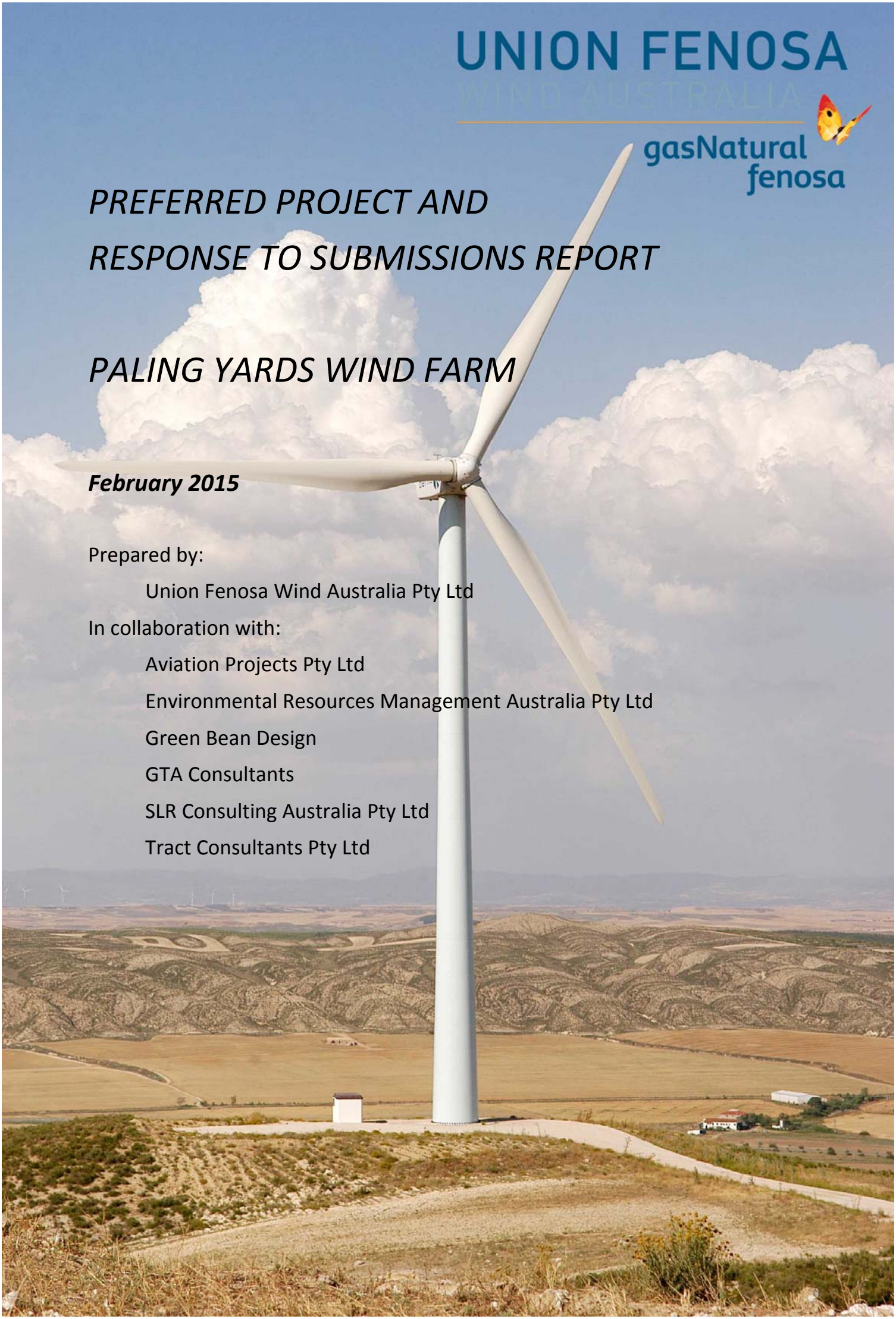

UNION FENOSA WIND AUSTRALIA

gasNatural fenosa

PREFERRED PROJECT AND RESPONSE TO SUBMISSIONS REPORT

PALING YARDS WIND FARM

February 2015

Prepared by:

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PALING YARDS WIND FARM

MAJOR PROJECT APPLICATION NUMBER (MP 10_0053)

STATE SIGNIFICANT DEVELOPMENT APPLICATION NUMBER (SSD 6699)

Revision Table:

Revision	Date of Revision	Description	Prepared By
V0	19th December 2014	Initial draft	S.M.
V1	30th December 2014	Final report	S.M.
V2	27th February 2015	Minor amendments	S.M.

Executive Summary

Union Fenosa Wind Australia Pty Ltd (**UFWA**) (the '**Proponent**') and its successors and assigns, is seeking project approval for the construction and operation of a wind farm facility with up to 55 wind turbines known as the Paling Yards Wind Farm (the '**Project**') located ~60km south of Oberon and in the Oberon Local Government Area.

The Project is a State Significant Development (**SSD**) under Part 4 of the *Environmental Planning and Assessment Act 1979* (**EP&A**). The environmental assessment requirements (EARs) for the Project were issued under Part 3A of the EP&A prior to repeal of Part 3A on 1 October 2011, the Project was then a transitional Part 3A project under Clause 2(1)(c) of Schedule 6A of the EP&A Act. On 21st March 2014 the Project was transitioned to SSD and will be assessed and determined under Part 4 of EP&A Act. The NSW Department of Planning and Infrastructure (DoP&I) stated:

> "*…To minimise any disruption to the assessment process, the actions taken under the Part 3A process to date, including the acceptance of the Environmental Assessment / Environmental Impact Statement (EIS) for public exhibition have been accredited under the SSD process and are taken to have been completed.*"

This Preferred Project and Submissions Response Report (the **Report**) has detailed the revised Project proposal to incorporate several design changes and commitments raised in the submission comments from various government agencies.

The Environmental Impact Assessment (**EIS**) and the Report have found that the Project would have a range of positive and negative impacts on the site and region. However, it was found that the benefits of the wind farm would outweigh the undesirable impacts, and with appropriate conditions and mitigation measures detailed, the impacts can be minimised. The Project is compatible with the existing land uses of the area and complies with relevant planning and environmental controls applicable to the site.

The Project if approved would have the following specific economic and environmental benefits:

- total capital investment of $275 million in the economy;
- generate up to 65 full time positions during construction, and up to 11 full time ongoing positions during the operation;
- Stimulation of the economy in the Oberon Council as a result of greater income generation and subsequent expenditure in the region;
- Provision of flow on economic benefits in terms of employment and commercial opportunities from the economic investment;
- Up-skilling of the local workforce within a growing energy market;
- Use of a significant portion of locally sourced materials and employment;
- Increases in the local tourism industry, and in turn, increased expenditure on local services such as accommodation and retail in Oberon Council;

- Contribute up to $1,900 per turbine per year (escalated annually with CPI) to the Oberon Council Community Enhancement Fund (CEF) that forms part of the Voluntary Planning Agreement (VPA);
- generate up to 550,833 MWh of clean, renewable energy, enough to power up to 85,344 average households;
- contribute to reducing the dangerous impacts of anthropogenic climate change, such as droughts, floods, extreme weather events and sea level rise by displacing up to 535,961 tonnes of greenhouse gases or the equivalent of taking up to 123,778 cars off the road;

The assessment of potential negative impacts arising from the Project found that the wind farm has the potential to have a low to moderate impact on landscape values, a limited impact on local communications facilities, an increase in noise for some residents (mainly host landowners), and result in the clearing of non-significant vegetation.

The impacts of the Project would be minimised by the extensive range of management plans that would be prepared before construction and ongoing monitoring of the compliance of the wind farm post-construction with the established standards.

This Report concludes that the proposed Paling Yards Wind Farm will offer a number of significant benefits and can be constructed with minimal impact to the existing environment by preparing and implementing the mitigation measures detailed in the revised Statement of Commitments.

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APPENDICES

ABBREVIATIONS

AGL	Above Ground Level
AQMP	Air Quality Management Plan
ANZECC	The Australian and New Zealand Environment Conservation Council
BBMP	Bird and Bat Management Plan
BBMS	Bird and Bat Monitoring Strategy
BFEMOP	Bush Fire Emergency Management and Operation Plan
CASA	Civil Aviation Safety Authority
CCC	Community Consultative Committee
CEC	Clean Energy Council of Australia
CEF	Community Enhancement Fund
CEMP	Construction Environmental Management Plan
CHMP	Cultural Heritage Management Plan
CNMP	Construction Noise Management Plan
CPI	Consumer Price Index
dB	Decibel
DCP	Development Control Plan
DECCW	NSW Department of Environment, Climate Change and Water (Now OEH)
DGRs	Director General Requirements / Environmental Assessment Requirements
DoD	Commonwealth Department of Defence
DoP&E	NSW Department of Planning and Environment (Formerly DoP&I)
DoP&I	NSW Department of Planning and Infrastructure (Now DoP&E)
DPI	NSW Department of Primary Industries
DRP	Decommissioning and Rehabilitation Plan
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EP&A Act	NSW Environmental Planning and Assessment Act 1979
EPA	NSW Environment Protection Authority
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
EPHC	Environment Protection and Heritage Council
EPL	Environment Protection Licence

ERM	Environmental Resources Management Australia Pty Ltd
ERP	Ecological Restoration Plan
F&FMP	Flora and Fauna Management Plan
GBD	Green Bean Design
HBTs	Hollow Bearing Trees
IPA	Inner Protection Area
LALC	Local Aboriginal Land Council
LGA	Local Government Area
LEP	Local Environmental Plan
LRET	Large-scale Renewable Energy Target
LSALT	Lowest Safe Altitude
LVIA	Landscape & Visual Impact Assessment
MRB	Mineral Resources Branch
MOS	Manual of Standards
MRET	Mandatory Renewable Energy Target
NHMRC	National Health and Medical Research Council
NIA	Noise Impact Assessment
NPW Act	National Parks and Wildlife Act 1974
OC	Oberon Council
OD	Over Dimensional
OEH	NSW Office of Environment & Heritage (Formerly DECCW)
OEMP	Operational Environmental Management Plan
ONMP	Operational Noise Management Plan
PCCR	Pre-Construction Compliance Report
RAAF AIS	Royal Australian Air Force - Aeronautical Information Service
RECs	Renewable Energy Certificates
RET	Renewable Energy Target
RFS	NSW Rural Fire Service
RMS	NSW Roads and Maritime Services (Formerly RTA)
RSA	Rotor Swept Area
RTA	NSW Road Traffic Authority (Now RMS)
RVMP	Riparian Vegetation Management Plan
SCA	Sydney Catchment Authority

SECP	Sediment and Erosion Control Plan
SER	Supplementary Ecology Report
SISD	Safe Intersection Sight Distance
SoC	Statement of Commitment
SWMP	Soil and Water Management Plan
TCP	Traffic Control Plan
TMP	Transport / Traffic Management Plan
TNSP	Transmission Network Service Provider
TSC Act	NSW Threatened Species Conservation Act 1995
UFWA	Union Fenosa Wind Australia Pty Ltd
ULSC	Upper Lachlan Shire Council
VPA	Voluntary Planning Agreement
WHO	World Health Organisation
WMA	Water Management Act 2000
WTG	Wind Turbine Generator

1. Introduction

This Preferred Project and Submissions Response Report (the **Report**) has been prepared in response to the submissions received following the public exhibition of the Environmental Impact Statement (**EIS**) (Revision 4, dated January 2014) for the proposed Paling Yards Wind Farm project (the **Project**).

The EIS was publically exhibited from 28th March 2014 to 30th May 2014 in accordance with Section 89F of the *Environmental Planning and Assessment Act 1979* (**EP&A**) The publically exhibited EIS received a total of 22 submissions, including 11 government agency submissions. The details of the submissions are shown in Section 3 - Consideration of all the submissions.

1.1. Purpose of this report

This Report addresses legislative requirements of section 89G(e) of the EP&A Act and section 85A of the EP&A Regulation 2000.

1.2. Structure of the report

In consideration of the community submissions and government agency comments to the publically exhibited EIS, This Report has been prepared to include:

- Updated details of the project description (Section 2);
- Project Benefits (Section 3);
- Design changes and amendments to the proposed development and infrastructure (Section 4);
- Consideration of the submissions (Section 5);
- Response to Government Agency Submissions and additional feedback comments (Section 6);
- Response to the Community Submissions (Section 7);
- A revised Statement of Commitments (**SoC**) (Section 8);

2. Project Description

This chapter details the proposed Project and all associated buildings and works that support the wind energy facility. It also details the major elements of the construction, operational and decommissioning phases.

2.1. Overview

Union Fenosa Wind Australia Pty Ltd (**UFWA**), the Proponent, and its successors and assigns, is seeking project approval for the construction and operation of a wind energy facility known as the Paling Yards Wind Farm (the **Project**).

The project comprises a number of elements, including:

- Up to 55 individual wind turbines, refer to Table 2.2.1 for turbine envelope size and rated capacity range;
- Up to 55 individual kiosks for the housing of transformers and switchgears and associated control systems, to be located in the vicinity of the wind turbine towers (in some turbine models the equipment is integrated within the tower or nacelle);
- Upgrades to local road infrastructure including up to six access points from Abercrombie Road;
- Internal unsealed tracks for vehicle access to turbines and infrastructure;
- An underground electrical and communication cable network linking turbines to each other and the proposed on-site substation;
- Up to three wind monitoring masts fitted with various instruments such as anemometers, wind vanes, temperature gauges and potentially other electrical equipment;
- A temporary batching plant to supply concrete for the foundations of the turbines and other associated structures;
- Obstacle lighting to selected turbines (if deemed necessary);
- Removal of native vegetation (if required);
- Vegetation planting to provide screening;
- A viewing platform within the site boundary adjacent to the Abercrombie Road corridor;
- Wind farm and substation control room and facilities buildings;
- An on-site electrical substation and approximately 9-10km of overhead powerline of up to 500kV;
- Grid connection achieved via an off-site 500kV electrical Terminal Station (including control room and other associated facilities) for the grid cut-in to the Mt Piper to Bannaby 500kV transmission line which bypasses the north-east and east of the site; and
- All associated and ancillary uses and activities.

The overall development footprint is less than 2% of the Site area.

The indicative infrastructure plan is shown in Figure 2.1.1.

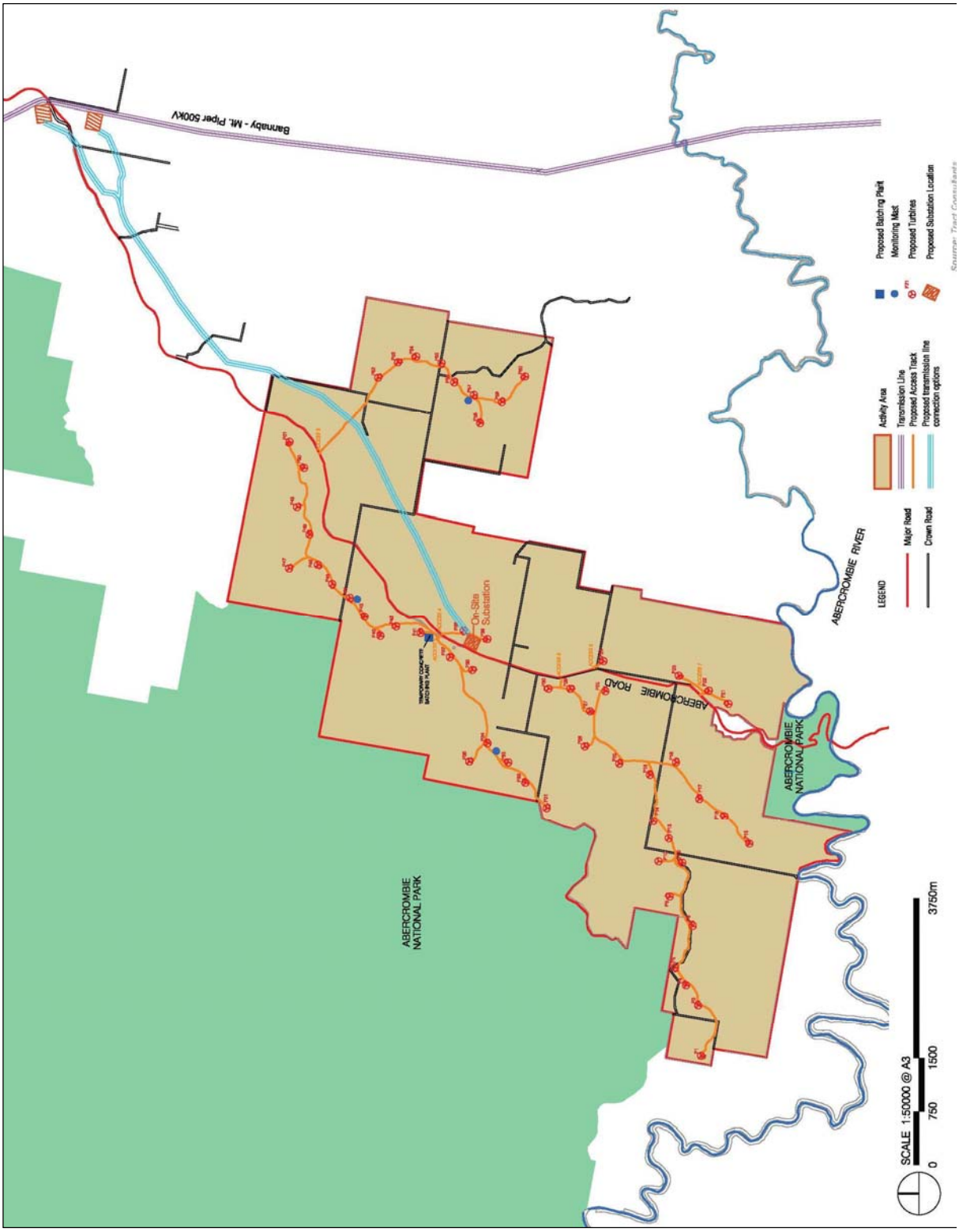


Figure 2.1.1 - Indicative Infrastructure Plan

For more details of site plan and surrounding area refer to Figure 12 of original EIS.

2.2. Turbine Specifications

The most important element in any wind farm is the wind turbine, often referred to as a Wind Turbine Generator (**WTG**). Turbines consist of a tall tower with 3 long blades mounted at the top that capture the wind.

The turbine manufacturing industry is dynamic, with new and updated models regularly released. Existing models are often made redundant only a few years after their release. The industry is rapidly growing and benefits from constant innovation and advancement in the efficiency of the turbines.

The major phase of a wind farm's cost is the initial construction, and turbine selection is a critical determinant of this cost. A turbines cost depends on a number of factors including the current economic climate (i.e. whether other wind farms also require supply in the upcoming period) based on competition between suppliers. In order to maintain competition between suppliers of turbines, and that the most up to date turbines can be used, it is important that a project has flexibility to select from a number of different turbine models from alternative suppliers.

To provide this flexibility, the proponent is seeking approval for a maximum turbine 'envelope' rather than a single turbine model. This envelope represents the largest and widest of the eight turbine models under consideration.

Many of the turbine models under consideration are smaller than the maximum envelope. In general, if any of the smaller turbines are utilised for the Paling Yards Wind Farm, the impacts described and assessed in this report are likely to be less.

The proposed envelope contemplates that, as a maximum, the turbine would have an overall maximum height of 175 metres when constructed. This envelope includes a tower of up to 119 metres in height to the hub, with blades up to 67 metres and a 2-3 metres wide hub.

Accordingly, for the purposes of this EIS, the largest turbine model under consideration (with 175m height to tip of blade) has been assessed in relation to all potential impacts other than noise impacts. The final noise characteristics of the largest turbines has not been available at the time of the preparation of the EIS, therefore the noise impact assessment has been carried out with the noise characteristics of one of the largest turbine models (Vestas V112) currently installed in Australia.

The Project is considering a large spectrum of turbine models, although each wind turbine is different, their physical envelope size and rated capacity has been captured within the range shown in Table 2.2.1.

Table 2.2.1 – Turbine Envelope Size and Capacity Range

Turbine Parameters	Range
No. of Turbines	Up to 55
Tower Hub Heights	Up to 119 metres
Rotor Blade Length	Up to 67 metres
Rotor Diameter	Up to 136 metres
Total Tip Height	Up to 175 metres
Turbine Capacity	*Up to 5.0MW each
Total Wind Farm Capacity	*Up to 275MW

** The largest turbine proposed in the EIS, the Gamesa 4.5MW platform has now been rated at 5.0MW by the manufacturer, hence increasing the theoretical total capacity of the wind farm, this doesn't change the assessments, as the turbine envelope size proposed will remain the same. The noise characteristics is not yet available for this platform, and it will be assessed to demonstrate compliance once it is provided by the manufacturer.*

There are some slight differences in the electrical construction of the turbines under consideration. Some of the turbines under consideration have a 690V / 33kV transformer in the nacelle, and 33kV switchgear either in the base of the tower or next to the tower in a kiosk. Some turbines have the 690V / 33kV transformer and the 33kV switchgear in the base of the tower. Other turbines have the 690V / 33kV transformer and the 33kV switchgear on the ground in a kiosk next to the tower.

The components of each of the turbine models under consideration are as follows;

- Reinforced concrete 'gravity foundations' up to 20 x 20 metres wide and between 1.5 to 3 metres in depth depending on the prevailing ground conditions. A rock anchor foundation is being investigated which would require much smaller concrete footing areas.
- A tubular steel tower, or a full concrete tower, or a Steel-Concrete Hybrid tower with up to 10 metres in diameter at the base (depending on the tower material), tapering to a diameter of approximately 3.0 metres at the top, with a total tower height of up to 119 metres, weighing between 250 and 1,900 tonnes (the full concrete tower is the higher end of the spectrum). The 100+ metre tower options would typically be a full concrete or steel-concrete hybrid with the concrete precast base and an upper steel section. The towers are painted in a non-reflective light grey/off white paint;
- A nacelle at the top of the tower housing the gearbox or a direct drive mechanism, and electrical generator, ensuring that the turbine is always facing into the wind and adjusting the angle of the blades to ensure maximum output of electricity and minimum noise.
- A rotor comprising a hub (attached to the nacelle) with three blades, and a shaft that connects to the generator via the gearbox or direct drive mechanism.

- 3 blades up to 67 metres long (excluding hub), made of lightweight materials.

A safety component incorporated in all models under consideration is a lightning protection system. All blades are manufactured with an anti-lightning protection system which minimises the damage to the turbines in the event of an atmospheric discharge (lightning). In the event of a lightning strike, power is diverted from the lightning to the nacelle which is grounded to the earth.

Other safety components of the turbines include;

- Sufficient standing and working space.
- Full containment of any leakage or spillage, by using dry-type transformers in the nacelle or using an oil-filled transformer in a kiosk adjacent to the tower with oil bunding built into the kiosk;
- Fibreglass weather protector;

The proposed turbines would result in efficient transfer of electricity as they have been chosen to match the local conditions in Paling Yards. As the height above the ground increases the wind resource generally increases and as a result the turbines under consideration are significantly more efficient than previous smaller models. The turbines under consideration are suited to the wind resource at Paling Yards, allowing maximum output capacity to be achieved at significantly lower wind speeds.

The turbines under consideration have a low 'cut-in' speed at nominal wind speeds (i.e. maximum output capacity is achieved at lower wind speeds). Generally, the wind turbines commence operation at a wind speed of approximately 3 to 4 metres per second, gradually increasing to the maximum output rate at 12 to 15 metres per second (depending on the turbine model). From this rate to approximately 20-25 metres per second (depending on the turbine model) the turbine operates at maximum capacity. In order to prevent damage to the turbine and various components, the turbines employ automatic shutdown at speeds above 20-25 metres per second (depending on the turbine model).

As turbines are becoming more technologically advanced they now incorporate other features which assist in monitoring performance with relevant standards. For example, turbines can employ a low noise mode or wind sector management to reduce the noise output and avoid reaching critical noise levels. These systems act to mitigate any isolated occasions where noise output exceeds the permitted threshold. It should be noted that the wind farm has been designed to prevent the risk of such impacts occurring in the first place, however this offers an additional ability to address impacts created by unusual weather patterns or other circumstances.

2.3. Turbine Layout

A revised indicative wind turbine layout has been prepared that shows 55 turbines. Please refer to Figure 2.1.1 - Indicative Infrastructure Plan. The indicative layout was prepared by the proponent using wind modelling software and the consideration of the issues detailed below.

The indicative locations shown reflect the current understanding of the best location for the turbines given the current knowledge of wind characteristics and presence of vegetation.

The indicative wind turbine layout was based on a number of inputs; principally;

- The site boundary;
- Topographical data;
- The location of significant native vegetation and native fauna;
- Noise assessments at key receiver points;
- Dwelling locations;
- Wind speed data collected on and off site;
- Visual amenity impacts (including shadow flicker at the nearby dwellings); and,
- Distance to adjacent turbines.

A number of draft layouts were provided and reviewed by the consultant team. The feedback provided by the consultant team was incorporated into the current indicative layout plan so as to mitigate the impacts of the proposal.

On a hilly terrain such as the Paling Yards site, the wind speeds vary across the site depending on the elevation and the location of hills around the site. In consideration of the predominant winds in the area and the defined ridgelines the wind turbine micrositing has been designed to take maximum advantage of these flows.

The indicative turbine layout is based on the preferred turbine envelope and capacity shown in Table 2.2.1. If project approval is granted, this proposed layout will be refined at the detailed design stage and once the final turbine has been selected so as to achieve the best energy generation from the selected turbine model. It is estimated that this may result in individual turbines being moved approximately 25-100 metres from the currently nominated location on the site plan.

The determination of the final turbine locations during detailed design is required to address:

- the particular siting characteristics of the final turbine chosen;
- any additional site constraints discovered during detailed site investigations (e.g. a discovery of an unusual geotechnical issue);
- further wind speed analysis; and
- access issues determined during the detailed design phase.
- Approval is sought on terms which allow the determination of the final turbine locations during detailed design subject to the following criteria:

- turbines would not be moved by more than 100m from their indicative locations;
- turbines would not be moved closer to the nearest neighbouring dwelling or any closer than 1.0km to any non-participating dwelling;
- turbines would be located so as to avoid any unnecessary impacts on flora and fauna or heritage items (including items of Aboriginal heritage).

2.4. Access to Site for Over-Dimensional Vehicles

The use of Over-Dimensional (OD) vehicles would be required to transport large wind turbine components (blades, tower sections) to the Wind Farm site. As the final turbine supplier has not yet been selected, the EIS adopted a 'worst case scenario' which combined a range of potential vehicles required to transport the various wind turbine components. Further investigations have been undertaken as part of this assessment, using additional data provided by possible suppliers, with the following revised 'worst case scenario' defined:

- Maximum OD Vehicle Length: 66.5 metres
- Minimum Height Clearance: 5.5 metres
- Minimum Road Width: 5.5 metres
- Maximum Road Gradient: 6%
- Maximum Road Crossfall: 2%

The EIS indicated that Bells Line of Road would be used as the proposed OD Transport Route across the Great Dividing Range. Following consultation with the RMS Special Permits, team it has been confirmed that this route is not supported. As such, the proposed use of the Great Western Highway (Route A32) has been investigated further.

