increase the preparedness of construction and maintenance staff, and facilitate orderly and safe evacuation and refuge during times of bushfire. The consideration of these mitigation and management strategies will allow the Project to decrease its impact on fire and bushfire hazards.

3.10 Water Assessment

The Project falls under the Macquarie Bogan Unregulated and Alluvial Water Sources Water Sharing Plan and the NSW Murray Darling Basin Fractured Rock Groundwater Sources Water Sharing Plan. The area is also managed with regards to the Central West Catchment Action Plan. Therefore, there are a number of water management targets in place including water sharing, water quality, management of water supply and wastewater, water conservation and efficiency, and river and wetland protection and rehabilitation.

Water requirements will be met by sourcing water from within the locality if licences can be obtained under the current water sharing plan. Where available, groundwater will be purchased from involved or adjacent landowner properties who hold groundwater licences and have unused allocations. The use of regulated surface water allocations from the nearby Burrendong Dam may also be an option. If water

cannot be sourced locally, then it will be brought to the Project site by external water suppliers under contract to the Project.

There will be minimal impacts to surrounding groundwater and surface waters due to limited activities within these areas and effective mitigation actions and management. Potential impacts are likely to occur mostly from construction activities, which will be managed with the appropriate Environmental Management Strategy.

3.11 Other Considerations

The draft EA included an evaluation of aspects of the Project beyond the key issues identified in the DGRs, including general environmental considerations and socio-economic values. The EIS will consider these aspects as required under the SEARs, including:

- Air quality and dust;
- Soils and landforms;
- Waste;
- Decommissioning and refurbishment;
- Mineral Leases;
- Neighbouring Land and the Local Environmental Plan;
- Community wellbeing and community funds; and
- Local economy.

A discussion of potential impacts on these aspects will be provided and, where necessary, management and mitigation measures identified.

4. CONCLUSION

The proposed Project is requesting SEARs under Part 4 of the EP&A Act, and will be subject to an Accredited assessment process under the EPBC Act. This PEA has identified potential environmental impacts that may result from the proposed Project, based on the draft EA and associated studies prepared under the original Part 3A Application.

The Proponent proposes to revise the proposed Project which will consist of up to 249 wind turbines, associated access tracks, overhead and underground power cables, substation(s) and ancillary facilities. The potential impacts of the Project will be assessed and appropriate avoidance, mitigation and management measures proposed. It is likely that, owing to advances in turbine technology and changes and additional social and environmental considerations, the results and conclusions from the draft EA are likely to change. The Project will be designed considering the findings of consultation with the local community and associated stakeholders which is ongoing.

A Statement of Commitments will be developed which provides a summary of measures to inform the Conditions of Approval which the Proponent will implement during the pre-construction, construction, operation and decommissioning phases.

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