It is likely that the Port Kembla shipping terminals would be the arrival location of the wind farm components. It is however noted that there is the option to use the Port of Newcastle for these activities. Discussion as to the suitability of the routes between these locations and the M7 Motorway were discussed within the EIS. Discussions with RMS officers indicate that there is no concern with transporting oversize loads between the above ports and the M7 Motorway, with such activities having occurred for other projects.

The proposed access route from the M7 Motorway is shown in Figure 2.4.1 and described as follows:

- M7 Motorway,
- Turn onto the M4 Western Motorway (westbound) at Light Horse Interchange,
- Continue onto the Great Western Motorway (A32) for 145 kilometres,
- Turn left into Littlebourne Street (O'Connell Road) at Kelso,
- Turn Right into Abercrombie Road at Oberon,
- Continue for ~70 kilometres to the proposed development site.

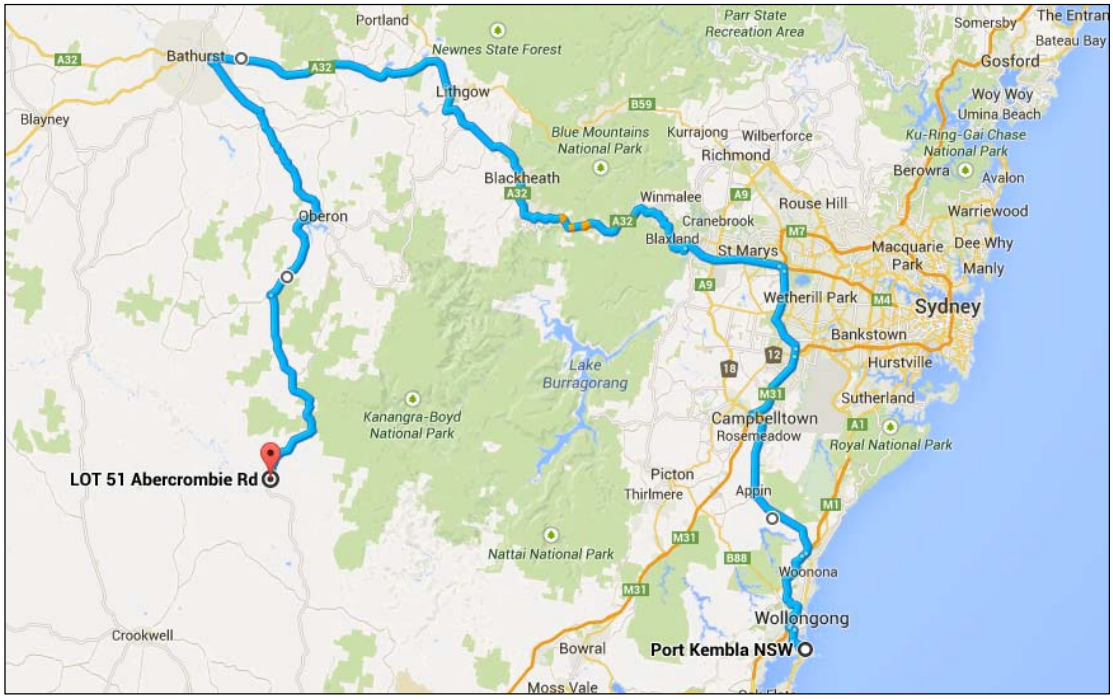


Figure 2.4.1 - OD Transport Route between Port Kembla and Paling Yards Site

The proposed route from Port Kembla to the Paling Yards site can be undertaken in approximately 5 hours by car. It is however noted that it could take up to15 hours (based in an average speed of 25km/h) for the proposed oversize transport vehicles. Given the weather conditions that are apparent in the Blue Mountains during the winter months (ice / snow), an assessment of the appropriate timing of vehicle movements should be undertaken in the Traffic Management Plan (TMP) to be prepared for the works.

As part of the route investigation, GTA Consultants undertook a “drive-through” and video recording of the route and liaised with the RMS Special Permits team to confirm the sections of the identified route that have been already approved and deemed appropriate for wind farm haulage and/or other oversize load requirements. The additional field investigations were conducted to identify potential areas of concern and take measurements wherever necessary.

Investigations and vehicle swept path analysis on critical corners / horizontal curves, indicate that the proposed route is feasible, with the following restrictions and conflict areas identified.

- The minimum available height clearance for vehicles is 5.5 metres, which is appropriate for the anticipated OD Transport vehicle load dimensions.
- Gradients along the route are in excess of the 6% maximum stated within the Worst Case OD transport vehicle requirements.
- Road cross-falls on the route are in excess of the 2% maximum stated within the Worst Case OD transport vehicle requirements.

- Vertical curve radii at several locations are smaller than the minimum 400m radius stated within the EIS 'worst case scenario' OD transport vehicle requirements.
- Road widths and small radius curved have been identified at the following locations:
  - Great Western Highway – 2 km west of Mount Victoria,
  - Great Western Highway – East and West of Hartley,
  - O'Connell Road – 12km north of Oberon.
- Temporary intersection modifications would be required at the following intersections:
  - Great Western Highway and Littlebourne Street, Kelso,
  - O'Connell Road and Abercrombie Road, Oberon.
- There are limited passing opportunities on Abercrombie Road south of Oberon.

The matters raised above do not restrict the use of the proposed route for access to the Wind Farm site. However, further detailed consideration will be analysed once the turbine supplier and transport contractor has been selected. The majority of the matters raised could be overcome by vehicle selection or custom vehicle manufacture. Temporary road works would be required at a several locations, as identified above. This could involve the removal of barriers and/or trees, or the construction of temporary pavement / roads.

The required treatment measures would be developed in consultation with RMS and the respective Councils along the route. These would be documented within a TMP to be prepared for the OD Transport movements and approved by RMS prior to the commencement of works.

It is also noted that RMS has planned road upgrade works along the Great Western Highway at Kelso and the Blue Mountains to be undertaken in the next 5 years. As part of the preparation and implementation of the TMP, the approved contractor would need to consult with RMS and road contractor(s) to maintain a suitable path of travel for the OD transport vehicles.

2.5. Access Road Entrance Points

The proposed wind farm infrastructure are on both sides of Abercrombie Road, to allow access to all turbines and associated infrastructure the proposal includes up to 6 access road entrance points. These locations are detailed below:

Access 1

Access 1 would form a T-intersection with Abercrombie Road approximately 3km north of the Abercrombie River crossing. The exact location would be finalised at the detailed design stage, the anticipated location to be at approximately 340 10'37"S and 149044'36"E. The eastern side of Abercrombie Road in the vicinity of Access 1

has mature non-native pine trees which would require clearing for the proposed intersection.

Access 2

Access 2 would form a T-intersection with Abercrombie Road approximately 4.5km north of the Abercrombie River crossing. The exact location would be finalised at the detailed design stage, the anticipated location to be at approximately 34009'49"S and 149044'49"E. The eastern side of Abercrombie Road in the vicinity of Access 2 has mature non-native pine trees which would require clearing for the proposed intersection unless it is constructed further north into grassland.

Access 3

Access 3 would form a T-intersection with Abercrombie Road approximately 5.2km north of the Abercrombie River crossing. The exact location would be finalised at the detailed design stage, the anticipated location to be at approximately 34009'24"S and 149044'46"E. The land on the western side of Abercrombie Road is elevated with a gradual slope towards the road.

Access 4 and Access 5

Access 4 and Access 5 are located in close proximity to each other on Abercrombie Road and would form two staggered T-intersections approximately 7.5km north of the Abercrombie River crossing. The exact locations would be finalised at the detailed design stage, the anticipated location to be at approximately 34008'19"S and 149045'70"E. Upon visual inspection, it is noted that the Safe Intersection Sight Distance (**SISD**) for the proposed intersections may not be achievable due to presence of a crest in the road to the south. To achieve SISD consideration will be given to move the access points north of the currently proposed locations, so as to benefit from the generally straight road alignment with good visibility. Staggered intersections, in place of a four-way single intersection, is considered to be appropriate at this location so as to avoid any direct through movements between site accesses, which may potentially compromise road safety.

Access 6

Access 6 would form a T-intersection with Abercrombie Road approximately 10.5km north of the Abercrombie River crossing. The exact location would be finalised at the detailed design stage, the anticipated location to be at approximately 34007'32"S and 149046'55"E. Both sides of Abercrombie Road in the vicinity of Access 6 have mature trees which would require clearing for the proposed intersection It is anticipated that this would be no more than six trees.

For more detail on the access road entrance locations (including photos) and transportation assessment refer to Appendix 4 – GTA Consultants Response to Traffic Related Submissions.

2.6. Access Tracks

The project will include a network of access tracks that lead from the proposed access points from the public roads to the turbines. The access tracks would connect each turbine and allow the safe passage of vehicles to the base of the tower. These access

tracks would only intersect with government roads at nominated access points, therefore reducing impacts on public roads, refer to Figure 2.1.1 - Indicative Infrastructure Plan.

Existing farm tracks would be utilised and upgraded where possible to reduce the need for additional soil disturbance and native vegetation removal. During the construction phase of the project, these would be widened up to 10 metres in width to support the extra load of trucks carrying equipment and cranes for the erection of the towers. This width would then be reduced during the operation phase of the project to approximately 5-6m. The tracks would continue to be used by the farmer to access the property and to attend to grazing livestock.

2.7. Electrical Works

Electrical works are required to link the Paling Yards wind turbines to a circuit and then link each circuit (consisting of between 6 to 12 turbines) to the medium voltage switchboard located at the on-site substation.

The electrical works comprise;

- 33 kV electrical cables (comprised of conductive wire surrounded by protective coating) linking the turbines to each other and the substation, installed generally 1m deep underground, surrounded by soft sand with back fill. Cable markers would identify the path of the underground cabling to prevent accidental digging around the cable trenches. Overhead powerlines may be utilised to overcome access and terrain constraints in limited circumstances.
- Control and communication cables linking the turbines to the control room, installed generally underground and adjacent to the 33kV electrical cabling.

All cables would generally follow the same alignment as the access tracks, thereby limiting the development footprint of the project. However, there may be several locations where the cable would diverge from the access tracks to reduce electrical losses and to overcome ground constraints.

The grid connection infrastructure is outlined Section 2.8.

2.8. Substation, Control Rooms and Facilities Building

The Project infrastructure for grid connection includes an on-site substation and an off-site terminal station (located north-east of the site) adjacent to the existing Mt Piper to Bannaby 500kV transmission line, the two locations are connected via 9-10km of overhead powerline rated for up to 500kV. Refer to Figure 2.1.1 for the indicative route of the powerlines and grid connection locations.

Both the on-site and off-site locations will have their own control room, facilities building, communication tower / pole, and associated ancillary and auxiliary infrastructure.

The transformation to grid connection voltage will either be made at the on-site or off-site locations. The detailed design process and investigation will further inform the configuration of the voltage transformation and powerline configuration, which

may include an interim voltage transformation at the on-site substation to reduce the transmission losses on the powerline connecting the locations, and the final transformation will be conducted at the off-site location.

The grid cut-in will be performed by the relevant Transmission Network Service Provider (TNSP), and would include augmentation to the existing transmission line assets, and may include construction of a new transmission tower.

2.9. Vegetation Removal and Planting

Vegetation Removal

Some vegetation removal is required to facilitate access and allow construction of the turbines. The required clearing is considered to be minimal as the site is already largely cleared and the project has been designed to avoid the need to remove native vegetation.

Approximately 1% of the site is required for wind farm infrastructure during the operation phase of the project.

The key reason for vegetation removal is for the provision of access tracks and potentially electricity easements. The access tracks have been designed to avoid native vegetation; however, some vegetation removal is unavoidable The areas and types of identified remnant vegetation within the development area are described in Chapter 12 – Flora and Fauna Impacts and in Appendix 8a and Appendix 8b.

A flora and fauna impact assessment for the Project was undertaken, which included an assessment of native vegetation on site. It found that most of the areas where the turbines and access roads/electricity easements are proposed represent cleared grazing paddocks with high levels of disturbance. A total area of approximately 14.0 hectares of remnant vegetation removal would be required for the Project including the transmission line, of which approximately 1.4 hectares is proposed to be rehabilitated post-construction. A draft Biodiversity Offset Strategy is prepared and included in Annex D of Appendix 5.

Once the detailed design for the Project has been finalised, a revised Biodiversity Offset Strategy will be prepared and form part of the Biodiversity Offset Package to be implemented.

Vegetation Planting

Vegetation screen planting can be an effective tool in mitigating the visual impact of wind turbines or other infrastructure. It is employed in the vicinity of nearby residences and along the roadside to screen potential views of turbines. However, screen planting is only effective where the planting can occur in close proximity to the viewing location (i.e. at a nearby dwelling). Planting would involve a variety of dense native vegetation, including both trees and shrubs, to effectively screen views. The flammability of the vegetation would be a key consideration in selecting species.

Many of the dwellings in the locality are already surrounded by vegetation that performs, at least to some extent, a screening role.

While the screening is proposed to be in close proximity to viewing locations, the exact area of screening and provision would depend on detailed design and discussions between an affected land holder and the proponent following the grant of project approval. The planting would be carried out at no cost to the landowner.

2.10. Wind Monitoring Equipment

Three wind monitoring masts have been previously installed on the site to confirm the wind resource and to provide wind speed and direction data, locations are shown in Figure 2.1.1 - Indicative Infrastructure Plan.

The existing monitoring masts are not permanent structures, and would be removed and reused elsewhere once the construction phase is complete. Up to three new permanent wind monitoring masts are proposed to be installed across the site at locations to be specified and negotiated with turbine supplier during construction of the wind farm. The purpose of these new permanent masts is to provide an independent validation of the wind regime for the wind turbines and to assist with assessing the overall wind farm performance. The masts consist of a tall, thin tubular or lattice structure and guy wires for support, and the masts are proposed to be up to 119 metres in height, and generally at the turbine hub height level.

2.11. Obstacle Hazard Lighting

Obstacle lighting consists of two flashing red lights mounted on the turbine nacelle to highlight their presence to nearby aircraft.

The obstacle marking and lighting assessment was conducted in accordance with the recently withdrawn guideline document - Obstacle Marking and Lighting of Wind Farms (CASA Advisory Circular AC139-18(0)). Although the document has been withdrawn by CASA for review purposes, it has been used for the purposes of risk mitigation for the proposed wind farm, as recommended by CASA.

An assessment under these guidelines showed that night lighting of 25 of the original 59 proposed turbines may be required, the lighting design was revised for the 55 turbine layout and with this configuration only 23 turbines may be required to have obstacle night lighting, refer to Figure 2.11.1 - Revised Obstacle Night Lighting Design for the lighting locations.

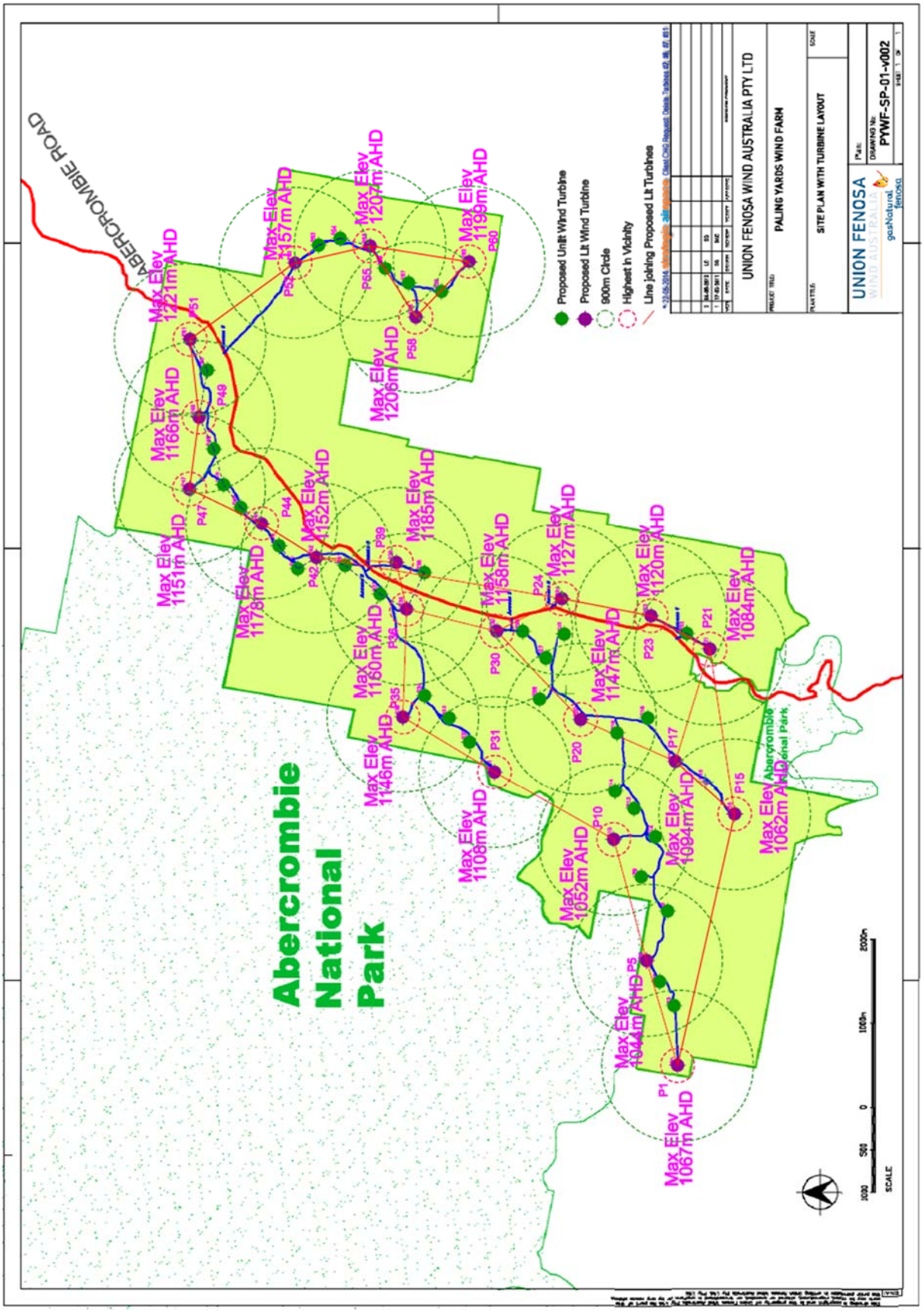


Figure 2.11.1 - Revised Obstacle Night Lighting Design

The characteristics of the lights would be consistent with CASA guidelines, which state;

- Two flashing red medium intensity obstacle lights should be provided;
- Light fixtures to be mounted sufficiently above the surface of the nacelle so that the lights are not obscured by the rotor hub, and at a horizontal separation to ensure an unobstructed view of at least one of the lights by a pilot approaching from any direction.
- Both lights should flash simultaneously;
- Characteristics of the obstacle lights should be in accordance with MOS Pt 139;
- All obstacle lights on a wind farm are to be synchronised to flash simultaneously; and
- An appropriate monitoring, reporting and maintenance procedure is to be established to ensure outages are detected, reported and rectified.

In addition, Department of Defence has requested via their submission for the obstacle lighting installation (if required by CASA) to be NVG compatible that operates at a wavelength range of 655 to 930 nanometres to enable the lighting to be visible to persons using night vision devices.

For more information on aeronautical impacts, please refer to Chapter 13 of the original EIS.

Visual impacts would be minimised by restricting the downward component of the light to either, or both, of the following:

- Such that no more than 5% of the nominal intensity is emitted at or below 5° below the horizontal,
- Such that no light is emitted at or below 10° below the horizontal.

For more information on visual impacts of the lighting, please refer to Chapter 9 of the original EIS.

The need for obstacle lighting for structures of this height is currently under review. It is possible that before construction has commenced, the guidelines would have been revised such that obstacle lighting for structures of this height may no longer be required. The need for obstacle lighting would be reviewed at regular intervals by the proponent and, in the event that the CASA guidelines are revised such that night lighting is no longer required then night lighting would not be installed, or if already installed at the time, they could be turned off.

2.12. Temporary Construction Facilities

A temporary construction area would be required within the Project site The temporary construction area would contain portable toilets, vehicle parking, assorted construction equipment, a concrete batching plant and vehicle wash down facilities.

A temporary hardstand area of approximately 50 x 50 metres would be required to enable the construction of each tower. The hardstand area would be constructed of compacted soil and gravel to provide a stable platform for construction equipment

and the crane. The hardstand area is only required for the construction phase and would be decreased in size following construction to accommodate maintenance activities. The excess portion of the hardstand area would be reseeded to pasture.

Temporary concrete batching plants would be required for the construction stage of the project to supply concrete for the turbine foundations. Batching plants need to be central to the activity area and well removed from houses due to the occasional generation of noise and dust. In consideration of these matters, the concrete batching plant is proposed to be located west of Abercrombie Road between turbines P37 and P41, Access Road number 5 will service this facility. Refer to Figure 2.1.1 - Indicative Infrastructure Plan for the batching plant location.

The area for the batching plants would be approximately 80m x 80m. This area would incorporate loading bays, hoppers, silos, hardstand areas, water tanks and stockpile areas for the storage of the aggregates, sands and other raw materials.

The concrete batching plant is likely to produce between 250m^3 and 500m^3 of concrete on an average day.

Where possible, raw materials for the concrete batching plant would be sourced on site, with all materials brought in from external sources being as clean as possible to minimise the potential of introducing weeds to the site. The water for the concrete would either be sought on site subject to a separate licence issued by the NSW Office of Water, or transported to the site via tanker trucks.

Once complete, the areas affected by temporary construction activities would be rehabilitated to their former agricultural state on completion of the construction stage. Detailed Construction Environmental Management Plan (**CEMP**) would be prepared prior to the grant of construction certificates for the project which would incorporate further detail to manage the impacts of construction activities including the temporary construction facilities.

2.13. Viewing Platform

On request from Oberon Council, the Project will now also include in the proposal a viewing platform within the site boundary adjacent to the Abercrombie Road corridor to allow the public to safely pull over off the road to better view the Paling Yards wind farm from the designated viewing area.

It is anticipated that the viewing platform will be located north of proposed Access Road 4/5, details of the proposed viewing platform and road interface will be determined in consultation with Oberon Council and during detailed design process seeking the relevant approvals in conjunction with the access roads.

2.14. Pre-Construction

If the project is approved, a number of further steps are required to prepare for the construction phase. This process would take approximately 18 – 36 months and includes:

- Detailed design phase of the final wind farm layout, including determination of the final turbine locations in accordance with the principles set out in Section 2.3 – Turbine Layout;
- Finalisation of additional agreements with key agencies;
- Preparation of the Pre-Construction Compliance Report;
- Finalisation and approval of the CEMP;
- Obtaining a construction certificate (if required by the conditions of approval);
- Tendering for wind turbine components and other key infrastructure;
- Tendering for the contracts for construction of the wind farm;
- Securing a grid connection agreement from the relevant TNSP; and.
- Securing an off-take agreement or equivalent mechanism for selling of electricity and Renewable Energy Certificates (**RECs**).

Following this initial period, the full construction phase would commence. This phase would likely take up to 24 months subject to delays due to weather and unforeseen circumstances.

At the peak of construction, the project is likely to be employing 65 people, across the tasks detailed in Table 2.14.1 - Construction Activities shown below.

Table 2.14.1 - Construction Activities

Activity	Works Involved
Site Establishment	Clearing of work areas, levelling and compaction, installation of portable buildings and installation / connection of utility services. Site Survey.
Internal Road Works	Removal of topsoil, levelling, sub-base compaction, gravel, drainage.
External Road Works	Upgrade existing roads where required. Provide new access roads to the site.
Foundations	Removal of topsoil, excavation, screed concrete, reinforcement steel bottom, installation of foundation ring, reinforcement steel top, concreting, concrete ring and conduits, backfilling.
Crane Pad Establishment	Removal of topsoil, base compaction, rock / gravel compaction.
Trenches and Cable Laying	Excavation; sand infill; lay cable; lay protective covering; back filling and compacting; installation of cable route markers.
Overhead Powerline	Installation of overhead powerline from the on-site substation to the off-site switching station adjacent to the Bannaby-Mt Piper 500kV transmission line.
Electrical Works (on-site substation)	Control building switchboards, communications, and Supervisory Control And Data Acquisition (SCADA) systems. Installation of cabling, switchgear, turbine control panels.

Activity	Works Involved
Turbine Supply	Transport of towers, nacelles, hubs and blades to site.
Turbine Erection	Erection of towers, nacelle, blades, installation of cabling.
Electrical Works (off-site substation)	Installation of high voltage switchyard equipment; control and auxiliary buildings; communications pole; new transmission line tower adjacent or in line with existing transmission line; and all other ancillary equipment as required by TransGrid for construction and operation of a new Terminal Station; potential installation for an additional high voltage transformer and switchgear.
Wind Farm Commissioning	Pre-commissioning of turbines, SCADA, cables testing, optical fibre. Testing and commissioning of turbines, switchgear, SCADA.
Electricity Grid Connection Commissioning	Final commissioning by the TNSP prior to connecting the generated electricity on the national electricity grid.
Construction Closure	Site Clean Up, revegetation, landscaping.

The majority of the early work in the construction period is to prepare the site for the arrival of turbine infrastructure. This involves road upgrades, access track and hardstand area preparation.

Once this stage is complete, the turbine components can be transported and erected on site, usually at the rate of one or two per week. This involves transportation to the hardstand area at the base of each turbine and using cranes to lift turbine components to assembly the structure. In most circumstances the turbine blades are assembled into the hub at ground level and are then lifted up to the nacelle by crane as a complete ensemble. In other circumstances the turbine blades are individually lifted and assembled into the hub.

The turbines are anchored using large concrete gravity footings. In areas where granite rocks lie at or just below the surface, the footing is directed attached to the rock which would reduce the amount of concrete required. This may include the potential for rock blasting based on an assessment by the geotechnical engineer. Details of any rock blasting (if any), and associated management techniques, would be provided in the CEMP.

Temporary facilities within a construction area would include portable toilets, vehicle parking, assorted construction equipment, a concrete batching plant and vehicle wash-down facilities. All temporary facilities would be located so as to avoid and minimise vegetation loss and the land would be reinstated to its former state at the conclusion of the construction stage.

While this section provides an overview of the construction process, the construction would be managed by a management plan, which would address matters such as;

- Erosion control and soil protection

- Water quality protection
- Vegetation protection
- Air quality and dust pollution prevention
- Safety
- Public road network access

Standard construction hours would apply to the project, as outlined below,

- Monday to Friday: 7:00am to 6:00pm
- Saturdays: 7:00am to 1:00pm
- Sundays: No construction

The following activities may be carried outside of these hours as required:

- Any works that do not cause noise emissions to be audible at any nearby residence not located on the site;
- The delivery of materials as requested by authorities for safety reasons; and
- Emergency work to avoid the loss of lives, property and / or to prevent environmental harm.

In the event that it is required to undertake other works outside the above construction hours, prior approval would be obtained from the relevant authority.

2.15. Operation

The operation phase of the project reflects the leasing arrangement with landowners. Landowners have agreed to grant the proponent a 30 year lease with the option to extend for another 30 years. Whilst no plan of subdivision will need to be registered as a result of these proposed leases, the project includes the grant of these leases and any deemed subdivision arising as a result.

During operation of the wind farm, all infrastructure associated with the wind farm would remain the property and responsibility of the proponent.

All access tracks used by the proponent would be maintained by proponent as part of the operation of the wind farm, but would remain available for host landowners' use.

The wind farm would be controlled by a computerised system. The system would link each turbine by communications (fibre-optic) cables typically laid in the same trench as the electrical cables. The computerised system would log all operating parameters and initiate the most efficient functionality of the turbines according to prevailing atmospheric conditions. The computerised system would also enable the controller to stop the turbine if required.

The system would ensure that rotational speed and the wind turbine angle operate automatically within the wind speed design envelope. Turbines would be disconnected from the grid at very low and very high wind speeds.

Maintenance of the turbines and associated infrastructure would be conducted throughout the operation phase. Maintenance includes a number of activities over different time periods. These are outlined in Table 2.15.1 - Typical Maintenance Schedule, shown below:

Table 2.15.1 - Typical Maintenance Schedule

Interval	Task
Monthly	Inspection of turbine generator and electrical infrastructure.
3-6 Monthly	Inspection of all machinery, greasing of bearings, checking of hydraulic oil.
As required	Periodic painting of tower structure; Replacement of electronic and electrical components; Access track maintenance including erosion control; Substation maintenance inclusive of insulator cleaning, removal of debris and greasing of contacts.

As with any infrastructure project there is potential for equipment breakdown or failure during the lifetime of the project. Whilst most repairs would be likely occur without impacts outside the wind farm site, should any of the raised components (within the nacelle or the blades themselves) need to be replaced, construction equipment such as cranes and other heavy machinery may be required to access the site temporarily. Such equipment may have a temporary impact on the road network but the temporary impact would be likely to be minimal.

As part of the operation phase, a number of monitoring protocols would be implemented. These would include a program to ensure compliance with all approval conditions, including conditions relating to noise, flora and fauna and any other relevant potential impacts. This would also likely include a monitoring program on birds and bats in the vicinity of the site.

Potential refurbishment

Whilst the design life of a wind turbine is typically more than 20-25 years and often extends to 30 years, it could potentially extend to a longer period subject to specific equipment / part replacement program that would allow it to operate efficiently and cost effectively. However the proposed wind farm has been designed to allow for the possible removal and replacement of turbines during the lifetime of the project. If a turbine needs to be replaced, this process would follow the construction stages outlined above and be consistent with any project approval granted for the project.

Where possible, the existing footings, access tracks and other infrastructure would be reused for any replacement turbine(s) during the operation phase.

2.16. Crown Land

Crown land in the form of unused / ungazetted road reserve is present within the site boundary and along the proposed transmission line route to the north-east. Most of these roads are disused and not evident on the ground.

Where the impacts occur, turbines will be micro-sited to avoid the crown land where practicable, and where necessary the proponent will apply to have the crown roads closed, following the appropriate process for closing these roads, and/or proposing a licensing arrangement, in consultation with the relevant authorities.

2.17. Minerals Titles

The project will not impact upon any minerals titles or mining areas. The formerly considered and assessed southern transmission line route options crossed minerals title boundaries; however these options are not proposed as part of this application.

2.18. Staging

The estimated timeline of the construction, operation and decommissioning phases of a 30 year (or 60 year) lifespan of the project is shown below in Table 2.18.1 - Construction Staging Timeline. The Proponent may stage the Project in different configurations as required.

Table 2.18.1 - Construction Staging Timeline

Stage	Activity	Timing
Construction	Site establishment	November 2017
	Internal road works	30 weeks*
	External road works	24 weeks*
	Foundations	40 weeks*
	Crane pad establishment	41 weeks*
	Trenches and cable laying	45 weeks*
	Overhead powerline	36 weeks*
	Electrical works (on-site substation)	15 months*
	Turbine supply	12 months*
	Turbine erection	17 months*
	Electrical works (off-site substation)	18 months*
	Wind farm commissioning	18 months*
	Electricity grid connection commissioning	19 months*
	Construction closure, site clean up	20 months*
Operation	Inspection of turbine generator and electrical infrastructure	Monthly, as specified by the turbine manufacturer
	Inspection of all machinery, greasing of bearings, checking of hydraulic oil	3-6 monthly as specified by the turbine manufacturer
	Periodic painting of tower structure	As required

Stage	Activity	Timing
	Replacement of electronic and electrical components	As required
	Access track maintenance including erosion control	As required
	Substation maintenance inclusive of insulator cleaning, removal of debris and greasing of contacts	As required
Decommissioning	Permanent cessation of electricity generation	At the end of either 30 or 60 years from commencement of operation**
	Electricity grid connection decommissioning	3 months***
	Removal of turbines	12 months***
	Removal of Electrical Works (on-site substation)	10 months***
	Removal of Electrical Works (off-site substation)	15 months***
	Removal overhead powerline	10 months***
	Removal of foundations	12 months***
	Removal of miscellaneous electrical works	11 months***
	Removal of crane pads	14 months***
	Site rehabilitation	15 months***
	Decommissioning closure	18 months***

** denotes approximate completion timeline for the construction activity from the date of the site establishment activities.*

*** denotes approximate duration for the operation of the wind farm. The proponent has an agreement with the landholders for a minimum 30 years with an option of another 30 years.*

**** denotes approximate completion timeline for the activities from the date of permanent cessation of electricity generation from the wind farm.*

2.19. Decommissioning

UFWA has entered into agreements for lease of land with the landowners who own land within the site. These agreements provide UFWA with leases for a term of 30 years and grant the proponent the opportunity to extend the lease for a further term of 30 years.

Any continuation of the wind farm beyond the first 30 year period may take the form of one of:

- Extended operation of the original turbines;
- Turbine replacement with the similar model that would have newer and more efficient technology; or
- Turbine replacement with a different model that would be subject to the requisite approvals being obtained at that time.

Once the wind farm reaches the end of its useful economic life, the project would be decommissioned.

Decommissioning essentially involves the reverse process to construction. All materials would be removed from the site and recycled appropriately. Access tracks would remain where beneficial to the ongoing use of the land by the owner. Tracks considered surplus to the owners' requirements would be rehabilitated and re-vegetated by introducing soil, mulch and grass seeds of local provenance.

It is a requirement of the Draft NSW Wind Farm Planning Guidelines (December 2011) (draft Guidelines) that the EA for the project includes a Decommissioning and Rehabilitation Plan (DRP). AECOM Australia Pty Ltd as an independent consultant has prepared the DRP in accordance with the draft Guidelines.

The proponent is responsible and committed to the decommissioning of the wind farm infrastructure, and the landowner is not liable for this obligation (this is demonstrated in the land lease agreements with each of the wind farm participating landowners as shown in the DRP).

UFWA seeks to mitigate the potential impacts resulting from the cessation of operation of the facility. This DRP outlines the stakeholder and landowner consultation, expected operational life, dismantling, land rehabilitation, funding arrangements, timeframes and responsibility associated with the decommissioning of the proposed Paling Yards Wind Farm. The proponent has committed to implementing this plan.

In relation to consultation, the relevant landowners have been extensively consulted about the project and the issues of decommissioning and rehabilitation were discussed at the early stages of the project. In particular, the DRP was discussed and agreed with all landowners. Feedback from the landowners was generally positive with no objections to the project.

UFWA has also consulted with the Oberon Council regarding the project in general and aspects of the construction, operation and decommissioning phases. UFWA will undertake further consultation with stakeholders prior to and during the decommissioning process.

3. Project Benefits

The Project benefits are set out in Section 6.5 – Project Benefits in the original EIS.

The Project if approved would have the following specific economic and environmental benefits:

- total capital investment of $275 million in the economy;
- generate up to 65 full time positions during construction, and up to 11 full time ongoing positions during the operation;
- Stimulation of the economy in the Oberon Council as a result of greater income generation and subsequent expenditure in the region;
- Provision of flow on economic benefits in terms of employment and commercial opportunities from the economic investment;
- Up-skilling of the local workforce within a growing energy market;
- Use of a significant portion of locally sourced materials and employment;
- Increases in the local tourism industry, and in turn, increased expenditure on local services such as accommodation and retail in Oberon Council;
- Contribute up to $1,9001 per turbine per year (escalated annually with CPI) to the Oberon Council Community Enhancement Fund (CEF) that forms part of the Voluntary Planning Agreement (VPA);
- generate up to 550,833 MWh of clean, renewable energy, which equates to the electricity use of a population up to 221,895 or equivalent to 85,344 average households. This is approximately two-thirds of Canberra's population (350,000) or more than ten times the size of Goulburn (20,127);
- contribute to reducing the dangerous impacts of anthropogenic climate change, such as droughts, floods, extreme weather events and sea level rise by displacing up to 535,961 tonnes of greenhouse gases or the equivalent of taking up to 123,778 cars off the road;

A key determinant in calculating the emission reductions of the Project is the type of energy that is displaced by the wind energy. In NSW wind energy displaces black coal fuelled energy, a co-efficient of 0.97 tonne per MWh of energy has been used to support the calculations below. This pool co-efficient is derived from GGAS (2010). Table 2.19.1 - Greenhouse Gas Savings outlines the savings that would be made as an outcome of the proposal.

[1] Based on $1,666 per wind turbine per year precedent set by NSW Land and Environment Court (L&EC) in August 2010 for another wind farm, and escalated by ~3% CPI per year from 2010 to equate to ~$1,900 in 2014. The contribution will be for each operating wind turbine and will commence on the anniversary of the commissioning of the wind farm.

Table 2.19.1 - Greenhouse Gas Savings

Parameters	Up to	Source
Number of Turbines	55	UFWA
Total Wind Farm Capacity (MW)	178*	UFWA
Annual Energy Output (MWh)	550,833	UFWA
Greenhouse gas displaced (tonnes)	535,961	Based on NSW GGAS 2010
Number of households supplied electricity	85,344	Based on AGO, 1999
Population supplied electricity	221,895	Based on Vic Sustainable Energy Authority 2003
Equivalent cars off the road	123,778	Based on Vic Sustainable Energy Authority 2003
Equivalent number of trees planted	799,941	Based on Vic Sustainable Energy Authority 2003

** The 178 MW figure has been derived from an estimate of the mix of turbine capacities. Whilst it is theoretically possible for the wind farm to produce up to 275 MW (5.0 MW x 55 turbines), this is unlikely given site constraints. As a result, it is more likely that a mix of turbine models with different capacities will be pursued. It has therefore been estimated that the output will be up to 178 MW.*

4. Design Changes

Several of the original specialist assessment that formed the EIS were carried out with 59 turbine layout instead of the proposed 55 turbine layout as is shown in the main EIS report, therefore their assessment results are deemed more conservative and the overall impact of the proposal will potentially be less than what has been assessed.

The major changes to the design have been listed below:

Aviation Obstacle Hazard Lighting

As part of this Report, the aviation obstacle hazard lighting design has been revised to accommodate the 55 turbine design which according to the current micrositing layout would include only 23 turbines to have obstacle lighting, refer to Figure 2.11.1 for the proposed lighting locations.

The obstacle hazard lighting would primarily be a requirement from CASA (subject to regulation at the time of the construction), however in lieu of CASA not mandating the lighting of the turbines, the Proponent may elect to install lighting to reduce its risk profile unless a condition of the Development Approval prohibits turbine obstacle hazard lighting to be installed for the Project.

Noise

Clarifications provided for EPA submission comments, and the Noise Impact Assessment (NIA) has been revised to Revision R5, refer to Appendix 3. The NIA in the original EIS contained Appendices A through G, these attachments have not been changed and remain valid, however to avoid duplication they have not re-issued with this Report.

Flora and Fauna

The proposal now includes a draft Bird and Bat Management Strategy and a draft Biodiversity Offset Strategy as shown in Annex C and D of the Appendix 5 respectively. These documents will be revised in consultation with OEH prior to construction phase.

Traffic and Transport

A revised assessment of the over-dimensional vehicle transportation route from Port to site has been undertaken and constraints and requirements identified, refer to Appendix 4 for further details.

The six access roads for the site have been re-assessed for Safe Intersection Sight Distance (SISD) and native vegetation clearing, and its recommended to relocate Access Road entrance 4 and 5 slightly further north to achieve the required SISD and minor clearing of native vegetation from proximity of Access Road entrance 6 to achieve the required turning area and SISD.

An outline of a Traffic / Transportation Management Plan is prepared and included in Attachment 2 of Appendix 4.

Viewing Platform

On request from Oberon Council, the proposal will now also include a viewing platform within the site boundary adjacent to the Abercrombie Road corridor to allow the public to safely pull over off the road to better view the Paling Yards wind farm from the designated viewing area.

The viewing platform location will be approximately north of proposed Access Roads 4/5, however the final location will be determined in consultation with Oberon Council and during detailed design process.

Statement of Commitments

A revised set of Statement of Commitments has been included in Section 8 of the Report that incorporates comments from various government agencies.

5. Consideration of all the submissions

5.1. Public Exhibition Provisions

The proposed Paling Yards Wind Farm EIS was on public exhibition from Friday 28th March 2014 to Friday 30th May 2014 at the following locations:

- NSW Department of Planning and Infrastructure (Information Centre), 23-33 Bridge Street, Sydney;
- Taralga Community Service Centre, 29 Orchard Street, Taralga;
- Oberon Shire Council, 137-139 Oberon Street, Oberon;
- Oberon Shire Council Library, Corner of Dart and Fleming Streets, Oberon;
- Upper Lachlan Shire Council (Crookwell Office) – 44 Spring Street, Crookwell;
- Crookwell Library – Denison Street, Crookwell;
- Nature Conservation Council – Level 2, 5 Wilson Street, Newtown.

NSW Department of Planning and Environment (**DoP&E**) [formerly called NSW Department of Planning and Infrastructure (**DoP&I**)] directly advertised for the public exhibition period and notified the local community in vicinity of the project site.

In addition to DoP&E notification, UFWA also notified the local community about the public exhibition and the information day to be held during this period through the distribution of the letters on 9th May 2014. These letters were via direct mail to the neighbouring landowners within 5km to 10km of the site boundary which were also included in the original door knock consultation, a few of the immediate neighbouring landowners were also called directly to notify them of the events.

The information day session was held on Tuesday 27th May 2014 which was conducted during the public exhibition. The purpose of the Information Day was to provide community members and other stakeholders with an opportunity to attend, learn more about the Project, and ask questions about the proposed development in order to make a more informed decision about the proposed Project for their submissions. The team of consultants that prepared the EIS reports were available to answer inquiries from all attendees at the Information Day.

5.2. Summary of Submissions

NSW Department of Planning and Environment (**DoP&E**) has received 22 submissions on the publically exhibited EIS for the Project.

Each submission has a unique reference number in the form of (ID xxxxx), this ID has been used in the response to submissions section to provide a reference to the individual submissions.

The submissions form two categories:

- Comments from the government agencies (11 submissions); and
- Comments / Objections from community members (11 submissions);

The summary statistics table for the submissions and their related topic is shown in Table 5.2.1.

Table 5.2.1 – Paling Yards Wind Farm Submission Summary

Submission Number	Aviation	Community Enhacement Fund	Crown Land	Cumulative	Electricity Price	EMI/ Telecommunication	Environment	Fire \ Bushfire	Flora & Fauna	Health	Heritage	Hydrology	Landscape and Visual	Mineral Exploration	Noise and Vibration	Property Values	Socio-Economic	Traffic & Roadworks	Transmission Line options	Turbine Layout - Micrositing
100431													🔴						🔴	
100357																				
100349	🟡											🟡								
100347																		🟡		
100345		🟡									🟡				🟡		🟡	🟡		🟡
100343															🟡					
100341							🟡		🟡		🟡									
100329	🟡																			
100327								🟡												
100325			🟡																🟡	🟡
100323														🟡						
99008									🔴	🔴			🔴		🔴	🔴			🔴	
99006							🔴		🔴	🔴			🔴		🔴	🔴	🔴	🔴		
99004						🔴				🟢			🔴		🔴	🔴	🔴			
98994					🔴															
98928																		🟡		
98922							🔴	🔴					🔴		🔴	🔴		🔴		
98920																🔴				
98819													🔴		🔴		🔴			
98743							🔴	🔴	🔴				🔴		🔴	🔴		🔴		
98565				🔴	🔴		🔴		🔴	🔴					🔴					🔴
97952					🔴								🔴			🔴				
TOTAL	2	1	1	1	3	1	5	3	5	4	2	1	8	1	9	7	4	6	3	3

🔴 Indicates objection submission
🟢 Indicates suportive submission
🟡 Indicates comment from government agency

5.3. Government Submissions, Comments on the Project

The government agency submissions covered a vast spectrum of topics, and provided a wide range of comments, including several shown in the following list:

- Support for the EIS assessment and recommended provisions;
- Propose draft conditions of the permit;
- Request for additional information;
- Request for updates to the Statement of Commitment;
- Request for consultation when preparing the various management plans;

Government agency submissions are address in detail in section 6 of this report.

5.4. Community Submissions, Supporting / Opposing the Project

The community submissions covered a range of topics including: Landscape and Visual, Noise, Health, Fire / Bushfire, Environment, Flora & Fauna, Turbine Layout (Micrositing), Transmission Line Options, Electromagnetic Interference, Socio-Economic and Property Value, Electricity Price Subsidies, Traffic and Transport, Cumulative.

Community submissions are addressed in detail in section 7 of this report.

6. Response to Government Agency Submissions

The following Government agencies submitted comments to the Project:

- Oberon Council (OC) – (ID 100345)
- Upper Lachlan Shire Council (ULSC) – (ID 098928)
- NSW Department of Trade & Investment – Resources & Energy - (ID 100232)
- NSW Department of Trade & Investment – Crown Lands – (ID 100325)
- NSW Rural Fire Service (RFS) – (ID 100327)
- Department of Defence - (ID 100329)
- NSW Office of Environment and Heritage (OEH) - (ID 100341)
- NSW Environmental Protection Agency (EPA) – (ID 100343)
- NSW Roads and Maritime Services (RMS) - (ID 100347)
- NSW Department of Primary Industries – NSW Office of Water - (ID 100349)
- Airservices Australia - (ID 100357)

The response to each of the comments raised by these agencies is shown in detail in sections 6.1 to 6.12.

6.1. Response to Oberon Council

The Oberon Council (**OC**) provided a submission (ID 100345) [ref D&B/SSD/Paling Yards GW:JB] dated 30th May 2014, with comments on the one unidentified building within 2km of proposed turbines, Voluntary Planning Agreement, traffic and transport requirements, cultural heritage management plan, viewing platform, 'jet' backup systems, socio-economic and employment within Oberon LGA. The submission comments and UFWA responses are shown in Table 6.1.1 - Response to Oberon Council (OC). For further details on traffic related assessment refer to Appendix 4 – GTA Consultants Response to Traffic Related Submissions.

Table 6.1.1 - Response to Oberon Council (OC)

Category	OC Submission Comments	UFWA Responses
Unidentified building within 2km	(1) Concern is raised over the assessment of dwellings not associated with the development and the proximity of those 'non-identified' dwellings that will be impacted by the development. It has been stated in the EIS that no assessment of these non-identified structures/dwellings has been carried out even though they will be the most affected by the proposed development. This issue requires further investigation. Council records for the most affected ·non-identified dwelling' show that the land is in private ownership however there is no record of any approval for a dwelling. We request the applicant (given the sensitive location of the land) undertake further investigation in relation to this land and we can provide contact details for this purpose.	(1) Noted. The Proponent has undertaken a comprehensive stakeholder consultation process during the environmental assessment process. There are no known non-participating dwellings within 2km of any proposed turbine, although there is a non-identified building located approximately 1.65km from the nearest proposed turbine on the south-east of the Project. During the door-knock consultation process on 30th and 31st May and 1st June 2011, and again during additional consultation process on 5th and 6th July 2011 the property of the non-identified building was visited, however due to the difficultly in accessing the property and the locked gate restricting access to reach the building on the property it was not possible to determine with any accuracy if the building was a dwelling or a shed, etc. Our letters that were left on the locked gate were not answered by the owner of the property, and we provided

Category	OC Submission Comments	UFWA Responses
		two additional letters to our landowner to place on the gate, and again no response was provided. Our landowner informed us that they believe the building is not an official dwelling, and we acknowledge Oberon Council's comment that there has not been any record of any approval for a dwelling on that property. The property is in our mail distribution list however to date we have not had any response from the owners of the property.
Voluntary Planning Agreement (Community Enhancement Fund)	(2) Should the Department give approval for the development, Council will be seeking to enter into a Voluntary Planning Agreement (VPA) in accordance with Section 93F of the Environmental Planning & Assessment Act 1979 (the Act). It is noted that the applicant has offered to enter into an Agreement should approval be recommended.	(2) Noted. The Proponent will commit to enter into a Voluntary Planning Agreement (VPA) with Oberon Council. The VPA will include an annual monetary contribution of amount of approximately $1,900 (adjusted annually to changes in the CPI) per operating turbine forming part of the Paling Yards Wind Farm. These annual contributions will be paid into the Oberon Council Community Enhancement Fund (CEF). The CEF will fund local projects within a radius of 50km of the Paling Yards Wind Farm within the Oberon Local Government Area. The local projects which will eligible for funding from the CEF will be projects aimed at: ▪ Enhancing any aspect of the local environment including, but not limited to, ameliorating any impacts from the Paling Yards Wind Farm; or ▪ Providing any community service or facility.

Category	OC Submission Comments	UFWA Responses
		The $1,900 referred to above is based on $1,666 per wind turbine per year precedent set by NSW Land and Environment Court (L&EC) in August 2010 for another wind farm, and escalated by ~3% CPI per year from 2010 to equate to ~$1,900 in 2014. The contribution will be for each operating wind turbine and will commence on the anniversary of the commissioning of the wind farm. The Proponent makes the VPA commitment subject to no other monetary contribution obligation forms part of the Development Consent conditions.
Traffic and Transport	(3) There is no concern about the volume of traffic expected to be generated by this development, given the low traffic volumes currently using Abercrombie Rd (which is the only Council controlled road to be used for access).	(3) Noted.
Traffic and Transport	(4) From Section 3.1 of the EIS it appears that vehicles up to 64.4m long may be required to deliver components to the site. This will require special transport arrangements, presumably involving escort vehicles. Also the minimum height clearance required is 6 6m, which raises clearance concerns along Abercrombie Rd. The applicant will be required to determine this, and to make appropriate arrangements with Council and all other agencies to	(4) Noted. Standard over-dimensional vehicle procedures (as required by RMS) would be used, including pilot vehicles as appropriate. As discussed in the additional route assessment undertaken by GTA Consultants (refer to Appendix 4), the minimum height clearance required for over-dimensional transport vehicles is 5.5 metres. An initial assessment indicates that all major structures provide this minimum clearance. However, a detailed assessment of all potential obstructions would be undertaken during the development of the

Category	OC Submission Comments	UFWA Responses
	rectify any issue raised, including tree removal and possible relocation of power lines. If any trees are proposed to be lopped or removed, this will be required to be undertaken in consultation with Council. Any such works required will be at the applicant's cost.	Traffic Management Plan (TMP), in consultation with the relevant Council and RMS. Approval would be sought from Council before any road modification works are undertaken by the Proponent, at the Proponent's cost.
Traffic and Transport	(5) The EIS states that the maximum gradient permitted is 6%, however some parts of Abercrombie Rd exceed this gradient. The applicant needs to justify how this issue will be dealt with.	(5) A detailed TMP will be prepared in consultation with Council and RMS prior to any over-dimensional wind turbine component movements. The plan will detail measures to manoeuvre the components up grades steeper than 6%. This could include the use of additional prime movers to increase pulling power.
Traffic and Transport	(6) The EIS does not specify the expected vehicle loadings, and whether the loadings may exceed the normal permissible legal loading for Abercrombie Rd or other roads Further information is requested relating to this issue and this may require pavement strength testing. The cost to repair any pavement damage must be borne by the applicant should the Department give approval to the development.	(6) It is noted that Abercrombie Road is currently used by logging trucks to transport timber. A dilapidation assessment will be carried out on O'Connell Road and Abercrombie Road prior to any over dimensional component movements. Pavement strength testing and assessment will be undertaken (if required) once the final turbine supplier and transport contractor are known. The Proponent will consult with Oberon Council and agree on any appropriate pavement upgrades / rehabilitation along Abercrombie Road, based on suitable criteria.

Category	OC Submission Comments	UFWA Responses
Traffic and Transport	(7) The EIS specifies there will be six access points from Abercrombie Rd into the development site; however the descriptions of the locations are not sufficient to accurately determine them on site. It is requested that they be marked on site to enable sight distances to be checked. Further information is also requested as to whether all six will remain as permanent accesses, or will they be in place only during the construction phase If they are only temporary, sight distance is not considered to be as critical. However traffic control may be required when they are in use.	(7) Additional details of the access locations have been provided within the assessment undertaken by GTA Consultants (refer to Appendix 4), with detailed designs required to demonstrate appropriate sight distances. This includes the coordinates and photos of each access location. All access locations are to remain accessible post construction to allow for maintenance and inspection of the turbines.
Traffic and Transport	(8) Accurate identification of the access locations is also important to determine if any significant vegetation will need to be cleared and to enable Council to set any conditions on their design.	(8) Additional details of the access locations have been provided within the assessment undertaken by GTA Consultants. This includes the coordinates and photos for each access location. Refer to Appendix 4 for more details. Of the six access points, two will avoid vegetation clearing, another two will require the removal of planted, non-native Pine trees (Pinus radiata), and the remaining two have some native trees nearby and subject to Safe Intersection Sight Distance (SISD) and approval from Council and RMS, vegetation clearing could be avoided.

Category	OC Submission Comments	UFWA Responses
Traffic and Transport	(9) The EIS states that in two locations the new accesses will form a "crossroads" on Abercrombie Rd (accesses are opposite each other). This is not desirable, but can be avoided with just a small offset between the two accesses.	(9) Noted. Access 4 and Access 5 would be constructed as staggered T-intersections to improve safety at these locations; details of which will be determined during detailed design.
Cultural Heritage	(10) It is noted that the applicants have stated that a Cultural Heritage Management Plan be provided for the development prior to any construction works. As part of any approval Council will assess the Plan prior to any activity on site. It is considered that this Plan must include how ongoing education for contractors will be undertaken to advise of potential sites and recognition of potential artefacts whilst in the construction phase. Any Plan of this nature will need to be approved by the relevant agency and Council.	(10) Noted. UFWA will consult with Oberon Council and other relevant stakeholders in preparation of the draft Cultural Heritage Management Plan (CHMP). The draft CHMP will include measures for on-going contractor cultural heritage education and awareness to assist recognition of potential sites and places during the construction phase of the Project. The Draft CHMP will be forwarded to the Representative Aboriginal Parties (RAPs) for review and endorsement and submitted to both OEH and the Oberon Council for approval.
Viewing Platform	(11) It is stated in the EIS that the applicant does not propose to provide a viewing area for the development, contravening Councils own Development Control Plan for Wind Developments. Council considers the establishment of an appropriate viewing area for the development as critical, given the width of Abercrombie Road and the significant nature of the development. This would be	(11) Noted. The proposal will now also include a viewing platform within the site boundary adjacent to the Abercrombie Road corridor to allow the public to safely pull over off the road to better view the Paling Yards wind farm from the designated viewing area. It is anticipated that the viewing platform will be located north of proposed Access Road 4/5, details of the proposed viewing platform and road interface will be determined in consultation with Oberon

Category	OC Submission Comments	UFWA Responses
	required separate to any voluntary planning agreement or community fund contribution.	Council and during detailed design process seeking the relevant approvals in conjunction with the access roads.
Noise from 'jet' backup system	(12) In researching other similar developments issues have previously been raised about 'jet' backup systems. Public criticism of these systems concerns substantial noise issues for neighbours. Council considers that these back-up systems should not be considered for the Paling Yards area In assessing the application no evidence has been found to establish these systems however conditions of consent to prohibit these should be included in any consent.	(12) Noted.
Socio-Economic and Employment	(13) Some issues over economic and social impacts have been raised as a consequence of the Information Day held at the Paling Yards Rural Fire Service Shed on 27 May. In response to a question regarding employment opportunities it was stated that about 40% of the workforce will be sourced locally. When questioned further "locally" was defined as "Oberon and surrounding LGA's". Council would encourage the developer to look closely at Oberon for labour hire and accommodation for workers during construction.	(13) Noted. UFWA will focus its efforts associated with advertising employment opportunities for the construction and operation phases within the Oberon locality and in consultation with Oberon Council determine the most effective way to engage with local businesses (including material providers and trades people).

6.2. Response to Upper Lachlan Shire Council

The Upper Lachlan Shire Council (**ULSC**) provided a submission (ID 098928) [ref F11/243 & D2014/2097] dated 28th May 2014, with comments on traffic and transport requirements, and transmission line options. The submission comments and UFWA responses are shown in Table 6.2.1 - Response to Upper Lachlan Shire Council. For further details on traffic related assessment refer to Appendix 4 – GTA Consultants Response to Traffic Related Submissions.

Table 6.2.1 - Response to Upper Lachlan Shire Council

Category	ULSC Submission Comments	UFWA Responses
Traffic & Transport (Roadworks)	(i) Upper Lachlan Shire Council (ULSC) has studied the Environmental Impact Statement and other documentation associated with the Paling Yards Wind Farm Development. Whilst Council acknowledges that the proponent plans to limit its use of the ULSC road network, Council has concerns that even this limited use proposal will have the potential to damage the road assets that are owned by the community in addition to posing a threat to the safety of existing road users.	(i) The current application doesn't propose to use the road between the site and Taralga for the transport of plant and equipment by over-dimensional vehicles, however may be used by light vehicles for access the proposed development during construction and operation. A minor increase in light vehicle traffic would not impact road condition or safety.
Traffic & Transport (Roadworks)	(1) Council is concerned that the information regarding Over Dimension, Over Mass and Heavy Haulage routes appears to be inconsistent. Council has sought advice from an experienced heavy haulage operator who considers that all of the routes favoured in the report are long, unwieldy, have areas where the heavy haulage parameters would be	(1) Noted. The current application doesn't propose to use the road between the site and Taralga for over-dimensional vehicles.

Category	ULSC Submission Comments	UFWA Responses
	exceeded (in terms of cross fall and longitudinal grades) as well as being uneconomical. The comparison with B-Double routes is unrealistic as each type of vehicle is allowed to use (or restricted from using) particular routes depending on characteristics that are unique to each type of vehicle. The operation of vehicles carrying OD and OM loads is significantly different to both 19m and 26mB-Doubles (19mB-doubles have general access rights that allow them to travel on roads that are used by conventional semi-trailers). It may also be of significant benefit to the developer and the wider community to upgrade the Abercrombie River Bridge, approaches roads and use MR256 for all vehicles to access the site. Should the proponent wish to use the route involving MR256, ULSC will require that the Abercrombie River Bridge be replaced and the associated roadway upgraded as necessary.	
Traffic & Transport (Roadworks)	(2) ULSC is also concerned with the lack of commitment from the developer in relation to the route that is likely to be used for light traffic to access the site. The Transport Impact Assessment states that 85.9% of the personnel on	(2) It is anticipated the project could generate up to approximately 168 two-way vehicle trips per day associated with site personnel during the construction period. There is also anticipated be an additional 40 two-way vehicle trips per day associated with

Category	ULSC Submission Comments	UFWA Responses
	site each day will travel from the Goulburn/Canberra area. Unfortunately, it fails to identify which route will be used by these people to access the site. Obviously, most staff will be seeking to use MR256 for this purpose. ULSC has concerns regarding the use of MR256 as several areas of substandard road (pavement strength and alignment) exist between Taralga and the Abercrombie River. Table 4.1of the T.I.A. assesses peak light traffic as being 120 movements per day; however this is assessed in one direction only. The base traffic is shown in two directions. Using this information after it has been corrected (multiplied by two), the light traffic on MR256 will almost double. Whilst, in absolute terms, the additional traffic may not cause problems with intersections and "traffic lights "and the road may have enough theoretical capacity, in relative terms the everyday existing users will have trouble in coping with these changes. This will be exacerbated when the existing traffic and development traffic will travel in opposing directions during the am and pm peaks. This additional traffic has the potential to cause significant conflicts for users of the existing road network.	construction vehicle traffic. Construction vehicle traffic would arrive and depart from the north via Abercrombie Road. Trips associated with personnel could approach from both directions. Based on the assumption that 86% of personnel would approach the site from the south, this equates to an additional 73 trips during any peak hour. It is acknowledged that this could represent a relatively high change in current traffic volumes to the south along Taralga Road and Richlands Road. However, absolute traffic volumes on these roads are anticipated to continue to operate within acceptable bounds. Although this could affect safety and associated risks of crashes on these roads, the relative risk is anticipated to remain low. Appropriate communication with the local community and other existing road users through signage and other media would assist in minimising such risks. Some additional warning signage at specific areas of concern (e.g. locations of substandard alignment) could be installed at the Proponent's expense.

Category	ULSC Submission Comments	UFWA Responses
Traffic & Transport	(3) It may be necessary to impose speed limits on parts of the public road network to ensure that the interaction of construction traffic with existing traffic occurs in a safe manner.	(3) A Traffic Management Plan (TMP) and associated Traffic Control Plans (TCP) will be prepared to manage traffic impacts and safety during construction. The operation of the site access points would be considered as part of this and appropriate measures implemented to maintain safety on Abercrombie Road.
Transmission Line Option	(4) ULSC acknowledges the proponents intention to connect to the Electricity Supply Grid via a local connection to the Mount Piper - Bannaby transmission line. It is assumed that any changes to this arrangement will require a modification application. Council will certainly be providing comments if this eventuates.	(4) Noted. The current application only proposes the northern transmission line options. If a grid connection via the proposed options doesn't eventuate, the Proponent will carryout further environmental assessments and seek a modification to the development consent at that time.
Traffic & Transport (Roadworks)	(5) ULSC is concerned that the proponent has not identified potential sources for road making gravels, concreting aggregates, cement and reinforcing steel. The documents assume that these materials will be delivered to the site from the north, but fails to provide evidence to indicate how this will be achieved and policed. Unfortunately, the transport of these materials has the greatest potential to damage the local road network (as well as reducing road safety for existing users). Viable suppliers of these materials exist in Goulburn, Crookwell, Berrima and Canberra. In addition to this, the proponent	(5) All transport of heavy materials is to access the site to and from the north via Abercrombie Road. This would be included as part of the construction contractor's agreement, with a requirement to specifically identify material origins. As such, it is anticipated that no heavy vehicles will access the site via Taralga Road.

Category	ULSC Submission Comments	UFWA Responses
	may be able to source gravel for internal roadworks from roadside earthworks involved in improving MR 256 which could provide cost savings for the development as well as road improvements for the benefit of the community.	
Traffic & Transport (Roadworks)	(6) Council does not favour the utilization of "laser car' dilapidation reports in assessing the condition of the roads prior to and after construction. These reports are mainly suited to a broader assessment of a larger scale road network and lack adequate detail to identify smaller pavement repairs that may be required. Instead of this process, Council prefers to have a joint inspection and agreement that relies on photographs to identify pre-existing faults in the pavement.	(6) Noted. It is not expected that dilapidation reports would be required for the use of roads by light vehicles only. However, the applicant will conduct any dilapidation reporting by joint inspection and agreement where necessary.
Traffic & Transport	(7) The proponent shall be required to produce a Transport Management Plan before consent is granted. This is to ensure that the required due diligence (and appropriate consultation with stakeholders) has been carried out in relation to any transport issues that might arise.	(7) Noted. A TMP and associated TCP will be prepared in consultation with RMS and respective Councils. A draft Table of Contents is provided in Attachment 2 of Appendix 4.

6.3. Response to NSW Dep. of Trade & Investment (Resources & Energy)

The NSW Department of Trade & Investment (Resources & Energy) division provided a submission (ID 100232) [ref OUT14/11397] dated 11th April 2014, with comments on impact to state or regional mineral resources. The submission comments and UFWA responses are shown in Table 6.3.1 - Response to NSW Dep. of Trade & Investment (Resources & Energy).

Table 6.3.1 - Response to NSW Dep. of Trade & Investment (Resources & Energy)

Category	DT&I Submission Comments	UFWA Responses
Mineral Resource	(1) The Mineral Resources Branch (MRB) has no concerns with the EIS as the proposed wind farm does not occur in proximity to any recognised state or regionally significant mineral resource.	(1) Noted.

6.4. Response to NSW Dep. of Trade & Investment (Crown Lands)

The NSW Department of Trade & Investment (Crown Lands) division provided a submission (ID 100325) [ref 13/03319] dated 8th May 2014, with comments on their requirements if Crown Roads are to be impacted by the proposed infrastructure. The submission comments and UFWA responses are shown in Table 6.4.1 - Response to NSW Dep. Of Trade & Investment (Crown Lands).

Table 6.4.1 - Response to NSW Dep. Of Trade & Investment (Crown Lands)

Category	Crown Lands Submission Comments	UFWA Responses
Crown Lands	(1) No wind turbines are visibly impacting on Crown roads; however, turbines P5, P8, P12, P14, P24, and P55 are currently placed in close proximity to Crown roads. If the location of any turbine in the detailed design stage, particularly the turbines noted here, are revised and found to impact on a Crown road, then the options for the proponent are: ▪ Relocate the turbine so as to not impact on potential use of the road and therefore breach the provisions of Section 5(1) of the Roads Act 1993; ▪ Or arrange for the adjoining landowner to close and purchase the affected section of Crown road; ▪ Or if any impacted Crown roads are not able to be closed, NSW Trade & Investment, Crown Lands would appraise with a view to authorisation via suitable easements	(1) Noted. The proponent will consider and implement the various options provided by Department of Trade & Investment (Crown Lands) in relation to impact to Crown Roads.

Category	Crown Lands Submission Comments	UFWA Responses
	replicating the provisions of the Land Acquisition (Just Terms Compensation) Act 1991 with compensation and fees assessed in the normal manner; It will always be Crown Lands preferred position that any Crown roads are closed if affected by any wind farm infrastructure.	
	(2) If a Crown road is to be upgraded to provide access of a vehicular standard, NSW Trade & Investment, Crown Lands would require the affected roads to be transferred to the local Council.	(2) Noted.
	(3) The proposed northern transmission line route corridor will be approximately 9 kilometres in length and 70 metre in width. Route sighting is selected to avoid direct with watercourses and Crown land. It should be noted that there remains an incomplete Claim under the NSW Aboriginal Land Rights Act 1983 over Lot 19 DP 753064. This Lot comprise Reserve 190027 notified 30/12/1987. This means that any cabling or transmissions power poles must not impact on this Crown Land because this Office cannot create	(3) Noted.

Category	Crown Lands Submission Comments	UFWA Responses
	an interest or dealing in the land until the Claim is determined and any appeal period expires.	
	(4) The provisions of the Native Titles Act (Cth) would be resolved by virtue of acquisition of suitable easements. The transmission line route is in close proximity to Lot 19 DP 753064 for several hundred metres.	(4) Noted.
	(5) All cables are stated to generally follow the same alignment as the access tracks to limit development footprint; however, this alignment may diverge from access tracks to overcome ground constraints and electrical losses. Any proposed internal access tracks or wind farm cabling crossing Crown roads are to be authorised by suitable easements.	(5) Noted.
	(6) If required, a letter of authority can be issued to the proponent permitting access to the site for the purpose construction and commissioning of the project. Such a letter would be on the premise that the proponent agrees in writing to all consent conditions and to finalise all easements as soon as practicable after construction.	(6) Noted.

Category	Crown Lands Submission Comments	UFWA Responses
	(7) When the final project final design stage is determined and approved by Planning and Infrastructure NSW, the proponent must undertake a status search with the Department to determine the impact of the final design on Crown land and roads. The fee for such a search will be determined on the basis of time taken with any costs to be borne by the proponent.	(7) Noted.
	(8) If the approved final design stage impacts on any Crown assets, Crown Lands reserve the right to seek additional requirements at that time.	(8) Noted.

6.5. Response to NSW Rural Fire Service

The NSW Rural Fire Service (**RFS**) provided a submission (ID 100327) [S10/0006] dated 6th May 2014, with comments use of existing guidelines and standards for preparation of fire prevention and protection measures.

The submission comments and UFWA responses are shown in Table 6.5.1 - Response to NSW Rural Fire Service.

Table 6.5.1 - Response to NSW Rural Fire Service

Category	RFS Submission Comments	UFWA Responses
Bush Fire	(1) At the commencement of building works and in perpetuity the property surrounding the infrastructure to a distance of 10 metres, shall be maintained as an inner protection area (IPA) as outlined within section 4.1.3 and Appendix 5 of *Planning for Bush Fire Protection 2006* and the NSW Rural Fire Service's document *Standards for asset protection zones*.	(1) Noted. The Proponent shall maintain the Inner Protection Area (IPA) for the property surrounding the infrastructure that is within the Project site and for the life of the Project.
	(2) Provision of adequate water supplies shall be made available for fire fighting personnel.	(2) Noted. The location and number of tanks or other water supply points will be determined in consultation with the NSW RFS.
	(3) Access throughout the site specifically, to the infrastructure shall be in accordance to 4.1.3 (2) of Planning for Bush Fire Protection 2006.	(3) Noted.

Category	RFS Submission Comments	UFWA Responses
	(4) A bush fire emergency management and operation plan detailing measures to prevent fires igniting during the construction phase and the operation of the wind farm, which include: ▪ Work involving risk of ignition that should not be carried out during total fire bans. ▪ Availability of fire suppression equipment. ▪ Storage and maintenance of fuels and other flammable materials. ▪ Notification of the local NSW Rural Fire Service Fire Control Centre for works proposed to be carried out during high fire danger periods to ensure weather conditions are appropriate. ▪ Bush fire emergency management planning.	(4) Noted. The Proponent will prepare a Bush Fire Emergency Management and Operation Plan (BFEMOP) in consultation with NSW RFS and Local Fire Brigades.

6.6. Response to Department of Defence

The Department of Defence (DoD) provided a submission (ID 100329) [AF17917720] dated 27th May 2014, with comments that it does not object to the proposal subject to their concerns listed below are addressed by the Proponent. DoD requests 'as constructed' details to be provided to RAAF Aeronautical Information Service, and that the wind farm be lit in accordance with Civil Aviation Safety regulation 139 and the Civil Aviation Safety Authority Manual of Standards 139, and to be consulted if there are any subsequent modification to the design. For clarification of the comments about the obstacle lighting, UFWA called Mr Nick Parker of DoD on 18th September 2014 and enquired about their obstacle lighting requirement, Mr Parker confirmed that DoD will require the specific LED light wavelength range only if CASA required obstacle lighting for the Project. The submission comments and UFWA responses are shown in Table 6.6.1 - Response to Department of Defence.

Table 6.6.1 - Response to Department of Defence

Category	DoD Submission Comments	UFWA Responses
Aviation	(1) Department of Defence request that the applicant provides 'as constructed' details of the wind farm to RAAF Aeronautical Information Service (AIS) for aeronautical charting. RAAF AIS has a website with a Vertical Obstruction Report Form at www.raafais.gov.au/obstr_form.htm which can be used to enter the location and height details of tall structures.	(1) Noted. UFWA will provide RAAF Aeronautical Information Service (AIS) with the 'as constructed' details of the wind farm.
	(2) Department of Defence requests that the Wind Farm should be lit in accordance with Civil Aviation Safety Regulation 139 and the Civil Aviation Safety Authority Manual of Standards 139. If Light Emitting Diode (LED) obstruction lighting is applied to the Wind Farm, the	(2) UFWA contacted Mr Nick Parker of DoD on 18th September 2014 and enquired about their obstacle lighting requirement, Mr Parker confirmed that DoD will require the specific LED light wavelength range only if CASA required obstacle lighting for the Project.

Category	DoD Submission Comments	UFWA Responses
	frequency range of the emitted LED light is requested to fall within the wavelength range of 655 to 930 nanometres. This will enable the lighting to be visible to persons using night vision devices.	CASA's advice (dated 4 August 2011), which is consistent with its current view as expressed with respect to other similar projects, was as follows: "*At this time, CASA has no specific authority to require marking or lighting of obstacles that are not at (or in the vicinity of) an aerodrome. Notwithstanding CASA's regulatory authority, owners of structures which could be hazardous to aviation have a duty of care. It is CASA's view that the provision of obstacle marking and lighting is a decision for, and the responsibility of, the project proponent. Any associated requirements for obstacle marking and lighting placed on developers by planning authorities, insurers or financiers are beyond CASA's scope.*" In the event that CASA mandates obstacle lighting on wind turbines for this Project, UFWA will install NVG compatible obstacle lighting that operates at a wavelength of ~855 nanometres (which sits within the range of 655 to 930 nanometres specified by Department of Defence).
	(3) To mitigate potential impacts to Defence activities, Defence requests to be consulted should there be any subsequent modification to the design, scale, location or intensity of the wind farm.	(3) Noted. In the event that there is any significant change to the siting of the turbine towers, UFWA will provide notification and relevant information to the Department of Defence and other relevant aviation authorities.

6.7. Response to NSW Office of Environment and Heritage

The NSW Office of Environment and Heritage (OEH) provided a submission (ID 100341) with comments on quantification of impacts to flora and fauna, avoidance, bird and bat collision, indirect impact, monitoring and mitigations, offset strategy, and on Heritage issues. The submission comments and UFWA responses for the ecology and heritage are shown in Table 6.7.1 - Response to NSW Office of Environmental and Heritage (A) and

Table 6.7.2 - Response to NSW Office of Environmental and Heritage (B) respectively.

Table 6.7.1 - Response to NSW Office of Environmental and Heritage (A)

Category	OEH Submission Comments	UFWA Responses
Flora & Fauna (Quantify Impact)	(1) The area of impact differs between the Environmental Assessment and the SER and requires clarification. The EA reports a total impact of 0.75 ha while the SER reports a total permanent impact of 12.6 ha. A further 1.4 ha is deemed to be temporary impact. The EA states that the entire 0.75 ha impact is of Western Tablelands Dry Forest emphasising the remaining turbines are within improved pasture and "are not representative of Derived Native Grassland". In contrast the SER reports a total of 2.9 ha of Apple Box – Yellow Box dry grassy woodland occurring as Derived Native Grassland within the development Footprint, of which 1.9 ha will be impacted. <u>Recommendation:</u>	(1) The vegetation survey methodology for the most recent survey undertaken by ERM as reported in the Supplementary Ecology Report (SER) was based on with a combination of qualitative field observation and plot/transect data collection according to the BioBanking Assessment Methodology (BBAM) (DECC 2009). The Environmental Assessment (EA) identified remnant vegetation as Western Tablelands Dry Forest which has been further refined and described as four separate communities: ▪ Apple Box - Yellow Box dry grassy woodland of the South Eastern Highlands; ▪ Broad-leaved Peppermint - Brittle Gum - Red Stringybark dry open forest on the South Eastern Highlands; ▪ Red Stringybark - Scribbly Gum - Red Box - Long-leaved Box shrub - tussock grass open forest the NSW South Western Slopes Bioregion; and ▪ River Oak forest and woodland of the NSW South Western Slopes and South Eastern Highlands Bioregions. The ERM survey confirmed that the majority of the Development Footprint consists of improved pasture although small patches of derived native grassland with scattered Apple Box (*Eucalyptus bridgesiana*) and Yellow Box (*E. melliodora*) trees were confirmed around the periphery. These areas (mapped as Apple Box - Yellow Box dry grassy woodland) constitute the TSC

<table>
<tr><th>Category</th><th>OEH Submission Comments</th><th>UFWA Responses</th></tr>
<tr><td></td><td>(1.1) That the actual area of impact be clearly described and quantified.</td><td>Act-listed EEC: White Box Yellow Box Blakely's Red Gum Woodland (Box Gum Woodland). These areas are highly modified from their pre-European condition and occur along undulating slopes of the Study Area in discrete patches and are currently used as grazing lands (hence their previous classification in the EA as cleared pasture).

In additional to the more clearly defined vegetation communities, the boundaries of vegetation have also been reassessed during the most recent surveys by ERM, and has included detailed mapping along the access tracks and the northern transmission line which were omitted from the original area calculations provided in the EIS.

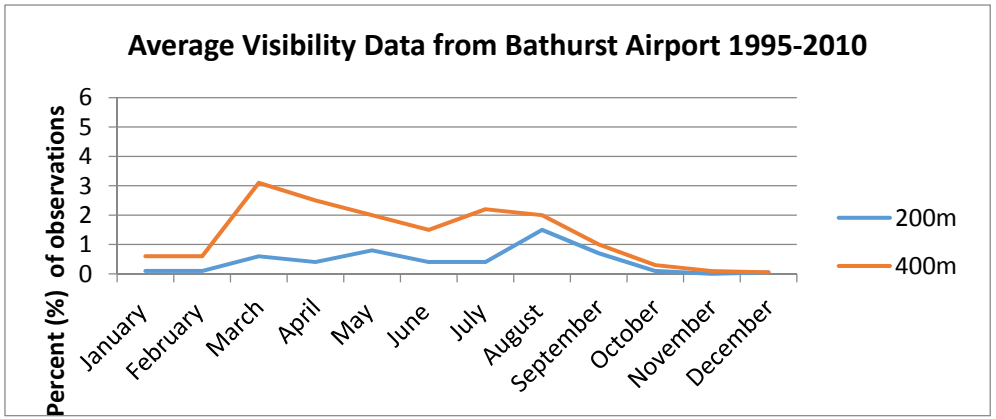
(1.1) The actual area of vegetation to be removed will be:

<table>
<tr><th></th><th>Veg Type 1</th><th>Veg Type 2</th><th>Veg Type 3</th><th>Veg Type 4</th><th>Veg Type 5</th><th>Veg Type 6</th><th>Veg Type 7</th><th>Total</th></tr>
<tr><td>Turbine Footing and access tracks (permanent clearance)</td><td>1.9</td><td>0.1</td><td>0</td><td>0</td><td>1</td><td>0.2</td><td>0</td><td>3.2</td></tr>
<tr><td>Crane Handstand (temporary clearance)</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0.4</td><td>0</td><td>0</td><td>1.4</td></tr>
<tr><td>Transmission Lines (partial clearance)</td><td>0</td><td>6.8</td><td>0</td><td>2.3</td><td>0</td><td>0</td><td>0.3</td><td>9.4</td></tr>
<tr><td>Total Cleared</td><td>2.9</td><td>6.9</td><td>0</td><td>2.3</td><td>1.4</td><td>0.2</td><td>0.3</td><td></td></tr>
<tr><td colspan="9">Veg Type 1: Apple Box - Yellow Box dry grassy woodland of the South Eastern Highlands (this vegetation forms part of the TSC Act-listed Box Gum Woodland EEC occurring in the Study Area as Derived Native Grassland)
Veg Type 2: Broad-leaved Peppermint - Brittle Gum - Red Stringybark dry open forest on the South Eastern Highlands_Mod-Good_Mod</td></tr>
</table>
</td></tr>
</table>

Category	OEH Submission Comments	UFWA Responses
		Veg Type 3: *Broad-leaved Peppermint - Brittle Gum - Red Stringybark dry open forest on the South Eastern Highlands_Mod-Good_Poor-Grassland* *Veg Type 4:* *Broad-leaved Peppermint - Brittle Gum - Red Stringybark dry open forest on the South Eastern Highlands_Mod-Good_Shrubby* *Veg Type 5:* *Red Stringybark - Scribbly Gum - Red Box - Long-leaved Box shrub - tussock grass open forest the NSW South Western Slopes Bioregion_Mod-Good_Mod* *Veg Type 6:* *Red Stringybark - Scribbly Gum - Red Box - Long-leaved Box shrub - tussock grass open forest the NSW South Western Slopes Bioregion_Mod-Good_Shrubby* *Veg Type 7:* *River Oak forest and woodland of the NSW South Western Slopes and South Eastern Highlands Bioregions_Mod-Good_Poor-Weedy* These calculations are based on: <u>Permanent</u> ▪ 6m wide access tracks ▪ 20m x 20m wide turbine footings ▪ 250m x 210m construction envelope for each substation ▪ 70m wide transmission line easement (partial clearance only) ▪ 7 x 1-1.5m2 for the footings of each wind monitoring mast <u>Temporary</u> ▪ 80 x 80m construction envelope for the concrete batching plant ▪ 50 x 50m wide crane hardstands ▪ 10m wide access tracks (only 6m wide will be permanent)
Flora & Fauna (Avoidance)	(2) The EA does not contain sufficient explanation regarding avoidance measures. Several turbines have been removed from the proposal therefore eliminating impact to Box Gum woodland within existing Commonwealth Conservation agreements.	(2) There are currently no plans or applications for the placement of wind turbines within the areas covered by the Commonwealth Conservation agreements. (2.1) The turbines in the remnant area have been moved closer to the cleared area to reduce the amount of vegetation clearing while keeping the minimum

Category	OEH Submission Comments	UFWA Responses
	While OEH welcomes the avoidance of these Box Gum woodland remnants it is stated several times within the EA that approval for these turbines may be sought at a later date. There are currently no plans or applications for the placement of wind turbines within the areas covered by the Commonwealth Conservation agreements. OEH again reiterates that placement of turbines within firstly an existing conservation agreement and secondly within an area of Box Gum Grassy Woodland Endangered Ecological Community (EEC) should be avoided where possible to do so. An additional turbine within remnant vegetation has been deleted and a further three have been relocated to sites just within the remnant. While this reduces impact there is no discussion regarding why deletion of all four turbines, or further relocation outside the remnant, is not feasible. <u>Recommendations:</u> (2.1) That the proponent ensures that all avoidance measures implemented in finalising the location and design of the facility are provided;	separation distance from other proposed turbines to minimise the wake loss effect on adjacent turbines. The microsited locations are placed on ridgelines that have the benefit of reasonably unobstructed access to the predominant wind direction. In consideration of the extensive grid connection requirement, the proposed project requires as many turbines as feasible to maintain project viability, and therefore turbines P10, P13 and P14 form part of the Project. (2.2) Ecological values have been considered during the design process and various project components have been located to minimise impacts on ecological values as far as practical whilst considering the technical capacity and viability of the project. The fundamental protocol for the final design is to avoid areas of native vegetation where possible. ▪ The proposed micrositing has completely removed all proposed infrastructure (including turbine P2, P6 and P7) to avoid impacts to the Box Gum Woodland conservation area, and ▪ Removed turbine P11 from the outstretched ridgeline to avoid the heavily vegetation area, along with relocating turbines P10, P13 and P14 closer to the edge of the cleared area, which has significantly reduced the vegetation clearing (2.3) The proposal doesn't include the placement of wind turbines within the areas covered by the Commonwealth Conservation agreements, hence turbines P2, P6 and P7 have been removed from the proposed layout.

Category	OEH Submission Comments	UFWA Responses
	(2.2) That the level of avoidance implemented is justified; and (2.3) That the DPE include a condition of consent ensuring that turbines are not placed within existing Commonwealth Conservation agreements containing Box Gum Grassy Woodland EEC.	
Flora & Fauna (Bird & Bat Collision)	(3) The EA has not adequately justified conclusions related to the risk of bird and bat collision and the significance of this impact. The SER provides a more comprehensive assessment of bird & bat strike although concedes that while the expected risk to bats at risk from rotor collision would be small this has yet to be confirmed. Neither assessment adequately discusses the likely influence of weather conditions commonly occurring at the site on bird collisions. Sites which experience poor weather and/or low visibility conditions need to be assessed taking this into account because it is likely to influence flight behaviour and increase the likelihood of impacts.	(3) Bird & Bat Collision (3.1) *Weather conditions* Poor visibility due to weather conditions (fog and rain) is often cited as a factor increasing risk of collision with structures, including wind turbines (Osborne *et al.* 2000; Drewitt and Langston 2006). In an American study (Arnett et al. 2005, cited in Strickland *et al.* 2011) it was found that wind speed and weather were significantly related to bat fatality. Nights with storms accompanied by high wind speeds had fewer fatalities, and nights immediately after storms accompanied by low wind speeds had higher fatalities (Arnett *et al.* 2005, cited in Strickland *et al.* 2011). In a second North American study, Osborn *et al.* (2000) identified that poor visibility may have contributed to two of eight bird mortalities related to collisions with turbines. Drewitt and Langston (2006) acknowledge that the increased risk of collision may be offset to some extent by lower levels of flight activity in poor weather conditions. The nearest available visibility data for the study area was taken from Bathurst Airport, approximately 90 km north of the study area (BoM 2010).

Category	OEH Submission Comments	UFWA Responses
	While the SER raises some additional factors that could potentially influence the susceptibility of bats to rotor strike there is little discussion of them. Additional risk factors relevant to consideration for an adequate impact assessment on all bat species known and likely to occur at the site include: ▪ Tree-roosting species may perceive turbines as potential roost trees; ▪ Ridge-top sites might coincide with availability of insect prey; ▪ Migrating bats may rely on sight (rather than echo-location) to navigate, being drawn to large structures on ridge-tops; ▪ Bats may investigate moving blades as movement may be mistaken as evidence of prey; ▪ Audible sound from turbines may attract bats from considerable distances; and ▪ Mating behaviour of tree-roosting bats may be centred on the tallest prominent feature in landscape. ▪ Risk of concussion from passing through low-pressure areas near turbines. <u>Recommendation:</u>	These data indicate that reduced visibility occurred more frequently in autumn and winter.  While collision risk factors are likely to vary across sites, and between countries (Hull and Cawthen 2012), it is reasonable to expect that poor visibility due to weather conditions may increase the risk of collision within the study area. Based on BoM data displayed above (BoM 2010), reduced visibility coincides with the colder months of the year when both bird and bat activity is reduced. This will reduce the likelihood of any additional impacts to birds and bats, above those already addressed within the SER (ERM 2013). Where possible, the data obtained during the bird and bat monitoring program will attempt to provide further information on the potential correlation between weather patterns and any observed increases in collision rates. *Additional risk factors relevant to bats* Evidence of mechanisms for bat mortality at wind farm sites specific to Australia is limited (Hull and Cawthen 2012) although numerous international

Category	OEH Submission Comments	UFWA Responses
	(3.1) That the Proponent take into account weather in assessing impacts on birds and bats, as well as further consideration of the above mentioned risk factors.	studies have identified a lack of a relationship between species richness and abundance of bats using a site, and the species richness and abundance of fatalities (Cryan 2010). This suggests that some species of bats are more prone to impacts than others (based on their habitat and/or behavioural characteristics) as outlined below: This has also been reported at the Bluff Point and Studland Bay Wind Farms in Tasmania where analysis of 8 years of monitoring data (2002-2010) has shown that only two of the four species recorded at the site (the Gould's Wattled Bat and Vespadelus sp) have been involved in collisions (Woolnorth Wind Farm Holding, 2013). ▪ Tree-roosting species may perceive turbines as potential roost trees, Cryan (2010) notes that it is plausible that bats could mistake turbines for tall trees. Bats may be attracted to them as a higher number of roosting opportunities may be available in taller trees, partly due to size and also due to the related maturity of the tree and hence likelihood of presence of cavities, loose bark and crevices (Cryan 2010). Cryan (2010) identified this possibility as particularly relevant to migratory bats. In Australia, bats display some migratory behaviour, however migrations are only local (BL&A 2011). Hull and Cawthen (2012) acknowledged that collisions of Goulds Wattled Bat (*Chalinolobus gouldi*), thought to be a tree-roosting species and present within the study area, at two Tasmanian wind farms, may support the theory that bats investigating turbine towers as potential roost sites or gathering sites for mating may contribute to the risk of bat mortality. The Eastern False Pipistrelle and Greater Broad-nosed Bat are both listed as vulnerable and roost in trees. Calls detected during a survey of the study area may be attributed to these species (although unable to be confirmed). There

Category	OEH Submission Comments	UFWA Responses
		is potential for these species to perceive turbines as potential roost trees, thereby increasing the level of interaction with turbines, and consequent risk of collision and barotrauma (Baerwald et al. 2008) [*Baratrauma - moving turbine blades have areas of relatively high and low pressure, with an area at the tip of each blade having a drop in atmospheric pressure sufficient to cause internal injuries and tissue damage to air-containing structures*]. ▪ Migrating bats may rely on sight (rather than echo-location) to navigate, being drawn to large structures on ridge-tops; Bats are thought to rely on visual cues (such as tall trees and turbines) during long-distance navigation, as visual cues may be detectable from greater distances than acoustic cues (Cryan 2010). Cryan and Barclay (2009) note that turbines may attract bats from distances greater than 1 km. In Australia, bats display some migratory behaviour but migrations are local and not considered to cover significant distances (BL&A 2011). The Eastern Bentwing-bat (listed as vulnerable and assumed to occur in the study area) migrates annually to maternity caves from distances up to approximately 300 km, and may travel up to 65 km in a night (OEH undated). It is possible the Eastern Bentwing-bat could exhibit this type of behaviour during long-distance navigation, thereby increasing the risk for collision with turbines, or barotrauma. ▪ Ridge-top sites might coincide with availability of insect prey; Cryan and Barclay (2009) describe 'hilltopping' behaviour by insects, in which flying insects are attracted to the tallest structures in the landscape during the daytime. In this event, bats may learn to use wind turbines as foraging sites. There is limited research into this phenomenon in Australia, however bat carcases found around turbines in Tasmania showed no evidence of their

Category	OEH Submission Comments	UFWA Responses
		having recently been feeding around turbines (Hull and Cawthen 2012). It is currently unclear if insect species would exhibit this hilltopping behaviour, with a consequent effect on bat behaviour, within the study area. ▪ mating behaviour of tree-roosting bats may be centred on the tallest prominent feature in landscape. Cryan (2010) notes that the potential perception of turbines as potential roost sites, the use of tall features (such as turbines) in navigation and the potential availability of insect prey at turbines may have contributed to bats evolving mating behaviours that focus on the tallest trees in the landscape. Cryan (2010) notes that species for which sexes have separate distributions outside of the mating period may be more likely to use the highest trees as rendezvous points during the mating period. Hull and Cawthen (2012) acknowledged that collisions of Goulds Wattle Bat (*Chalinolobus gouldi*), thought to be a tree-roosting species and present within the study area, at two Tasmanian wind farms, may support the theory that bats investigating turbine towers as gathering sites for mating may contribute to the risk of bat mortality. Although, mortality was most prevalent in Autumn, a period of post-reproduction for the species (Hull and Cawthen 2012). ▪ Risk of concussion from passing through low-pressure areas near turbines. Moving turbine blades have areas of relatively high and low pressure, with an area at the tip of each blade having a drop in atmospheric pressure sufficient to cause internal injuries associated with barotrauma, rather than concussion; these aspects are discussed in the SER.

Category	OEH Submission Comments	UFWA Responses
		▪ Bats may investigate moving blades as movement may be mistaken as evidence of prey Thermal images of bats appearing to chase moving blades suggest that bats may be attracted to blades (Cryan and Barclay 2009). It is unknown how prevalent this behaviour is, or if this behaviour would be exhibited by the species present at the study area would, however it is possible this factor could attract species to turbines, thereby increasing the risk of collision or barotrauma. ▪ audible sound from turbines may attract bats from considerable distances There are reports of bats being attracted to the 'swoosh' sound of sticks being waved through the air, suggesting bats may also be attracted to sounds produced by moving blades (Cryan and Barclay 2009). It is unknown how prevalent this behaviour is, or if this behaviour would be exhibited by the species present at the study area, however it is possible this factor could attract species to turbines, thereby increasing the risk of collision or barotrauma. *Summary* Overall, while a number of hypotheses have been presented to describe the causes of bat mortality related to wind turbines, the lack of evidence of these causes, and particularly lack of evidence in an Australian context, makes it difficult to quantify potential impacts to bat species. Hull and Cawthen (2012) found that high-flying, open-air foraging bats are more at risk of fatality at wind turbines than other species. Males and females were impacted similarly, but there was a predominance of adults suggesting that the Tasmanian Windfarms were not resulting in mortality of dispersing juveniles

Category	OEH Submission Comments	UFWA Responses
		and sub-adults. Based on the data available it is unlikely that the impacts to bats would be significant at a population scale and there may be opportunities for the Bird and Bat Monitoring Plan developed as part of this Project to contribute to the understanding of interactions between bats and turbines in an Australian context.
Flora & Fauna (Indirect Impacts)	(4) The EA does not adequately address the potential for indirect impacts to fauna on the development site. There is a growing literature indicating that wind farms can have a detrimental impact on how fauna, particularly migratory species, utilise habitat surrounding turbines. Indirect impacts include, but are not restricted to: ▪ significant alteration of flight paths, ▪ change in habitat use patterns, ▪ changes in occupancy or population densities and ▪ changes in breeding success. The SER acknowledges the potential for indirect impacts in Section 4.2.4 stating that "Careful planning to avoid placement of turbine clusters in or near areas of high habitat value will manage the alienation of habitat to threatened woodland species".	(4) Indirect Impact Considerations *Alteration of flight paths* There is potential for wind farms to act as a barrier to flying birds, causing them to avoid the area and hence take another flight path. While there is little research into avoidance rates exhibited in Australia (Smales 2006), biodiversity monitoring at two wind farms in Tasmania did not provide evidence of a barrier effect (Hull, no date). Bird Utilisation Surveys conducted as part of the SER did not identify any migratory birds, and no species were observed exhibiting direct movement at height over the landscape as would be expected from migrating species. In addition, it is not considered likely that large numbers of species will cross the Study Area. This is due to the Development Footprint being higher than the majority of the surrounding area which would increase energy expenditure required for species flying over the plateau. The open nature of the Study Area is expected to deter species which are vulnerable to predation in open areas. There were no potential movement corridors identified within the Development Footprint such as vegetated corridors or narrow cleared areas or saddles between forested areas. For species that do move through the Study Area, the Paling Yards Project layout provides spaces of approximately 400m between most turbines, which would be expected to allow bird and bat species to move between turbines.

Category	OEH Submission Comments	UFWA Responses
	Although turbines P10, P13 and P14 have been resited they are still situated within remnant woodland and thus have the potential to indirectly impact fauna. OEH suggests that consideration should not be restricted to species listed on the EPBC Act or TSC Act. Recommendation: (4.1) That the Proponent assesses the potential for indirect impacts of turbines on fauna.	*Change in habitat use patterns and changes in occupancy or population densities* There is limited research on changes in habitat use, occupancy and population densities of birds and bats due to wind farms in Australia. The findings of a 10 year monitoring program for two wind farms in Tasmania showed a general reduction in biodiversity across the survey period within both the wind farm site and reference sites, with the decline commencing prior to construction. A synthesis of available research in the United States (The Wildlife Society 2007) summarised the following findings for bird species groups in the United States: ▪ reported grassland bird densities were lower within 80 to 100 m of wind turbines; ▪ in one study, raptors were observed to not nest within a 32km2 wind facility, despite it having similar habitat to a nearby area with 5.94 nests/100km2. However, other studies reported raptors nesting within 800m of wind farms; and ▪ reported densities of some waterfowl were lower within 600 m of wind turbines, however other species appear to experience no displacement effect. While not directly transferrable to Australian conditions and Australian species, these findings can give an indication of the scale of potential displacement of bird species. It is unclear to what extent operation of wind turbines may displace bird and bat species present in the study area, however it is recognised that displacement will reduce the number of birds interacting with turbines, consequently reducing the risk of collision.

Category	OEH Submission Comments	UFWA Responses
		Changes in breeding success Wind farms may indirectly impact breeding success through displacement of fauna from breeding locations, or mortality of individuals which would otherwise breed. A study of two fauna at two Tasmanian wind farms indicated that eagles continued to breed successfully at the wind farm sites, at the same or a higher rate than other areas of Tasmania. Additionally, a study of bat mortality at these sites identified that mortality was highest in autumn, a predominately post-reproduction period, suggesting the timing of bat fatalities would not result in the direct loss of young (Hull and Cawthen 2012).
Flora & Fauna (Monitoring & Mitigation)	(5) The EIS does not provide detail of the monitoring methodology proposed for monitoring the impacts of rotor strike nor does it adequate consider mitigation measures in response to bird and bat strike. The SER states that a monitoring program to monitor impacts of bird and bat strike across the wind farm will be established in consultation with OEH, providing no detail of methodologies that may be adopted <u>Recommendations:</u> (5.1) That the proponent develop a Bird and Bat Monitoring Plan that provides detail of how impacts on bird and bat populations will be monitored, including details on survey locations, parameters to be	(5) Bird and bat monitoring post construction is becoming routine practise both in Australia and overseas. There are no consistent standards in Australia for undertaking monitoring. (5.1) A draft Bird and Bat Monitoring Strategy (BBMS) has been developed (refer to Annex C of Appendix 5 to this Report). The draft BBMS identifies appropriate survey methodologies and frequency, and provides guidance on bird and bat management. It provides a framework that can be used for development of a detailed Bird and Bat Management Plan (BBMP) for both the construction and operational phases of the wind farm once approved. (5.2) It outlines an indicative and adaptive program for monitoring the effects of each turbine and provides a sampling strategy specific to the first two years of operation. The details of ongoing monitoring (after the first two years of operation) will be negotiated and established based on the recommendations of the initial monitoring.

Category	OEH Submission Comments	UFWA Responses
	measured, frequency of surveys and analyses and reporting, and contains mitigation measures that will realistically reduce fatalities. (5.2) That the DoP&E include a condition of consent requiring a monitoring program capable of detecting any changes to the population of birds and/or bats that can reasonably be attributed to the operation of the project. This may require data to be collected prior to the commencement of construction. Data relating to mortality rates should be submitted to OEH on an annual basis for the first five years of operation and every two years thereafter.	
Flora & Fauna (Offset Proposal)	(6) As indicated in Issue (1) above, Assessment of Impacts, the EA reports a total impact of 0.75 ha while the SER reports a total permanent impact of 12.6 ha and a further 1.4 ha of temporary impact. Accordingly, the EA proposes no Offset Proposal while the SER includes a BioBanking Credit Calculator Report	(6) A draft Biodiversity Offset Strategy has been prepared for the proposal (refer to Annex D of Appendix 5 of this Report). (6.1) The Proponent will revise the offset strategy in consultation with OEH once the detail design of the layout has been finalised.

Category	OEH Submission Comments	UFWA Responses
	indicating the need for an offset of 289 credits, equating to 31.1 hectares. Statement of Commitment number 59 states that "The proponent will develop an offset package in accordance with the Principles for the use of biodiversity offsets in NSW". <u>Recommendation:</u> (6.1) That the offset requirements be clearly described and quantified and that a biodiversity offset strategy be prepared in consultation with OEH.	

Table 6.7.2 - Response to NSW Office of Environmental and Heritage (B)

Category	OEH Submission Comments	UFWA Responses
Heritage	(1) OEH notes that archaeological sites were identified but only one site (P8) is likely to come within the zone of potential impact by turbine placement and construction. A minimum 100 metre separation is recommended in the Cultural Heritage Impact Assessment although there appears to be some uncertainty as to the extent of the potential surface or sub-surface deposits. OEH recommends that the extent of this site be determined prior to work commencing and ensure micro-siting of turbines to avoid the site.	(1) A Cultural Heritage Management Plan (CHMP) will be developed prior to the construction phase for the project and will include measures for subsurface test excavation at Site P8 to determine the extent of the site. This will allow the proponent to micro-site nearby turbines to avoid potential impacts. The test excavation will be undertaken in accordance with the Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW (DECCW 2010). Tasks will involve: ▪ Consultation with RAPs and an offer of participation in the subsurface investigation; ▪ At least 14 days written notification to OEH and submission of the sampling strategy to OEH; ▪ Two archaeologists for approximately one to two days fieldwork; ▪ Completion of an Aboriginal Site Impact Recording Form for submission to the NSW Aboriginal and Heritage Information Management System AHIMS Registrar; and ▪ Preparation of an Archaeological Report to document results of the investigation
Heritage	(2) OEH also notes that proposed mitigation measures (Section 18.5) recommend that once proposed access track locations and other	(2) As part of the preparation of the CHMP, prior to construction work and following final footprint design, targeted surveys of pegged access tracks and other disturbance areas will be undertaken in consultation and collaboration

Category	OEH Submission Comments	UFWA Responses
	disturbance areas are pegged on the ground, additional targeted surveys of these areas should be undertaken. This is of particular importance where infrastructure intersects with locations of potential higher use by Aboriginal people in the past, such as watercourses.	with the RAPs to identify potential Aboriginal heritage values at risk of impact by the project. Particular attention will be paid to areas of potential higher use by Aboriginal people in the past, such as watercourses. This will likely be undertaken over two to three days by one archaeologist with participation of RAPs. If additional sites are identified during these surveys, an assessment and strategy for the management of the sites will be included in the CHMP for the project. The CHMP will be provided to the RAPS for review and approval and submitted to OEH and the Oberon Shire Council for approval.

6.9. Response to NSW Environmental Protection Authority

The NSW Environmental Protection Authority (**EPA**) provided a submission (ID 100343) [ref FIL07/8-06: DOC14/38665-02] dated 30th May 2014, with comments about the noise criteria and noise limits, proposed draft conditions of the permit relating to air, noise, vibration and water. The submission comments and UFWA responses are shown in Table 6.9.1 - Response to NSW Environmental Protection Authority (EPA). For more details on the response to EPA refer to Appendix 2 and for the revised Noise Impact Assessment revision R5 refer to Appendix 3.

Table 6.9.1 - Response to NSW Environmental Protection Authority (EPA)

Category	EPA Submission Comments	UFWA Responses
Noise	(1) Wind speed at microphone height was not measured to exclude wind-affected data.	(1) Local wind speed, due to the sheltering by the house and local vegetation, is typically lower than at higher elevations above ground. SLR has previously undertaken the exclusion process (wind logged at microphone height) and has found that almost no points are excluded and the net result on the final curve is negligible. Additionally, as the wind speed is a 10 minute average, and wind seeds at 1.5 m AGL in a typical garden setting are highly variable, then it is that the L90 statistic (quietest 10%) will be affected by wind on microphone disturbance. In any case, the noise limits do not rely on the background + 5 dBA curve for most locations.

Category	EPA Submission Comments	UFWA Responses
Noise	(2) Red dots used by the consultant on photographs of monitoring equipment may have concealed whether or not the wind screens were installed properly.	(2) Red dots were placed over the picture to show the location of the microphone more clearly. They can sometimes be difficult to see, particularly when photos are printed out. The red dots have been removed in the most recent version of the report. The EPA will observe that indeed, some of the microphones were not yet in place or had not yet had their windscreens put on at the time the photos were taken, however SLR can confirm that windscreens were used for all measurements, as is standard practice for all environmental noise logging
Noise	(3) Noise loggers were installed in vegetation at a number of locations, which may have led to elevated background noise curves.	(3) For some of the background monitoring locations, the entire house is surrounded by trees and vegetation. Finding a location that is not influenced by wind in trees would not be representative of the actual noise levels at the house. Sometimes noise logger location is dictated by other constraints including presence of other noise sources, residents consent, access considerations, security, prevailing wind direction and shelter. In any case, the limit does not rely on the background + 5 dBA curve for most locations.
Noise	(4) The NIA did not specify the height at which wind speed measurements were undertaken, but states that it was adjusted to 100 m height wind speed.	(4) Wind speed measurements were taken at 20, 40 and 60 m above ground level on each wind mast. The hub height wind speed was

Category	EPA Submission Comments	UFWA Responses
		calculated based on the 10-minute shear value calculated from the 20 m and 60 m AGL wind speeds. This information is included in revision 5 of the report.
Noise	(5) The number of valid data points reported for three of the monitoring locations, regression curves may have been affected by the noise floor of the noise logging instrument used, between 22 dBA and 30 dBA (higher than recommended in the draft NSW guidelines.)	(5) The requirements for noise loggers are that they be at least Type 2 certified; no minimum noise floor is given. The loggers used were all Type 1, exceeding this requirement. There is a requirement for Sound Level Meters undertaking frequency analysis measurements to have a noise floor less than 20 dBA, but this does not apply to loggers in the background monitoring campaign. In any case, the limit does not rely on the background + 5 dBA curve for most locations.
Noise	(6) Plotted data for location 128 showed some stratification, and correlation of background noise measurements with wind speed at location 10 was very low (a maximum of 0.26683). This may indicate excessive extraneous noise levels at these locations.	(6) The standard does not require a minimum R2 value, only that the value be stated. Upon investigating this issue, it was discovered that a referencing error had caused some of the scatter plots in the report to be incorrect. The regressed lines and equations used for the technical assessment were not affected, only four of the presented graphs in the report document. This error has been corrected in the new revision of the report.
Noise	(7) Noise generated at the premises must not exceed the noise limit of 35 dBA (for all wind speeds) at any	(7) The Proponent requires clarification from EPA about the 'flat' noise limit, that is, 35 dBA for all wind speeds.

Category	EPA Submission Comments	UFWA Responses
	residential receiver not subject to a negotiated agreement.	SLR Consulting notes that background noise has already been shown to exceed this value at higher wind speeds at some locations and that background noise can also vary on a seasonal basis. Furthermore, we note that the predicted levels of noise at some locations are very low compared with the background noise levels. Thus, when the compliance measurements are conducted, it is possible that the noise levels will have slightly increased and/or be above 35 dBA but not due to noise from the wind farm. It is important that EPA acknowledges that measuring wind farm noise at levels close to or below ambient background noise is technically difficult and that the limit should not be read to literally mean that if the regressed noise line is over 35 dBA that the wind farm is in breach.
Noise	(8) The Proponent shall prepare a revised Noise Impact Assessment (NIA) for the final turbine model and turbine layout selected prior to commissioning of the wind turbines. The revised NIA must demonstrate, through appropriate modelling and in accordance with the Environmental Noise Guidelines: Wind Farms (SA EPA 2003), that the final turbine model and layout can meet the noise limit(s) derived in accordance with those guidelines.	(8) Noted. The Statement of Commitment has been updated accordingly.

Category	EPA Submission Comments	UFWA Responses
Noise	(9) Prior to commissioning of the turbines, the Proponent must prepare and implement a Noise Management Plan that includes the following measures to manage noise emissions from the operation of the project. The Plan must be undertaken generally in accordance with the Environmental Noise Guidelines: Wind Farms (SA EPA 2003) and include, but not necessarily be limited to: a) compliance monitoring, within one year of commissioning, against the noise limits, b) identification and implementation of best practice management techniques for minimisation of noise emissions where reasonable and feasible, c) measures to be undertaken to rectify annoying characteristics resulting from the operation of the project such as infrasound, tonality or adverse mechanical noise from component failure, and d) procedures and corrective actions to be undertaken if non-compliance is detected.	(9) Noted. The Statement of Commitment has been updated accordingly.

6.10. Response to NSW Roads and Maritime Services

The NSW Roads and Maritime Services (**RMS**) provided a submission (ID 100347) [ref WST14/00033] dated 30th May 2014, with comments on transportation considerations and requirements. The submission comments and UFWA responses are shown in Table 6.10.1 - Response to NSW Roads and Maritime Services. For further details refer to Appendix 4 – GTA Consultants Response to Traffic Related Submissions.

Table 6.10.1 - Response to NSW Roads and Maritime Services

Category	RMS Submission Comments	UFWA Responses
Traffic & Transport	(1) The selected road transportation routes for materials from Port Kembla and Port of Newcastle to the site assumes access from Sydney using Bells Line of Road (MR 184) and possibly Great Western Highway (HW5). Access across the Great Dividing Range for over size/over mass and some low loader vehicles is not possible using Bells Line of Road and may not be possible using Great Western Highway. Transportation access from east to west by road will need to be obtained, subject to approval, via roads other than Bells Line of Road. In developing new routes, the proponent is strongly encouraged to consult with Roads and Maritime Special Permits Unit.	(1) GTA Consultants further investigated the suitability of the proposed oversize vehicle access route and the site access points on Abercrombie road. RMS Special Permits branch has been consulted and an assessment of the proposed over-dimensional transport route via Great Western Highway (A32) is provided in the additional assessment undertaken by GTA Consultants (refer to Appendix 4). The use of Great Western Highway is feasible, however a number of potential conflicts have been identified. A detailed Traffic Management Plan (TMP) and scope of any road modification works would be developed in consultation with RMS and respective Council prior to any over-dimensional wind turbine component movements.
Traffic & Transport	(2) The applicant has stated that final transportation routes will be determined as part of the development of and approval of a Traffic Management Plan (TMP). Access	(2) RMS Special Permits branch has been consulted and an assessment of the proposed over-dimensional transport route via Great Western Highway (A32) is provided in the additional assessment undertaken by

Category	RMS Submission Comments	UFWA Responses
	to the site, particularly for over size and over mass vehicles, is critical to the establishment of the proposed wind farm and transportation routes for these and other types of vehicles should be determined as part of the development application process.	GTA Consultants. The use of Great Western Highway is feasible, however a number of potential conflicts have been identified. A detailed TMP and scope of any road modification works would be developed in consultation with RMS and respective Council prior to any over-dimensional wind turbine component movements.
Traffic & Transport	(3) The Transport Impact Assessment (TIA) lacks a robust assessment of alternate methods of transportation of materials to the site (e.g. rail). Partial usage of alternative transport methods would minimise disruption to traffic using the State road network.	(3) Due to the alignment of the rail corridor over the Blue Mountains, the transport of turbine components via rail is not possible. The potential to transport components to the site via air is not considered cost effective at the moment, however such an assessment will be included within the TMP, which will be prepared prior to any over-dimensional component movements.
Traffic & Transport	(4) The TIA does not provide an assessment of tourist traffic generated by the proposed development. Roads and Maritime's previous experience with wind farms has shown that viewing platforms with wind farm information available at strategic locations allows motorists to safely pull off the road to view wind turbines and minimises unsafe viewing and driving practices.	(4) It is not anticipated that significant additional tourist traffic would be generated by the proposed development, due to the site location. However, any existing tourist traffic on Abercrombie Road may desire to stop and view the turbines. As such, a viewing platform is proposed to be provided north of Access 4/5 to allow tourists to safely pull over off the road and view the wind turbines. Details of the proposed viewing platform and road interface will be determined during detailed design, seeking the relevant approvals in conjunction with the access roads.

Category	RMS Submission Comments	UFWA Responses
Traffic & Transport	(5) Cumulative impacts provided in the supporting documentation focuses on other wind farms in the region and not on other developments/works such as mining proposals and road upgrades. For example, in the event that the Great Western Highway is proven to be a suitable transportation route, upgrades at Kelso and Forty Bends will impact on transportation of materials, staff, etc to the site.	(5) The cumulative impacts of the project and other developments / works will be assessed as part of the TMP prepared for the transport of over-dimensional wind turbine components. Such an assessment will be more relevant once the project timing is better understood. The approved transport contractor will consult with RMS and relevant contractors undertaking works on the Great Western Highway to maintain a suitable path of travel for the OD transport vehicles during wind farm construction.
Traffic & Transport	(6) No detail of intersection upgrades to accommodate over-size/over-mass vehicles has been provided. The applicant has stated that details of intersection and access upgrades will be provided in the TMP.	(6) Additional assessment of the proposed OD transport route by GTA Consultants has identified several locations at which modification works may be required, including: ▪ Great Western Highway – 2 km west of Mount Victoria ▪ Great Western Highway – East and West of Hartley ▪ Great Western Highway and Littlebourne Street intersection, Kelso ▪ O'Connell Road – 12km north of Oberon ▪ O'Connell Road and Abercrombie Road intersection, Oberon. The extent of upgrade works required will not be known until final wind turbine supplier and transport contractor is known. The upgrade works would be undertaken in consultation with RMS and the relevant council and detailed within the Traffic Management Plan to be prepared.

Category	RMS Submission Comments	UFWA Responses
Traffic & Transport	(7) Prior to the commencement of construction works, a Traffic Management Plan (TMP) shall be prepared for the project in consultation with and approved by Oberon Council and Roads and Maritime Services. The TMP shall identify the proposed route(s) and associated impacts (temporary street closures, removal and replacement of road infrastructure, upgrading of road infrastructure, etc.) which will be required in order for necessary materials and machinery to be delivered to the site. The TMP shall include assessment of high risk locations that prevent safe two-way passage of traffic and how traffic movements are to be negotiated, projected delays experienced by traffic on affected roads (origin to destination), cumulative impacts and mitigating measures to be employed. The applicant is to be accountable for transport operations complying with the TMP as well as the haulage contractor.	(7) Noted. A TMP and associated Traffic Control Plans (TCP) will be prepared in consultation with RMS and respective Councils. A draft Table of Contents is provided in Attachment 2 of Appendix 4.
Traffic & Transport	(8) Prior to any haulage requiring over-size/over mass vehicles and loads the proponent will be required to obtain special permits. To obtain a permit, the proponent will need to contact Roads and Maritime's Special Permits Unit in Glen Innes; The requirements outlined in Roads and Maritime's publication Operating Conditions: specific permits for oversize and over mass vehicles and loads are	(8) Noted. The Proponent will obtain all permits required to carry out works within the public road.

Category	RMS Submission Comments	UFWA Responses
	to be followed. This publication is available online at: www.rms.nsw.gov.au/heavyvehicles/oversizeovermass	
Traffic & Transport	(9) If any parts of the proposed transport routes on classified roads are unable to cater for the project related traffic and transport, the proponent is required to improve such part of the road to safely cater for the length, size and volume of vehicles and their loads and to protect the integrity of the classified road network. This may include the proponent constructing stopping bays (suitable hard stand areas) at distances and dimensions determined by Roads and Maritime. These areas would be required along proposed routes to allow following vehicle queues to pass. Upgrades of the road network shall be determined following submission of the TMP and constructed prior the commencement of construction works.	(9) Noted. A TMP and associated TCP will be prepared in consultation with RMS and respective Councils. This would include details of road upgrade works would be carried out at the cost to the proponent. A draft Table of Contents is provided in Attachment 2 of Appendix 4..
Traffic & Transport	(10) Prior to any work on the State classified road network, the proponent will be required enter into a formal agreement in the form of a Works Authorisation Deed with Roads and Maritime Services.	(10) Noted. The Proponent will enter into a Works Authorisation Deed with the RMS for all works on classified State Roads.
Traffic & Transport	(11) Any disturbances to traffic lanes, shoulders, verges or other disturbance within the road reserve of classified roads are to be reinstated to pre-existing or better	(11) Noted. The Proponent would reinstate all areas disturbed by the transport of wind farm components to pre-existing or better condition.

Category	RMS Submission Comments	UFWA Responses
	condition. This includes any impact on the road pavement, culverts, bridges, causeways, signage and traffic islands.	
Traffic & Transport	(12) Prior to the commencement of haulage operations, a full and independent risk analysis and inspection of the transport route(s) is required and a copy of the analysis is to be supplied to Roads and Maritime Services. Further analysis and reporting to assess possible damage to and repair of the route will be required on a regular basis and at completion of construction works.	(12) Noted. An independent risk analysis and inspection of the transport route will be carried out prior to the commencement of haulage operations (noting that a preliminary assessment has now been carried out by GTA Consultants. Further analysis and reporting would be completed as required to comply with any reasonable request of RMS.
Traffic & Transport	(13) Roads and Maritime requires a commitment from the proponent to provide funding for the maintenance and repair of any affected classified roads for the duration of transportation of over size and over mass vehicles and loads, to the satisfaction of Roads and Maritime. The commitment to fund maintenance and repairs shall be included in the TMP.	(13) Noted. The Proponent will commit to funding the maintenance and repair of any roads damaged through the transport of wind farm components. Details of this commitment would be included as part of the TMP to be prepared for the project.
Traffic & Transport	(14) Vehicles transporting loads will not be permitted to travel in convoys or platoons unless specifically permitted	(14) Noted. The criteria will be included in the TMP.

Category	RMS Submission Comments	UFWA Responses
	by the relevant roads authority and/or Roads and Maritime.	
Traffic & Transport	(15) Convenient and easily accessible areas shall be identified and appropriate facilities provided for members of the public to safely view wind turbines.	(15) Noted. A viewing platform is proposed to be provided north of Access 4/5 to allow tourists to safely pull over off the road and view the wind turbines. Details of the proposed viewing platform and road interface will be determined during detailed design, seeking the relevant approvals in conjunction with the access roads.
Traffic & Transport	(16) All arrangements for the control of traffic on classified roads are to be in accordance with Roads and Maritime's publication Traffic Control at Work Sites. A Road Occupancy Licence will be required prior to any works commencing within three (3) metres of the traffic lanes of state classified roads and submission of a TMP will be part of Road Occupancy Licence(s).	(16) Noted. The Proponent will obtain a Road Occupancy Licence from the RMS (or Council equivalent) prior to commencing any works on or near public roads. All works will be carried out in accordance with Traffic Control at Work Sites manual, by suitably qualified personnel.

6.11. Response to NSW Dep. of Primary Industries (NSW Office of Water)

The NSW Department of Primary Industries (**DPI**) - NSW Office of Water, provided a submission (ID 100349) (Ref OUT14/15847) dated 10th June 2014, with comments on groundwater and surface water licensing requirement, foundation design considerations, and Soil and Water Management Plan requirement.

The submission comments and UFWA responses are shown in Table 6.11.1 - Response to NSW Dep. Primary Industries (NSW Office of Water).

Table 6.11.1 - Response to NSW Dep. Primary Industries (NSW Office of Water)

Category	NSW Office of Water Submission Comments	UFWA Responses
Hydrology	(1) The EIS indicates water requirements over the 12 month construction period of 30ML. This is to cover concrete production, road construction and dust suppression. A number of water supply options have been identified however, a secure supply is yet to be determined. This represents a commercial risk to the proponent. The proposal to ensure all regulatory requirements are addressed prior to commencement of activities is supported. The NSW Office of Water advises the information provided in Annex A of Appendix 14 in relation to Part 2 and 5 licensing under the Water Act 1912 has been superseded due to commencement of water sharing plans for both groundwater and surface water. This has been more accurately interpreted in Section 3 of Appendix 14.	(1) Noted. The Proponent will further investigate its options for water sharing plans and temporary transfer of licence from existing licence holders in the area, or alternatively use tankers to import water from external sources.

Category	NSW Office of Water Submission Comments	UFWA Responses
Hydrology	(2) The Geotechnical Assessment indicated no groundwater was observed in the test pits (maximum depth of 3.5m) or boreholes (maximum depth of 20m) however groundwater levels may vary. The final footing design of either a gravity footing or anchored footing may alter the likelihood of groundwater being intercepted. If anchored footings are selected it is recommended an assessment be carried out on the. potential impacts of intercepting groundwater on existing groundwater users and groundwater dependent ecosystems. If appropriate, this assessment should be accompanied by suitable mitigation measures and will need to consider any licensing requirements under the Water Management Act 2000. Dewatering of less than 3ML/yr for construction will generally not require a water access licence, however it is recommended the proponent contact the Office of Water to confirm licensing requirements if groundwater will be intercepted.	(2) Noted. The Proponent will consult with the NSW Office of Water once the preliminary turbine foundation designs have been prepared.
Hydrology	(3) The development of a Construction Environmental Management Plan which is to include a Soil and Water Management Plan is supported in consultation with the Office of Water.	(3) Noted. The Proponent will prepare a Soil and Water Management Plan (SWMP) as part of the CEMP in consultation with NSW Office of Water. The Statement of Commitment has been updated accordingly.

Category	NSW Office of Water Submission Comments	UFWA Responses
Hydrology	(4) The proponent must obtain relevant licensing under the Water Act 1912 or Water Management Act 2000 from the NSW Office of Water before commencing any works which intercept or extract groundwater or surface water.	(4) Noted. The Statement of Commitment has been updated accordingly.
Hydrology	(5) The design of waterway crossings for access roads and cable installations, and any associated instream works is to be included within the Construction Environmental Management Plan. These designs are to be prepared in accordance with NSW Office of Water's "Guidelines for Controlled Activities on Waterfront Land".	(5) Noted. The Statement of Commitment has been updated accordingly.
Hydrology	(6) If rock anchoring is selected for wind tower foundations, the Office of Water requests a groundwater assessment be undertaken and endorsed prior to construction. This is to assess the risk of impact on existing licensed groundwater users and groundwater dependant ecosystems and provide suitable mitigation measures. Any necessary licensing requirements under the Water Management Act 2000 will also need to be obtained.	(6) Noted. The Statement of Commitment has been updated accordingly.

6.12. Response to Airservices Australia

Airservices Australia provided a submission (ID 100357) dated 1st April 2014, with comments on their aeronautical assessment of the Project in July 2011 and in consideration that there have been no amendments to the turbine locations and heights, their advice remains the same and they have no further comments regarding the EIS. The submission comments and UFWA responses are shown in Table 6.12.1 - Response to Airservices Australia.

Table 6.12.1 - Response to Airservices Australia

Category	Airservices Submission Comments	UFWA Responses
Aviation Safety	(1) At a maximum height of 1221m (4006ft) AHD the proposed Wind farm will not affect any sector or circling altitude, nor any approach or departure at any registered aerodrome in the area. It also will not affect any lowest safe altitudes (LSALTS) for air routes in the area. If applicable to the airport, no assessment was conducted in relation to any other procedures made available by another Part 173 Certified Designer. This proposed wind farm to a max height of 1221m AHD will not impact the performance of Precision/Non-Precision Nov Aids, HF/VHF Comms, A-SMGCS, Radar, PRM or Satellite/Links.	(1) Noted, UFWA will ensure the wind farm's maximum height is kept to 1,221m AHD, if there are any micrositing of the turbine locations prior to construction that would encroach above this maximum height, Airservices Australia will be notified of these changes and a further aviation assessment would be undertaken (if required). The Statement of Commitment has been updated accordingly.

7. Response to Community Submissions

Many of the community submission raised similar issues. For ease of reading, the responses to the community submissions have been packaged into categories to avoid unnecessary duplication of responses. The submission categories include: Landscape and Visual, Noise, Health, Fire / Bushfire, Environment, Flora & Fauna, Turbine Layout (Micrositing), Transmission Line Options, Electromagnetic Interference, Socio-Economic and Property Value, Electricity Price Subsidies, Traffic and Transport, Cumulative. The responses are shown in detail in sections 7.1 to 7.13 respectively.

7.1. Landscape and Visual

The responses to the community submissions about landscape & visual concerns are shown in Table 7.1.1.

Table 7.1.1 - Response to Community Submissions (Landscape and Visual)

LANDSCAPE AND VISUAL	
Submissions included (ID 97952, ID 98743, ID 98819, ID 98922, ID 99004, ID 99006, ID 99008, ID 100431) **[Please note that not every submission raised every issue, however for ease of reading all issues are addressed.]**	
Community Issues raised:	**UFWA Responses:**
Concerns raised with regard to the visual impact of the proposed development and suggestions that the view from privately owned property will be negatively impacted.	The visual impacts of the proposed wind farm were addressed at Chapter 9 of the EIS and a full landscape and visual impact assessment (LVIA), prepared by Green Bean Design, was provided at Appendix 6. The LVIA assessed the visual impacts and documented the process and results. It is important to note that the project is positioned in a relatively isolated location that is further than 2km from a non–project involved, identified dwelling. The LVIA was prepared in accordance with the Australian Wind Energy Association and Australian Council of National Trust's publication *Wind Farms and Landscape Values National Assessment Framework* (2007) (NAF) as well as the Draft NSW Wind Farm Guidelines 2011.

LANDSCAPE AND VISUAL	
	The LVIA determined that the landscape surrounding the project has an overall 'medium to high sensitivity' to accommodate change, and that the Landscape Character Areas (LCAs) within the 10 km viewshed represent landscape characteristics that are reasonably typical in the New South Wales Central Tablelands and the NSW/ACT Border Region. It has been noted that some recognisable characteristics of the landscape will be altered by the project and that visually prominent elements will alter some perceived landscape characteristics. However, the main characteristics of the landscape, patterns and combinations of landform, and land cover will still be evident. Photographic montages are provided at Figures 32 – 40 of the LVIA and indicate the visual impacts of the proposal on various locations, up to a distance of 10km from the turbines. Subject to any conditions of approval, the proponent would commit to implementing landscape treatments to screen and mitigate the potential visual impact of the project for individual neighbouring properties within an appropriate distance from the site, subject to consultation and agreement with individual property owners. Those dwellings identified within Table 17 of the LVIA, with an overall medium to high rating in relation to significance of visual impact are likely to be the first to address landscape mitigation measures with the proponent. Testing of the proposed visual mitigation measures will be undertaken after the measures have been implemented for the project, in order to assess and identify any residual impacts. An assessment of each potential residential view location indicated that: ▪ 37 of the 78 residential view locations have been determined to have a nil visual impact; ▪ 11 of the 78 residential view locations have been determined to have a low visual impact; ▪ 19 of the 78 residential view locations have been determined to have a low to medium visual impact; ▪ 5 of the 78 residential view locations have been determined to have a medium visual impact; and ▪ 6 of the 78 residential view locations have been determined to have a medium to high visual impact.

LANDSCAPE AND VISUAL	
	The six residential dwellings determined to have a medium to high visual impact are associated residences.
Suggestions that colouring the turbines and towers to blend with the environment so that the impacts may be reduced.	Visibility is addressed within the EIS and LVIA, and the visibility of the proposed wind turbines is found to be partially dependent on weather conditions. Chapter 5.1 if the LVIA details climatic and atmospheric conditions, with Figure 7 providing photos to depict visibility in various weather conditions, including clear blue sky, partly cloudy and fog/low cloud cover. Testing of a variety of turbine colours across Australian and internationally suggests that, given fluctuating weather and landscape conditions, off white is the most effective colour to reduce visual impact. It is unlikely that a more appropriate colour than off white will be found to 'blend' the turbines with the environment, when the sky colour is variable and unpredictable. The wind generator blades, tower and nacelle are to be treated/ painted with a non-reflective white, off white or light-grey colour to reduce glare and minimise blade glint.
Concern raised that the number of turbines is yet to be fixed and so the visual impact cannot be accurately assessed.	The number of turbines initially originally proposed was 59. This number was reduced as a consequence of the findings of the final flora and fauna assessment. Turbines numbered P2, P6 and P7 were removed due to the Conservation Agreement in place for the Box Gum Grassy Woodland project as part of the Commonwealth government's Environmental Stewardship program. As part of the adequacy review of this EIS, discussions between DoPI and the flora and fauna specialist have prompted the removal of P11, in order to reduce vegetation clearing for the project. The outcome has resulted in a proposal which now involves a maximum of 55 turbines.

LANDSCAPE AND VISUAL	
	The Landscape and Visual Impact Assessment was prepared in consideration of the proposal involving 59 turbines. As a consequence of the reduction of 4 turbines, the impact of the proposal is now reduced from that which was assessed. While the amended proposal involves a reduction in the total number of turbines, the assessment was carried out with regard to landscape and visual impact of the greater number of turbines originally proposed to ensure impact has been assessed at the maximum.
Concern raised that proposed ground lighting may disrupt night time view.	An obstacle marking and lighting assessment was undertaken in accordance with the guideline document - Obstacle Marking and Lighting of Wind Farms (CASA Advisory Circular AC139-18(0)). An assessment under these guidelines shows that night lighting of 25 of the proposed turbines may be required. This lighting design is subject to confirmation of the final turbine layout. If the wind turbines to be installed have a blade tip height lower than 150 m AGL, no obstacle lighting is necessary. If the wind turbines to be installed will have a blade tip height of 150 m or more AGL, obstacle lighting may be required. Visual impacts could be minimised by restricting the downward component of the light to either, or both, of the following: ▪ No more than 5% of the nominal intensity is emitted at or below 5° below the horizontal; and/or ▪ No light is emitted at or below 10° below the horizontal. The need for obstacle lighting for structures of this height is currently under review. It will also be reviewed at regular intervals by the proponent and, in the event that the CASA guidelines are revised such that night lighting is no longer required, then night lighting would not be installed, or switched off after installation.

LANDSCAPE AND VISUAL	
Concern raised that transmission lines will further negatively impact the view.	The LVIA assessed four proposed transmission line options. The potential transmission line corridors were assessed, and it was determined that the northern 500kV transmission line option would result in an overall *Low to Moderate* visual impact, while the southern 330kV transmission line options would result in an overall *Moderate* visual impact, with potential for high impact in certain locations. The southern transmission line options are no longer proposed and the northern transmission line option has been identified as preferred. Accordingly approval has been sought for the northern 500 kV transmission line corridor option only. The LVIA found that the proposed 500 kV transmission line to the north of the site would not be significantly visible from any surrounding project involved or non-project involved residential dwellings within or beyond the site due to a combination of topography and scattered tree cover. Some sections of the transmission line would be visible to motorists travelling along Abercrombie Road. However, there would be partial screening provided by roadside scattered tree cover. The LVIA confirmed that the proposed transmission line route would result in a lesser degree of visual impact than the formerly considered and assessed 300 kV transmission line corridors to the south due to: ▪ a shorter distance of constructed and visible transmission line; ▪ a significantly lower number of surrounding residential dwellings located within the vicinity of the transmission line; and ▪ a reduced requirement for vegetation clearing to establish a transmission line easement.

7.2. Noise

The responses to the community submissions about noise concerns are shown in Table 7.2.1.

Table 7.2.1 - Response to Community Submissions (Noise)

NOISE	
Submissions included (ID 98565, ID 98743, ID 98819, ID 98922, ID 99004, ID 99006, ID 99008) **[Please note that not every submission raised every issue, however for ease of reading all issues are addressed.**	
Community Issues raised:	**UFWA Responses:**
Submitters raised concern with regard to the increased noise which may occur as a result of the proposed turbines being located less than 5 times the rotor diameter abreast and 8 time the rotor diameter down wind.	SLR Consulting Australia have completed a Noise Impact Assessment for the proposal, utilising methodology and criteria supported by the South Australian Environmental Protection Authority (SA EPA) Environment Noise Guidelines for Wind Farms (February 2003), World Health Organization (WHO) limits, construction noise guidelines (DECC Interim Construction Noise Guideline 2009) and blasting impact. The Noise Impact Assessment provides: *"Simultaneous noise monitoring and wind monitoring was conducted at 8 locations during the period 7th June 2011 through to 24th June 2011 to determine baseline conditions and establish criteria for surrounding residential receivers.* *Noise predictions were made for receptors within a 6 km of a proposed WTG. WTG noise has been predicted using an indicative layout of 59 WTG's and an assumed mix of 3 turbine types and assessed against relevant criteria prescribed by the SA EPA Guideline and World Health Organisation (WHO) goals where appropriate.* *All non-project involved receptors were found to be below the relevant noise criteria. Some project involved receptors are predicted to slightly exceed the WHO noise criteria, however, these locations are used for a very limited part of the year only and it is*

NOISE	
	proposed to enter into a noise agreement regulating their use and that these will not be used should post construction noise testing definitively show an exceedance of the criteria. *The project is yet to select and finalise the WTG layout and WTG makes/models. Upon finalising the layout and WTG models a revised noise prediction and assessment will be completed in which the noise impact mitigation techniques listed in Section 9.3 will be investigated thoroughly to produce a fully compliant layout.* *WTG vibration levels have been evaluated and based upon overseas research available were found to be acceptable.* *Construction noise and vibration impacts have been assessed and the 'worst case' scenarios modelled were found to be generally acceptable.* *Blasting impact has been assessed and found to be acceptable. With a maximum instantaneous charge (MIC) of up to 20 kg, the airblast overpressure is anticipated to be below the acceptable level of 115 dB Linear for all existing residences. Similarly, vibration levels are anticipated to be well below the acceptable criteria."* UFWA have made several commitments with regard to noise as detailed within the Statement of Commitments provided at Chapter 24 of the EIS, and revised in this Report. The following commitments will ensure noise is limited and mitigation measures are in place. The following commitments relate to operational noise as included in Statement of Commitment (SoC) in Section 8: ▪ *SoC-6.1. When the final turbine model and layout are selected, prepare a revised Noise Impact Assessment (NIA). The NIA will demonstrate, through appropriate modelling and in accordance with the Environmental Noise Guidelines: WindFarms (SA EPA 2003), that the final turbine model and layout can meet the noise limits derived in accordance with those guidelines.*

NOISE	
	▪ *SoC-6.2. Prepare a Construction Noise Management Plan (CNMP) that forms part of CEMP. The CNMP will establish protocols and measures that include:* ▪ Mechanisms to prevent any unreasonable impact of construction noise on sensitive receivers. ▪ *Undertake construction activities associated with the Project that would generate audible noise at any non-involved residence during the standard construction hours as outlined below:* ▪ *Monday to Friday: 7:00am to 6:00pm* ▪ *Saturdays: 7:00am to 1:00pm* ▪ *Sundays: No construction* ▪ *In the event that it is required to undertake other audible works outside the above construction hours, prior approval will be obtained from the relevant authority.* ▪ *Ensure that any blasting complies with the ANZECC guideline. Ensure that during any blasting event the airblast overpressure must not exceed 115dB (Linear Peak) and ground vibration peak particle velocity must not exceed 5 millimeters per second (peak particle velocity) when measured at the nearest residential premise.* ▪ *SoC-6.3. Prepare an Operational Noise Management Plan (ONMP) as part of the OEMP, in consultation with EPA. The OEMP will be undertaken generally in accordance with the Environmental Noise Guidelines: Wind Farms (SA EPA 2003) and include the following provisions:* ▪ *ensure that operational noise levels will comply with the South Australia EPA Environmental Noise Guidelines principal acceptability criteria that the wind farm LA90 (10 min) noise should not exceed the greater of an amenity limit of 35 dBA or the pre-existing background noise by more than 5 dBA at each integer wind speed from cut in to rated power at any non-host property or residential receiver where*

NOISE	
	noise agreements (in accordance with Section 2.3 of the SA EPA Guidelines) have not been entered into with the property owner; ▪ *ensure that the operational noise levels comply with the World Health Organization (WHO) Guidelines for Community Noise of 45 dBA or the pre-existing background noise by more than 5 dBA (whichever is the higher) for any host property or residential receiver where noise agreements (in accordance with Section 2.3 of the SA EPA Guidelines) have been entered into with the property owner;* ▪ *during commissioning the actual received turbine noise level will be verified and determined through extensive monitoring;* ▪ *compliance monitoring, within one year of commissioning, against the noise limits;* ▪ *identification and implementation of best practice management techniques for minimisation of noise emissions where reasonable and feasible;* ▪ *measures to be undertaken to rectify annoying characteristics resulting from the operation of the project such as infrasound, tonality or adverse mechanical noise from component failure;* ▪ *procedures and corrective actions to be undertaken if non-compliance is detected (i.e. provisions for reasonable response time to alleged noise complaints and mitigation works); and* ▪ *Undertake routine noise monitoring, assessment and reporting at compliance critical locations.* ▪ *SoC-6.4. Implement the approved ONMP during the operation phase.* ▪ *In circumstances where undue turbine noise impacts are identified during operations (i.e. due to temperature inversion, atmospheric stability or other reasons) then an adaptive management measures will be implemented to achieve compliance with the applicable noise limits. This will include:*

NOISE	
	▪ *Receiving and documenting noise impact complaint through telephone hotline or other designated means.* ▪ *Investigating the nature of the reported impact.* ▪ *Identifying exactly what conditions or times lead to undue impacts.* ▪ *Operating selected turbines in a reduced 'noise optimised' mode during identified times and conditions (sector management).* ▪ *Providing acoustic upgrades (glazing, façade, masking noise etc.) to affected dwellings.* ▪ *Turning off turbines that are identified as causing the undue impact during identified times and conditions.*
Concern raised with regard to the increased noise which may result from the turbines being located within the wake of another turbine, and about the variable speed of turbines, which may result in thumping and beating sounds, unlike fixed speed turbines.	CSIRO Land and Water published A Planners Guide, 'Wind Resource Assessment in Australia' in 2003 (Coppin *et al),* which provides background to wind energy and acknowledges that wind is only one resource which must be considered in the development of a wind farm. Coppin provides that the role of a wind turbine is to extract energy from air, which then results in a wake of slower, more turbulent air behind the turbine. This wake is likely to have an impact when there is another turbine placed directly behind the first. Siting of turbines in a direct line is not in the best interests of UFWA. Not only would a direct line interrupt the airflow and result in potentially less energy yields but it would also result in significant wear and tear on the turbines. The noise impact of one turbine being located within the wake of another turbine appears to be due to the amplitude modulation of the aerodynamic noise from blades, which is referred to as a "swish" or "thump". Bowdler, D – 'Amplitude modulation of wind turbine noise: a review of the evidence', 1 July 2008, explores the evidence relating to amplitude modulation and summarizes how the totality of what people experience when listening to wind turbine noise is dependent on

operating modes, weather, and even the location of the listener with respect of the turbines and the wind. The review concluded:

> *"It seems probable that there are two distinct mechanisms in operation to create AM. The first is swish which is a function of the observer's position relative to one turbine. The second is thump which is due to turbine blades passing through uneven air velocities as they rotate. In the second case the uneven air may be due to interaction of other turbines, excessive wind shear or topography. These two mechanisms are entirely separate though it is possible that they interact.*
>
> *If this is the case there is little that can be done about swish but further research into thump would help to avoid excessive AM in future developments."*
>
> A report by Salford University commissioned by BERR concluded that *"the incidence of AM and the number of people affected is probably too small at present to make a compelling case for further research funding in preference to other types of noise which affect many more people."*

SLR Consulting have addressed the issue of excessive amplitude modulation in the response to submission 098565 and provide:

> *"There has been extensive and wide ranging study conducted by Renewable UK, which attempts to more accurately explain the phenomenon, its potential causes and highlights the difficulties in quantifying the phenomenon – particularly when there is appreciable distance between the turbines and the receiver.*
>
> *The submission implies that infrasound is similar to (or related to) the amplitude modulation of audible sound. This is a common misconception, especially as both terms use 'Hertz' as their unit of measurement. In an effort to clarify the situation, we provide the following advice:*
>
> *'Amplitude modulation' refers to the fluctuations of the overall (usually A-weighted) noise level. This fluctuation has its own frequency of modulation, which is usually at the blade pass*

frequency of the WTG, typically between 0.5 and 2 Hz. This is not an indication of the low frequency characteristics of the noise but a rate of change in overall loudness.

The 'beating' phenomenon is not synonymous with the 'thump' identified earlier and instead refers to where two or more sources have similar (but slightly differing) frequencies. For constant, pure tone noise sources, the small difference in frequency makes the overall noise level vary with a 'beat'. This phenomenon does not occur with broadband sources. WTG's are an inherently varying noise source, with their own rate or variation, which could be said to have its own 'beat'. Therefore the beat frequency referred to relates to where the variation in noise level from one WTG occurs at almost the same rate as another WTG and the two sources are at a maximum at the same time. How often this alignment occurs is the 'frequency of occurrence' but could also be called a 'beat frequency'. The alignment becomes less likely with an increasing number of turbines. With the natural variation of wind conditions on site, the alignment of turbines becomes increasingly unlikely as the rotational frequencies and phase differences between all the WTGs themselves are varying in nature.

Where the degree of amplitude modulation is typical, the overall degree modulation does not change with phase alignment of the two noise level waveforms. This is because the 'trough' of the waveform is also energetically summed, leading to an overall net increase in level, rather than an increase in the variation of the noise level. Furthermore, as the phase alignment between two noise level waveforms occurs only briefly, the increase in noise is momentary. As the waveforms shift to be out of phase, the noise level becomes more constant and almost does not modulate at all.

The claim that the NHMRC study, based on 10 WTGs is invalid does not reflect the true nature of large scale wind farm sites. Because of the offsets required between WTGs to get maximum output, the site takes up a very large area. This means that noise at a single location is mostly only due to the closest 6 to 10 turbines. The WTGs at greater distances contribute to the overall noise level but their variation of noise level does not contribute to the overall amplitude modulation.

NOISE	
	Finally, should conditions that increase the prevalence of excessive amplitude modulation occur, it would be possible to implement an adaptive management approach where turbines are put into a noise optimised mode during identified times and conditions (sector management).”
Concerned were raised with regard to infrasound.	The National Health and Medical Research Council (NHMRC) published a report in July 2010 titled Wind Turbines and Health, which provided that: *“there is no reliable evidence that sounds below the hearing threshold produce physiological or psychological effects”(Berglund 1995)* Dr Mark Diesendorf, the Deputy Director of the Institute of Environmental Studies at the University of NSW, provides: *“infrasound was a problem with older wind turbine technology”* (NSW Legislative Council 2009), and that infrasound is *“virtually undetectable at a range of 400 metres”* (NSW Legislative Council 2009). The Project will utilise modern wind turbine technology and is highly unlikely to result in any infrasound. An Independent Expert Panel established by the Massachusetts Department of Environmental Protection (MDEP) and the Massachusetts Department of Public Health (MDPH) found that “*There is insufficient evidence that the noise from wind turbines is directly (i.e. independent from an effect on annoyance or sleep) causing health problems or disease)”* (MDEP & MDPH 2012). The report findings showed that the levels of infrasound produced by modern wind turbines at distances as close as 68 metres are well below the levels required for non-auditory perception (feeling of vibration in parts of the body, pressure in the chest, etc.). Section 11.4.3 of the EIS considers alternate sources of infrasound and provides:

NOISE	
	An Australian study, Infrasound Measurements from Wind Farms and Other Sources (November 2010), was commissioned by Pacific Hydro to measure and compare infrasound levels from wind farms and common environment infrasound sources, both natural and man-made. The noise measurements were recorded for Pacific Hydro by an independent acoustic consulting firm, Sonus Pty Ltd. *Infrasound was measured at two of Pacific Hydro's Australian wind farms, Clements Gap in South Australia and Cape Bridgewater in Victoria (both while operating and while the turbines were switched off). Infrasound was also measured at a beach, a cliff top along the coastline, in the Adelaide CBD close to two busy roads, and in an Adelaide suburb in close proximity to a gas-fired power station.* *The methodology involved measurements being conducted below the ground surface in a test chamber. Testing confirmed that the levels of infrasound above the ground and within the chamber were the same in the absence of surface winds as when measuring a known source of infrasound.* *The results determined that infrasound is not unique to wind farms. Furthermore, the levels of infrasound produced by wind turbines is well below perception thresholds and is also below levels produced by other natural and man-made sources (Pacific Hydro 2010). One of the highest levels of infrasound that was recorded was at a beach.*

7.3. Health

The responses to the community submissions about health impacts concerns are shown in Table 7.3.1.

Table 7.3.1 - Response to Community Submissions (Health)

HEALTH	
Submissions included (ID 98565, ID 98994, ID 99004, ID 99006, ID 100431) **[Please note that not every submission raised every issue, however for ease of reading all issues are addressed.**	
Community Issues raised:	**UFWA Responses:**
Submitters raised concerns with regard to the potential health implications of living close to a wind farm.	Health impacts associated with living in close proximity to a wind farm were addressed in Chapter 11 of the EIS. Section 11.3.1 provides that the National Health and Medical Research Council (NHMRC) published a landmark study, titled 'Wind Turbines and Health (2010)', which tested the hypothesis that "*there are no direct pathological effects from wind farms and that any potential impact on humans can be minimized by following existing planning guidelines*". The NHMRC is the preeminent national body on health research and is regarded as producing 'gold standard' work. The study investigated scientific data and literature on the effects on human health and found that the hypothesis was tested positive. *"While a range of effects such as annoyance, anxiety, hearing loss, and interference with sleep, speech and learning have been reported anecdotally, there is no published scientific evidence to support adverse effects of wind turbines on health" (NHMRC 2010)."*

HEALTH	
	The World Health Organisation (WHO) provides a similar opinion, with the claim that *"Wind energy is associated with fewer health effects than other forms of traditional energy generation and in fact would have positive health benefits*" and "*In relation to all sources of energy, the health effects associated with wind energy are negligible"* (WHO 2004). The external Project referenced in the WHO study considers wind energy *"to have the lowest level of impacts (health and environmental), of all the fuel cycles considered"* (CIEMAT 1998 cited in WHO 2004). Section 11.4 of the EIS provides: *A key issue amongst the health concerns associated with wind farm developments is impacts relating to noise. Wind turbines produce mechanical noise from the motor gearbox, as well as aerodynamic noise, produced by wind passing over the blade of the wind turbine. As well as the general range of sound emissions, older wind turbines also generate infrasound (NHMRC 2010).* *The NHMRC Report noted that, "there is no reliable evidence that sounds below the hearing threshold produce physiological or psychological effects" (Berglund 1995 cited in NHMRC 2010). The Minnesota Department of Health (2009) found that "if functioning correctly, mechanical noise from modern wind turbines should not be an issue" (MDH 2009 cited in NHMRC 2010). Dr Mark Diesendorf, the Deputy Director of the Institute of Environmental Studies at the University of NSW, states that "infrasound was a problem with older wind turbine technology" (NSW Legislative Council 2009), and that infrasound is "virtually undetectable at a range of 400 metres" (NSW Legislative Council 2009).*

HEALTH	
	Section 11.4.5 provides detail with regard to vibroacoustic impacts on health, as shown following: *Scientific evidence details Vibroacoustic Disease as "the clinical manifestation of a systemic disease that develops after long-term exposure to noise (≥1 0 yr) which is characterized by large pressure amplitude (≥90 dB SPL) within the lower frequency bands (≤500 Hz)" (Branco & Rodriguez 1999).* *In relation to concerns regarding Vibroacoustic Disease, the NSW Legislative Committee (2009) found that "there does not appear to be any evidence to support the proposition that vibrations from wind turbines can cause this disease" (NSW Legislative Committee 2009). As discussed above, noise produced by wind turbines is less than 90 dB.* The EIS also provides detail with regard to other suggested causes of negative health impacts associated with wind farms, such as wind turbine syndrome, shadow flicker, electromagnetic impacts, impacts on psychological wellbeing and blade throw. Section 11.6 of the EIS details the proposed mitigation measures, including: ▪ *Provide accessible information on wind farm impacts including the benefits, and project details, process and updates.* ▪ *Install warning signs to alert the public against unauthorised site entry.* ▪ *Restrict access to the wind turbines and associated infrastructure to reduce personal injury and public hazards, including locked access to towers and electrical equipment, warning signs with postings of 24-hour emergency numbers, and fenced storage yards for equipment and spare parts.* ▪ *The wind generator blades, tower and nacelle are to be treated/painted with a non-reflective white or off white colour to reduce glare and minimise blade glint.* ▪ *Noise levels should comply with the applicable noise guidelines, unless an agreement is in place with the effected landowner(s), and in any case should not be more than the*

HEALTH	
	45dB(A) noise limit (for indoors) recommended by the World Health Organisation (WHO) publication Guidelines for Community Noise. ▪ *Shadow flicker at any dwelling should not exceed 30 hours per year unless an agreement is in place with the effected landowner(s).* ▪ *Wind turbines to be equipped with sensors that can react to any imbalance in the rotor blades and shut down the turbine if necessary.* ▪ *Regularly maintain and service all wind turbines.* *In relation to blade throw, a number of measures are proposed for the project. Each turbine model considered for this project would be certified against the relevant standards including:* ▪ *IEC 61400-23 [Wind turbine generator systems, Full-scale structural testing of rotor blades]; and* ▪ *IEC 62305-1 / 3 / 4 [Protection Against Lightning].* *Lighting protection systems are incorporated into the blade designed to reduce the risk of damage from lightning strikes to the blades. The safety systems are designed to initiate a shutdown of the turbine upon detection of failure.* *The operational and maintenance contracts of the turbines provide incentives to maximise the output of the wind farm. The maximum output is achieved through rigorous maintenance regime to ensure the turbines are operating at full efficiency, and this includes mitigating and repairing any degradation to the blades to keep generation at optimum levels.* *Additionally, the use of fencing and signage will discourage unauthorised access to the wind turbines, which would further reduce the risk of blade throw incidences.*

7.4. Fire / Bushfire

The responses to the community submissions about Fire / Bushfire concerns are shown in Table 7.4.1.

Table 7.4.1 - Response to Community Submissions (Fire / Bushfire)

Fire / Bushfire	
Submissions included (ID 98743, ID 98922) **[Please note that not every submission raised every issue, however for ease of reading all issues are addressed.**	
Community Issues raised:	**UFWA Responses:**
Concern raised with regard to aerial firefighting opportunities as a consequence of the proposed wind farm.	As a result of increased wind farm development in Victoria and NSW, the Victorian Country Fire Authority (**CFA**) and the NSW Rural Fire Service (**RFS**) have extensively studied the implications of wind farms on fire, and the possible mitigation measures to reduce the risk. The Draft NSW Wind Farm Guidelines specify that assessment must detail bushfire hazards and risk, including recommending consultation with the NSW Rural Fire Service. Section 16 of the EIS addressed the fire impacts associated with the proposed wind farm and Section 13 addressed aeronautical impacts. An Aeronautical Impact and Night Lighting Assessment was prepared by Aviation Projects, attached to the EIS and marked Appendix 9. Aviation Projects provided that "*the proposed development does not impose any significant risk to normal flying operations, provided aircraft are operated in compliance with applicable regulatory and operational control requirements and with the application of good airmanship".* While aerial fire-fighting operations may potentially be restricted in the vicinity of the proposed wind farm, Aviation projects note that there is still a valid ground-based means of fighting bushfires.

Fire / Bushfire	
	Consultation with the RFS Development Assessment and Planning Officer, NSW (Mr. Doug Stevens) was undertaken and Mr. Stevens provided that he considered wind farms to be an advantage to RFS operations generally, because they required a cleared area, a water supply, and provided improved access to the property. The CFA have published Emergency Management Guidelines for Wind Energy Facilities (Version 4 - February 2012), which provide wind energy facility operators with CFA's preferred safety measures. CFA recognise firefighting limitations within and adjoining a wind farm footprint; including limitations on aerial support, as well as access and egress conditions. In the planning, design and development of wind farms CFA provides that wind turbines should be located a minimum distance of 300 metres apart. This provides adequate distance for aircraft to operate around a Wind Energy Facility, given the appropriate weather and terrain conditions. "*Fire suppression aircraft operate under "Visual Flight Rules". As such, fire suppression aircraft only operate in areas where there is no smoke and during daylight hours. Wind turbines, similar to high voltage transmission lines, are part of the landscape and would be considered in the incident action plan*." The Indicative Site Plan submitted and identified at Figure 11, maintains around 300m distance between almost all of the turbines. Currently there are approximately 6 turbines which are located with a distance of less than 300m from another turbine and they provide a minimum distance of around 260m, 269m and 295m. The indicative layout is subject to minor alteration and does not provide the final determined location of each turbine. UFWA have provided a Statement of Commitments in association with the proposed wind farm and include a commitment that "*Once the turbine locations are finalised, the proponent will notify the RAAF Aeronautical Information Service (AIS) of the location and height details of the turbines."* Further consultation with local fire authorities will occur prior to construction of the project and as detailed within Table 10 of the EIS, part of the environmental management plan, a bushfire risk management plan will be developed based on the guidelines *Planning for Bushfire Protection 2006*.

Fire / Bushfire	
	Further, the proponent commits to consult with the RFS during periods of high fire danger, and generally to ensure the RFS are familiar with the site. Section 16.4 of the EIS further addressed the mitigation measures proposed and provides that mitigation measures will be detailed in a Fire Management Plan (FMP). The FMP will be prepared in consultation with State and local RFS, as well as the Department of Planning and the Environment, pursuant to the provisions of *Planning for Bushfire Protection 2006*. The FMP will address safety, communication, site access and emergency response protocols. Other mitigation measures detailed within the EIS, which are to be implemented as part of the project include: ▪ *"Consultation and training with the NSW Rural Fire Service in regard to the adequacy of bushfire prevention measures to be implemented on site during construction, operation and decommissioning.* ▪ *Consultation with the NSW PWS on the management of bushfires in the adjacent National Park* ▪ *Consult with the RFS during periods of high fire danger* ▪ *Inform RFS and any aerial agriculture operators on the location of the wind turbines, transmission lines and monitoring masts.* ▪ *Development of workplace health and safety protocols to minimise the risk of fire for workers during construction and during maintenance in the control room and amenities.* ▪ *On-site vegetation management during construction and operation to minimise potential sources of fuel.* ▪ *Re-organisation of construction activities during periods of high fire danger, including ceasing use of explosives, and management of hot work activities such as welding or cutting.* ▪ *Use of materials and equipment during operation that minimise the likelihood of fire.* ▪ *Maintenance of vehicles to minimise sparking from exhaust systems.*

Fire / Bushfire	
	▪ *Automatic shutdown of any overheating turbine mechanism.* ▪ *Shut down of turbines during a bush fire in the area.* ▪ *Lightning protection on each turbine.* ▪ *Under-grounding of electrical and communication cables where practicable.* ▪ *Access to adequate water supply, with water access points be located in safe, easily identifiable areas and accessible in all weather conditions by equipment up to 15 tonnes* ▪ *A turning circle with a minimum radius of 10 metres will be provided for fire appliances at all water access points.* ▪ *The location and number of tanks or other water supply points will be determined in consultation with the NSW RFS.* ▪ *Careful storage and handling of flammable materials and ignition sources brought onto the site, as per manufacturer's instructions.* ▪ *Storage of appropriate fire fighting equipment onsite during the construction phase, ensuring that a minimum of one person on site is trained in its use.* ▪ *Periodical inspection of overhead transmission easements to monitor any regrowth of encroaching vegetation.* ▪ *Vehicle turn-around facilities to be provided at every turbine tower site.* ▪ *At least 5-metres wide internal access tracks to be provided that are driveable and permanently clear of vegetation for heavy fire-fighting equipment up to 15 tonnes* ▪ *Provision of wind turbine access tracks that continue onto adjacent paddocks and are not dead-ended.* ▪ *Implementing a wide fuel break in accordance with RFS, Council and State Government recommendations to slow the spread of fire.* ▪ *Any vegetation plantings to have low fire resistance.* ▪ *Micro-siting of the turbines following approval will consider bushfire risk."*

7.5. Environment

The responses to the community submissions about Environment concerns are shown in Table 7.5.1.

Table 7.5.1 - Response to Community Submissions (Environment)

ENVIRONMENT	
Submissions included (ID 98565, ID 98743, ID 98922, ID 99006) **[Please note that not every submission raised every issue, however for ease of reading all issues are addressed.**	
Community Issues raised:	**UFWA Responses:**
Submitters raised concern with regard to potential loss of soil moisture in the wake of the proposed turbines (soil drying effect).	The nature of wind farms is that they take energy from the wind, and as such, it can be expected that some localised weather changes would result. The question is whether the changes are significant and have any negative impacts on surrounding properties. There are many claims with regard to the effect of wind farms on local weather and several studies in America and Europe have indicated that the area immediately surrounding a wind farm may be slightly warmer at night and slightly cooler during the day compared to the rest of the region. Somnath Baidya Roy, Professor of Atmospheric Science at the University of Illinois first proposed a model in 2004 to describe the impact of wind farms on local climate. In 2009 Roy collaborated with Neil Kelley, a principal scientist at the National Wind Technology Centre, who had collected temperature data for a seven week period in 1989 at a wind farm in San Gorgonio, California. This union provided the first observation-based evidence of daytime cooling and nocturnal warming effects of wind turbines. Roy identified that the temperature change was dependent on the mixing of warm and cool air in the atmosphere in the wake of the turbine rotors. As the rotors turn they create turbulence, which pulls upper-level air down towards the surface, while surface air is pushed up, causing the warmer and cooler air to mix.

Roy provided that the nocturnal warming effect could be used to provide some frost protection or even slightly extend the growing season in farm areas, such as the Midwestern USA.

The researchers provided that one strategy to mitigate the impact on local weather was to locate the turbines in areas that already have a turbulent atmosphere so the consequence of turbulence from the rotors would be minimal.

Roy provides that although observed data on wind speed and turbulence in and around operational wind farms are readily available, information on other meteorological variables do not exist in the public domain.

> *"The only available information is temperature data from a wind farm at San Gorgonio, California, collected during June 18–August 9, 1989 (Fig. 1). To the best of our knowledge, this is the only meteorological field campaign conducted in an operational wind farm. The wind farm consisted of 23-m-tall turbines with 8.5-m-long rotor blades arranged in 41 rows that were spaced 120 m apart."*

Accordingly, scientific data in relation to local climate impacts from wind farms are primarily the result of simulations and more research is needed over extended periods. The San Gorgonio example relates to a wind farm comprising very small turbines, located much closer to the ground that current examples and accordingly the effect could be considerably different.

This claim was supported in an article published in the Climate Dynamics Journal of 1 January 2013 titled, Diurnal and seasonal variations of wind farm impacts on land surface temperature over western Texas. L. Zhou et al. provided:

> *"Recent studies have investigated the possible impacts of wind farms on local to global weather and climate. Although debates exist regarding the regional to global scale effects (Keith et al. 2004; Kirk-Davidoff and Keith 2008; Sta Maria and Jacobson 2009; Barrie and Kirk-Davidoff 2010; Wang and Prinn 2010), modelling studies agree that wind farms can significantly affect local-scale meteorology (Baidya Roy et al. 2004; Adams and Keith 2007; Baidya Roy and Traiteur 2010; Baidya Roy 2011; Fielder and Bukovsky 2011). However, these studies are based*

primarily on numerical simulations of regional global models, which due to lack of observations, crudely represent the effects of wind turbines by explicitly increasing either surface roughness length or turbulence kinetic energy. Evidently, more realistic model parameterizations should be developed and modelling results should be validated against the observations."

As discussed by Roy, any impact of wind farms on local agriculture could be beneficial through the reduction in frost and extended growing season. This is a topic which has been further explored by researchers from the Ames Laboratory and the University of Colorado, who spent several months during the Spring of 2010, investigating corn fields in the Midwest to research the interaction of wind turbines on surrounding farmland.

Gene Takle and Julie Lundquist used wind measuring instruments to determine the intensity of turbulence and recorded the intensity of turbulence from near the earth's surface to well above the top tip of the turbine blade. In addition to wind turbulence, plant moisture and temperature readings were collected.

"The data collected so far indicates that the turbines may offer more than the sustainable production of electricity, they may also benefit surrounding crops by helping them stay cooler and dryer, fight off attack from fungi and toxins and improve CO2 extraction.

The instruments placed upwind and downwind recorded persistent increased turbulence up to a quarter of a mile from the turbine. According to Takle and other studies, the turbines channel air downwards, increasing airflow to surrounding crops. This is thought to speed up natural processes such as heat exchange - keeping crops cooler during hot days and stirring up air in the lower atmosphere to make things a little warmer at night, which could help to ward off early frosts in the Fall. The process could also increase carbon dioxide extraction from the air and soil.

More turbulence may also help dry out dew that settles on crops and therefore limit the time window that fungi toxins have to establish on leaves. Drier crops could also negate the need to artificially dry corn or soy at harvest time.

The researchers say that it's early days for the study but results obtained so far indicate that turbines could have a subtle impact on crop yield."

Further research into this topic is contained within the American Meteorological Society, Crop Wind Energy Experiment – Observations of surface-layer, boundary layer, and mesoscale interactions with a wind farm, dated May 2013.

Rajewski et al provides that the goal of the Crop Wind Energy Experiment (CWEX) was to develop a basic understanding of how wind farms change the energy and crop production systems.

The CWEX was launched to investigate if turbines create measureable changes in microclimate over crops. An extensive field programme was carried out during the summer of 2010, with further investigations in 2011. The results *"provided valuable insights into the exchanges over a surface that has been modified by wind turbines".*

The investigation was inconclusive and found that the research undertaken provided a good basis for a more comprehensive measurement program, which was planned for the summer of 2014.

Consideration of available research, consistently points to inconclusive outcomes, dependant on the consideration of additional research, yet to be completed. There remains no evidence that wind turbines cause any significant detrimental impacts on local weather and climatic conditions.

While there is possible indication that the local weather and climate could be slightly impacted by a wind farm, the possibility exists that the impact on local and immediate agriculture could be beneficial and not detrimental, as discussed by Roy and Takle.

It is also noted that, of the thousands of turbines installed across Australia over decades, there has been little if any recorded negative impacts on surrounding weather or local microclimate conditions.

ENVIRONMENT	
Concerns were raised that the loss in soil moisture would impact the Abercrombie River, and have flow on impacts on the Lachlan River and the Murray River and associated water catchments.	As discussed above, the research with regard to this topic remains inconclusive and so any flow on effect is not able to be accurately considered until it can be established that there is any local impact. Even if the wind farm did reduce soil moisture in the area immediately surrounding turbines, this area is such a small fraction of the Abercrombie River catchment, the impact is considered to be negligible. Hydrological impacts are discussed within Table 7.7.1, and provide that Chapter 20 of the EIS addresses the requirements in relation to the Abercrombie River and provide that Environmental Resources Management Australia (ERM) Pty Ltd was commissioned by UFWA to assess the potential hydrological impacts in relation to the project. The full report undertaken by ERM Pty Ltd was attached to the EIS and marked Appendix 14.
Concerns were raised with regard to the potential for wind farms to impact global climate change.	Findings from the Department of Climate Change (2008) and the International Energy Agency (2007) indicate that "the high emissions intensity of energy use in Australia is mainly the result of our reliance on coal for electricity" as detailed within Section 6.2.1 of the EIS. Chapter 25 describes that the proposed wind farm would generate up to 550,833 Megawatt hours (MWh) of clean, renewable energy per year and displace 535,961 tonnes of greenhouse gases. Claims that wind farms negatively impacting global climate are not scientifically justified. As discussed above, research has suggested that wind turbines may have an impact on localised weather and climate as a consequence of the mixing of warm and cool air in the atmosphere in the wake of the turbine rotors. Research remains inconclusive and suggests that any local climate impact is very minor in nature and not necessarily present in locations with existing turbulent conditions. There is no indication of any wide spread negative impact on climate. To the contrary, wind farms displace greenhouse gases emitted from fossil fuel energy sources such as coal, and as such, assist in reducing the harmful and well supported negative impacts of human induced climate change.

7.6. Flora and Fauna

The responses to the community submissions about flora and fauna concerns are shown in Table 7.6.1.

Table 7.6.1 - Response to Community Submissions (Flora and Fauna)

FLORA AND FAUNA	
Submissions included (ID 98565, ID 98743, ID 99006, ID 99008) **[Please note that not every submission raised every issue, however for ease of reading all issues are addressed.**	
Community Issues raised:	**UFWA Responses:**
Submitters raised concerns with regard to the Abercrombie National Park, which is segmented by the proposed wind farm and may impact avian inhabitants.	The EIS addressed the proximity of the proposed wind farm to Abercrombie National Park, along with the Ecological Assessment prepared by Anderson Environmental Consultants (AEC), attached to the EIS at Appendix 8A, which addressed the potential impact on avian inhabitants. The AEC's assessment provided that "*overall the biodiversity impact risks in relation to wind turbine collisions are usually insignificant compared to the threats associated with other activities and processes. Erickson et. Al. (2001) found that wind turbine collision deaths probably represent 0.001% to 0.02% (1 out of every 5000 to 10000 avian fatalities) of the annual collision fatalities in the United States. Australian studies of wind farms such as Pacific Hydro's Codrington Wind Farm – Victoria which opened in 2001 recorded very low numbers of bird and bat fatalities (4 birds and one bat between 2001 and 2003). Behavioural studies undertaken for this wind farm also indicated that water birds are adept at avoiding the wind farm sites (Fact Sheet 8 – Wind Farms and Bird and Bat Impacts, AusWEA's).*" Environmental Resources Management Australia (ERM) were engaged to prepare a Supplementary Ecological Report, which was attached to the EIS at Appendix 8B and addressed the biodiversity issues raised by DoPI. The assessment addressed the potential impact of the project on native

FLORA AND FAUNA	
	vegetation, birds and bats and the results indicated that the project would not have a significant impact on any threatened ecological communities or species. Following the public exhibition of Paling Yards EIS, ERM were engaged to address relevant community submissions and prepared a Bird and Bat Monitoring Strategy, which provides: *"The potential impacts of wind turbines on birds and bats have been detailed within the Supplementary Ecology Report (SER) (ERM 2014a). The main potential impacts on both bird and bat species from an operational wind farm are:* ▪ *direct mortality associated with rotor collisions and collisions with other associated infrastructure including towers, guy wires and transmission lines; and* ▪ *indirect impacts relating to habitat loss through the effects of installation of wind farm facilities.* *As described by ERM (2014a), collision risk for birds depends on a wide range of factors as summarised below:* ▪ *high collision rates are particularly evident for large soaring raptors, near areas used by large numbers of roosting or foraging birds, migratory flyways or local flight paths or areas with high bird use. No large concentrations of birds were recorded in the Study Area and the area is not known to form part of any significant migratory routes for large numbers of birds. Wedge-tailed Eagles were frequently observed within the Study Area, soaring at RSA height and may be susceptible to rotor strike; and* ▪ *bird collision risk may vary on a seasonal basis due to bird migration or breeding. No birds were recorded exhibiting direct movement at height and no birds listed as Migratory under the EPBC Act were recorded although it is recognised that birds that may visit the Study Area in some years based on spatial and temporal flowering patterns and other resource availability."*

FLORA AND FAUNA	
	"This Bird and Bat Management Strategy (BBMS) identifies appropriate survey methodologies and provides guidance on bird and bat management. It outlines general guidelines on reporting and evaluation and acts to ensure that the Bird and Bat Management Plan (to be developed based on the principals outlined in this strategy) will be consistent with the following guidelines: ▪ *AusWEA Wind Farms and Birds: Interim Standards for Risk Assessment (BL&A 2005);* ▪ *Best Practice Guidelines for the implementation of Wind Energy Projects in Australia (Clean Energy Council 2013); and* ▪ *Environment Protection and Heritage Council National Wind Farm Development Guidelines – Public Consultation Draft – October 2009.* *This BBMS provides a framework that can be used for development of a detailed Bird and Bat Management Plan for the operational phase of the wind farm once approved. It outlines an indicative and adaptive program for monitoring the effects of each turbine and provides a sampling strategy specific to the first two years of operation. The details of ongoing monitoring (after the first two years of operation) will be established based on the recommendations of the initial monitoring."*
Concern was raised with regard to the potential impact on surrounding wildlife and eco-system as a consequence of the clearing involved for development of the wind farm.	As discussed above AEC carried out an Ecological Assessment to determine the presence or potential presence within the Project Site of any threatened species, populations or endangered ecological communities as listed under the *Threatened Species Conservation Act 1995* (TSCA) and the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBCA). The findings of the report were that the project would be unlikely to have significant impact on any communities, populations or threatened species listed under the TSCA or EPBCA. No Endangered Ecological Communities or threatened species listed under either the EPBCA or TSCA were detected within the project site during the field surveys. However, the project was still

FLORA AND FAUNA	
	assessed in consideration of each threatened species with potential to occur in the area and in accordance with the criteria contained in the EPBCA and the 7-Part Tests of Significance pursuant to the TSCA. The results further concluded that the project is not likely to result in a significant impact on any endangered ecological community or flora species and accordingly, not considered a controlled action. ERM carried out an assessment included in the SER, to address the requirements of the DoPI adequacy review letter, dated 9 May 2013, including biodiversity issues relating to methodology, avoidance, assessment of impacts, bird and bat impact, mitigation and proposal. The ERM SER addressed the biodiversity issues raised using information collected during a 5 day field survey as well as subsequent data analysis. The conclusion found: *"The potential impact of the Project to native vegetation, birds and bats has been assessed. The results indicate that the Project would not have a significant impact on any threatened ecological communities or species. The majority of the Development Footprint consists of improved pasture with scattered Eucalypt trees and small patches of derived native grassland around the periphery. Measures have been provided to manage impacts, including avoidance and mitigation measures. An offsets package is proposed to be development that will compensate for the residual impacts to biodiversity."* ERM have addressed relevant community submissions from public exhibition and prepared a Bird and Bat Monitoring Strategy and draft Biodiversity Offset Strategy which will enable continued monitoring of the Project throughout consent, construction and operation, if approved. Refer to Appendix 5 of the Report for details of the ERM response to submissions and strategy documents.

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Concerns were raised with regard to the potential impacts on the local platypus, trout and other local marine life within the Abercrombie River both during construction and operation of the wind farm.

Section 3.4.1 of the Appendix 8A of Original EIS, included a literature review and background searches, which revealed that a number of threatened species listed under the *Environmental Protection and Biodiversity Conservation Act 1999* and *Threatened Species Conservation Act 1995*, had the potential to occur within the Project site.

Table 6 provides two fish which may occur in the area, being the Murray Cod and Macquarie Perch.

Table 6: Potential Threatened Fauna species - Fish

Common Name	Scientific Name	EPBC	TSC	Data
Murray Cod	*Maccullochella peelii peelii*	V		EPBC search states species or species habitat may occur within Upper Lachlan LGA.
Macquarie Perch	*Macquaria australasica*	E		EPBC search states species or species habitat may occur within Upper Lachlan LGA.

Key: CE= Critically Endangered, E= Endangered, V=Vulnerable.

The NSW Government Industry & Investment included the following matters within the DGRs in order to reflect the view of the Fisheries Division:

Fisheries issues:

> *"- Details of any direct impacts to the Abercrombie River. If any is proposed or likely, then a Test of Significance for Macquarie Perch should be included*
>
> *- Proposals for erosion and sediment control across the site to ensure no impact upon water quality in the Abercrombie River*
>
> *- Details of all access tracks to be upgraded or constructed (both at the wind farm site as well as along the transmission line corridor). Include a map showing these sites in relation to watercourses (creeks and rivers)*

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	- The proposed erosion and sediment control practices for the construction of the transmission line component that address its linear nature *- Details of surface runoff and water quality management works proposed for access roads and tracks that will be used to construct and provide ongoing access to the transmission lines* *- Details of the management of any wastewater that is produced during construction and operational stages of the development* *- Details of proposed measures to prevent and manage fuel spills* *- Details the measures, responsibilities and reporting for the management of major incidents involving water quality* *- Demonstrate that the proposed water quality management measures for construction and operational stages of the project are based on SCA-endorsed Current Recommended Practices (CRPs). Where proposed measures are not based on SCA-endorsed CRPs, it needs to be demonstrated that the measures will achieve the same water quality outcomes* *- The sustainability of systems and proposed management measures over the long term, including delineation of ongoing maintenance responsibilities* *- Determine whether a neutral or beneficial effect on water quality of surface will occur during the construction and operational stages of the project."* Chapter 20 of the EIS addressed the requirements in relation to the Abercrombie River and provided that ERM was commissioned by UFWA to assess the potential hydrological impacts in relation to the project. The full report undertaken by ERM was attached to the EIS and marked Appendix 14. Chapter 20 of EIS provides: *"A wind farm in a rural area can potentially impact on the hydrology of the area, notably on streams, drainage lines, dams and water catchments.*

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	This hydrological assessment identifies potential water-related risks and appropriate management and mitigation measures to ensure that construction and operation of the project would not result in any unacceptable hydrological impacts." *"The site is characterised by a prominent elevated plateaux landscape dissected by deep valleys. More than 50 ephemeral first order watercourses are present within the site, including the Abercrombie River. The watercourses flow generally towards the south and west, to the Abercrombie River."* *"The Abercrombie River is present directly south of the site, flowing along the site's south-eastern boundary. It is 130 km in length and commences from Mount Werong in the east to the Wyangala Dam near Cowra to the west. The river is a tributary of the Lachlan, a significant river in central New South Wales, which it joins at Wyangala lake.* *The Goulburn-Oberon (Abercrombie) Road crosses the Abercrombie River in the Abercrombie Gorge."* Chapter 7 of the ERM hydrological assessment provides detail with regard to the projects ability to maintain a neutral or beneficial effect on water quality, pursuant to the provisions of Clause 28(3) of the REP. *"Through appropriate management of construction activities including erosion and sediment control, hazardous materials storage and handling, and spill emergency response and clean-up procedures, potential water-related impacts would be contained on-site and prevented from reaching watercourses. These measure will be outlined in a details Soil and Water Management Plan to be prepared post consent and before commencement of construction."*

7.7. Turbine Layout (Micrositing)

The responses to the community submissions about turbine layout concerns are shown in Table 7.7.1.

Table 7.7.1 - Response to Community Submissions (Turbine Layout - Micrositing)

TURBINE LAYOUT (Micrositing)	
Submissions included (ID 98565) **[Please note that not every submission raised every issue, however for ease of reading all issues are addressed.**	
Community Issues raised:	**UFWA Responses:**
The submitter raised concern with regard to the layout presentation of the turbines within the Environmental Assessment due to the lack of topographic detail.	The indicative wind turbine layout plan was prepared for up to 55 turbines. The indicative layout was prepared by the proponent using wind modelling software and reflects the site constraints and the typical spacing required for the wind turbines currently under consideration. The indicative locations shown on the layout plan, reflect the current understanding of the preferred location for the turbines, given the currently proposed turbine models, knowledge of the wind characteristics and the presence of significant vegetation. The indicative wind turbine layout was based on a number of inputs, principally: ▪ The site boundary; ▪ Topographical data; ▪ Wind speed data collected on and off site; ▪ Dwelling locations; ▪ The location of significant native vegetation and native fauna; ▪ Noise assessments at key receiver points; ▪ Visual amenity impacts (including shadow flicker at the nearby dwellings); and ▪ Typical spacing required.

TURBINE LAYOUT (Micrositing)	
	As detailed within the EIS, the turbine layout has been revised on several occasions since 2010, as a consequence of specialist studies, as well as stakeholder input. Layout amendments have included: ▪ Selection of the northern transmission line as the least impact option; ▪ Removal of the southern substation; ▪ Removal of turbine P26 to reduce potential noise impact for landowners; ▪ Removal of turbines P2, P6, and P7 in response to the flora and fauna assessment; ▪ Removal of turbine P11, associated crane pad and access track; ▪ Relocation of turbine P10 by 184m, reduced access track; ▪ Relocation of turbine P13 by 70m, reduced access track and less clearing for crane pad; ▪ Relocation of turbine P14 by 86m, reduced access track and less clearing for crane pad; ▪ Micrositing of the turbines to minimise local impacts; ▪ Changes to the location of several access tracks to further utilise the existing farm tracks and reduce the infrastructure footprint; ▪ More underground cabling to provide more efficient transfer of electricity and reduce the infrastructure footprint; ▪ A new access road to separate the wind farm construction vehicle traffic from the access used by the project involved landowners; ▪ Selecting a smaller wind turbine envelope size for specific locations to reduce potential noise and shadow flicker impact for the project involved landowners; ▪ New substations to reduce length of overhead powerlines; and ▪ Selection of powerline poles for the northern transmission line route to minimise and avoid where possible the removal of native vegetation.

TURBINE LAYOUT (Micrositing)	
	If project approval is granted, this proposed layout will be refined at the detailed design stage and once the final turbine has been selected so as to achieve the best energy generation from the selected turbine model. It is estimated that this may result in individual turbines being moved approximately 25 to 100 metres from the currently nominated location on the site plan. A geotechnical assessment undertaken for the project found that the site topography comprises 'plateau' and 'hillcrest' areas at an elevation of between 900 and 1065 metres surrounded by steeply sloping gullies and creek lines that flow to the Abercrombie River. The gently sloping plateau areas are generally cleared and used for grazing, while the more steeply sloping areas are generally heavily vegetated. Topography was a primary consideration in siting of the turbines, not only with regard to the availability of wind, but also as a consequence of the desire to leave as much vegetation undisturbed as possible.
Concern raised with the location of the proposed turbines being less than 5 times rotor diameter abreast and 8 times rotor diameter downwind.	The submission referrers to a 'rule of thumb' with regard to turbine spacing, however, this 'rule of thumb' varies from source to source and would appear to relate to situations where the wind is blowing from a narrow range of wind directions. Coppin *et al* Wind Resource Assessment in Australia – A Planner Guide, CSIRO Land and Water 2003 references a 'rule of thumb' spacing of 2 blade diameters across and 10 diameters downwind between rows. However, it concludes that 2 across is "visually" very close and 4 blade diameters across seems to be an accepted value. As addressed within Section 6.6.4 of the EIS, the subject site has a total site area of 3,900 hectares, with approximately 1% of the land being directly developed for the proposed turbines, access tracks and supporting infrastructure. Siting of the turbines has been in consideration of the minimum distances required for operational efficiency.

TURBINE LAYOUT (Micrositing)	
	In addition to the noise related conditions contained within the Statement of Commitments, UFWA have committed to the development of a Noise Management Plan, which will ensure noise is limited and mitigation measures are in place, if the location of turbines to one another create additional noise. While we note the submitters concerns with regard to proximity of the turbines to one another, it is important to consider that the subject site is significant in size and the placement of the turbines could have been at greater distances, however, the proposed location of each turbine has been as a consequence of detailed investigation of the site's topography and wind modelling to ensure optimum efficiency. As discussed above, siting of turbines in a direct line is not in the best interests of UFWA. Not only would a direct line interrupt the airflow and result in potentially less energy yields but it would also result in significant wear and tear on the turbines.

7.8. Transmission Line Options

The responses to the community submissions about transmission line option concerns are shown in Table 7.8.1.

Table 7.8.1 - Response to Community Submissions (Transmission Line Options)

TRANSMISSION LINE OPTIONS	
Submissions included (ID 99008, ID 100431) **[Please note that not every submission raised every issue, however for ease of reading all issues are addressed.**	
Community Issues raised:	**UFWA Responses:**
Concerns were raised about the proposed powerline options, and also concerns about why some other powerline options were not assessed.	The project proposes an overhead powerline connection of approximately 9-10km to a proposed off-site electrical Terminal Station, which would connect to the Mt Piper to Bannaby 500kV transmission line (the 'north-eastern options'). Two options were considered for overhead connection to the existing power transmission network. These were a southern and northern connection, with each including sub-options. The North-eastern option, involving an overhead powerline connection of approximately 9-10km to a proposed off-site electrical Terminal Station that would connect to the Mt Piper to Bannaby 500kV transmission line that passes north-east and east of the site. The Southern option considered a 55km overhead powerline connection to the approved Crookwell 2 Wind Farm substation which connects to the Gullen Range to Bannaby 330kV transmission line. Through the technical assessment and consultation process, it was established that the north eastern transmission line is the least impact route and the most feasible options. On this basis, approval is only being sought for the north eastern options. The proposed transmission line will include the following:

TRANSMISSION LINE OPTIONS	
	▪ A proposed corridor of approximately 9-10km in length and 70 metres in width, with the aim to avoid removal of native vegetation as much as possible. ▪ Transmission line power poles will be spaced approximately 200 to 250 metres apart. It is proposed that the spacing is flexible so as to minimise impacts on environmental features such as waterways. ▪ Power poles will be located no closer than 40 metres to any watercourse, except where these are only first order "minor streams" as defined by the Water Management Act 2000. ▪ A permanent access track will not be constructed along the length of the transmission line. Instead, access will be gained informally across grassed paddocks using the closest route from existing tracks/roads nearby. The routes which are selected will have the least potential for environmental impact. ▪ There will be no need to construct watercourse crossings for the purpose of vehicle access, whether permanent or temporary, during transmission line construction. This is on the basis that in situations where the lines cross a creek, cables can be pulled from one side of a creek to the other without needing to drive across the creek. The proposed transmission line would be constructed over a maximum of eight or nine parcels of land (depending on the sub-option chosen). The parcels are generally cleared farmland, and the line route has been designed to avoid removal of native vegetation where possible. Although the northern transmission line route has multiple sub-options, the grid connection negotiations with the Transmission Authority will continue to identify the most cost-effective grid connection configuration and transmission line corridor, and if the final preferred location is significantly different to the two sub-option locations proposed in the EIS, UFWA will undertake additional assessment of that location and associated corridor and seek an amendment to the development consent.

7.9. Electromagnetic Interference

The responses to the community submissions about electromagnetic interference concerns are shown in Table 7.9.1.

Table 7.9.1 - Response to Community Submissions (Electromagnetic Interference)

ELECTROMAGNETIC INTERFERENCE	
Submissions included (ID 99004) **[Please note that not every submission raised every issue, however for ease of reading all issues are addressed.**	
Community Issues raised:	**UFWA Responses:**
Concerns were raised relating to the potential impact on electronic communications (i.e. phone, wi-fi, TV) from electromagnetic interference.	Concerns about impacts arising from EMI around the turbines are addressed in the Electromagnetic Interference Impact Assessment prepared by Garrad Hassan at Appendix 11 of the EIS. The assessment found that in relation to radio and TV reception: ▪ FM signals may be susceptible to interference from wind turbines, which can be mitigated by the installation of a high quality antenna. ▪ Interference to analogue television could potentially occur at particular houses (listed in the report), however, analogue television has being phased out across Australia, and if digital reception is marginal, residents in the vicinity of the site may be eligible to receive access to the Government-funded satellite television service to view free-to-air television. Mitigation measures proposed to address EMI include: ▪ For any interference with fixed point-to-point links, either the relevant turbines or the communications tower may be slightly relocated, where possible. ▪ Realigning or relocating the householder's TV antenna. ▪ The installation of an external antenna or more directional and/or higher gain antenna at the affected household;

ELECTROMAGNETIC INTERFERENCE	
	▪ The installation of cable/satellite TV at the affected household; and ▪ Installation of a TV relay station. ▪ A person with portable device moving a short distance to a new or higher location until the signal strength improves. In general, Very High Frequency (VHF) and Ultra High Frequency (UHF) band radio signals, and digital voice based technologies such as cellular phones (often called 3G or NextG mobiles) are essentially unaffected by wind farm development. This includes land mobile repeaters, radio, and the audio component of analogue television, and mobile phones.

7.10. Socio-Economic and Property Value

The responses to the community submissions about Socio-Economic and Property Value concerns are shown in Table 7.10.1.

Table 7.10.1 - Response to Community Submissions (Socio-Economic and Property Value)

SOCIO-ECONOMIC AND PROPERTY VALUE	
Submissions included (ID 97952, ID 98743, ID 98920, ID 98922, ID 98994, ID 99004, ID 99006, ID 99008) **[Please note that not every submission raised every issue, however for ease of reading all issues are addressed.**	
Community Issues raised:	**UFWA Responses:**
Concern raised in relation to a reduction in property values, particularly for lifestyle properties.	The submitted Environment Impact Assessment (EIS) and associated Socio Economic Impact Assessment prepared by ERM addressed the issue of property value associated with the proposed wind farm. However, concern has been raised that the information provided does not detail relevant or credible research in relation to the impact of wind farms on property values. Section 8.3.2 of the EIS considered property values within the 'Indirect Impacts' section of the assessment and referenced a 2006 study by Henderson and Horning Property Consultants, which looked at wind farms and property values over a 15-year period. The study assessed 78 property sales around the operating Crookwell wind farm between 1990 and 2006, and found no impact of the wind farm on property values close to the site. A separate study by the NSW Department of Lands in 2009 looked at properties located near eight wind farms and found no evidence that wind turbines caused property values to drop, or increase at a slower rate than comparable properties. The report found that wind farms "do not appear to have negatively affected property values in most cases". The report also found that "no reductions in sale price were evident for rural properties or residential properties located in nearby townships with views of the wind farm". Further reference was made to a land evaluation report, which was presented to Pyrenees Shire Council, Victoria in August 2012. As home to one of Australia's largest wind farms, Waubra, the

SOCIO-ECONOMIC AND PROPERTY VALUE	
	report considered property prices from 2010 to 2012 and found that residential properties in the Waubra area increased in value by 10.1 percent during the period, an increase which was the largest of any town in the shire. Additional investigation has now been undertaken to explore the effect that wind farm visibility has on property values. McCarthy, I.; Balli, H. O. 2014. Wind farms and residential property values, *International Journal of Strategic Property Management 18(2): 116-124* provides a study, which examines the effect that wind farm visibility has on residential property values using a hedonic regression model. The study area was Ashhurst, New Zealand, where the township comprises approximately 900 dwellings and is located within 8 km of two separate wind farms, comprising a total of 189 turbines (103 x 660Kw, 31 x 3MW, 55 x 1.65MW). The two wind farms were developed between 1998 and 2007 and the analysis used 945 open market house sales that occurred between 1995 and 2008. The methodology adopted provides that the price a house sells for depends on its unique combination of physical, location and environmental characteristics. Distance to turbines was not considered a variable in the model as all houses are sited within 2.5 to 3.5km from the closest turbine. The viewshed was determined at a radius 8km from the wind farm, established by Hoen, B. 2006, in a study which concluded that there was no statistically significant relationship between sale price of residential property and view of, or distance to, the wind farm. This study is addressed in greater detail following. Another study, which adopted a radius of 8km from the wind farm as the outer limit of the viewshed was Sterzinger, *et al.* 2003.

SOCIO-ECONOMIC AND PROPERTY VALUE	
	The visual impact was studied by McCarthy, I.; Balli, H. O. 2014 using GIS viewshed analysis and field inspection. The models in each case indicated that the turbines located between 2.5km and 6km from the township had no significant impact on property value. It found that *"the results indicate that the Tararua and Te Apiti turbines had no significant impact on sale price of Ashhurst residential property*." There have been several studies into this topic over the last decade, the most extensive of which Hoen *et al.* (2011), based on almost 7,500 dwellings sales within 16km of 24 existing wind farms in nine different states in the United States. The study involved four models and extensive field work to ensure accurate view variables, considering both turbine view and vista. They concluded that neither view of the turbines nor the distance of the home to the turbine has a significant effect on house price sales. Hoen, B. (2006), conducted an earlier study which considered 280 bona fide residential property sales in the United States, using a hedonic regression model and concluded that in the community studied, there was no statistically significant relationship between sale price of residential property and view of, or distance to, the wind farm. One study which indicates some correlations between distance from a wind farm and value, involved the analysis of 1,052 property sales in Cornwall, United Kingdom (Sims and Dent (2007)), however, the study concluded that other variables, not included in the analysis may be the main driver of price. A further study in relation to Cornwall investigated 199 property sales between 2000 and 2007 since the construction of the wind farm. Sims *et al*. (2008) used GIS and site visits to gather data on distance to turbines and turbine visibility from the front and rear of the house on each lot, also considering vistas for each sale and found no relationship between the number of wind turbines visible and property value.

SOCIO-ECONOMIC AND PROPERTY VALUE	
	Having considered the EIS, ERM assessment and available research in relation to dwelling prices, it would appear that property values will not be negatively affected by proximity to, or view to the proposed wind turbines.
Concern raised that DoPI requirements, as outlined in a letter dated 18 April 2012, were not addressed: *"Consider any potential impacts upon property values consistent with the draft guidelines, including properties within 2km."* In addition, reference was made to the Draft NSW Wind Farm Planning Guidelines, which provides: *"Property Value* *The potential for a proposed wind farm to impact on the value of surrounding properties that do no host the wind farm facility, including properties within 2km of a proposed wind turbine should be considered."*	All properties within 2km of any proposed wind turbine are associated with the Paling Yards project. The Landscape and Visual Impact Assessment (LVIA) considered the *Draft NSW Wind Farm Guidelines* (Draft Guidelines), which set out a comprehensive framework for the assessment of landscape and visual impacts including residential dwellings within a 2km distance of any proposed wind turbine. It is important to note that there are no non-project involved, identified residential dwellings within 2km of any proposed wind turbines. For those properties located outside a 2km radius of any proposed turbine, the previous considered research indicates an established viewshed of 8km in relation to any wind farm development. There is no evidence to suggest property prices will be negatively impacted by the proposed wind farm and the research of McCarthy and Balli (2014), Hoen *et al.* (2011), Sims *et al*. (2008), Sims and Dent (2007), Hoen, B. (2006) and Sterzinger, *et al.* (2003) indicate no reduction in property value within the 8km viewshed of a wind farm within any of the localities investigated. The submitted EIS and LVIA provide consideration of any dwellings within a 10km viewshed and provide a total of 48 residential dwellings are located within the stipulated viewshed. Pursuant to the provisions of Oberon Local Environmental Plan 2013, the majority of the land within the viewshed is zoned E1 National Parks and Nature Reserves or RU1 Primary Production and provides for a minimum lot size of 100 hectares. The stipulated minimum lot size confirms that there is little opportunity for land fragmentation or significant development within the locality in the short to medium term. Oberon LEP was commenced on 20 December 2013 and accordingly, provides a recent and current decision of the Council to maintain the 100 ha minimum lot size and rural landscape of the area.

SOCIO-ECONOMIC AND PROPERTY VALUE	
	Consideration of the zoning and minimum lot size confirms that there is unlikely to be any significant increase in the number of dwellings located within the 10km viewshed of the proposed wind farm and so there is little opportunity for the proposal to effect property value, when subdivision and development potential is unlikely to result in any substantial increase in dwellings in the short to medium term.
Concern raised that property value was addressed at Chapter 8.2.3 'Indirect Impacts', and not considered a direct impact.	The submitted EIS identifies direct impacts of the proposal at section 8.3.1 and identifies a number of direct economic impacts, including; ▪ design and development of the project; ▪ construction of the project; ▪ construction and commissioning of the project; and ▪ expenditure and employment associated with the management, operation and maintenance and decommissioning of the project. Some direct impacts for the local economy are also identified, including; ▪ employment; ▪ capital investment; and ▪ land use and revenue. The Socio Economic Impact Assessment prepared by ERM emphasises that the value of rural land in the area surrounding the site is determined by a range of economic factors such as commodity prices, interest rates, and the supply of land and /or availability of similar land for sale. Therefore, the establishment of the project on rural lands would be only one consideration in determining land value and accordingly, property value would be an indirect impact and not a direct impact. It is important to consider the findings of relevant research, discussed above, within the EIS and ERM report, which found no correlations between property value and proximity to a wind farm.

SOCIO-ECONOMIC AND PROPERTY VALUE	
Concern raised why the socio-impact report prepared by ERM did not address property value in more detail and why a study of all properties within a 10km radius was not carried out. The submission further questioned the relevance of the studies referenced in the EA, which were considered too old (2003).	In accordance with the requirements of the Department of Planning and Infrastructure Checklist, dated 18 April 2012, UFWA were required to *"Consider any potential impacts upon property values consistent with the draft guidelines, including properties within 2km."* In addition, the Draft NSW Wind Farm Planning Guidelines require the assessment of property value and "*The potential for a proposed wind farm to impact on the value of surrounding properties that do no host the wind farm facility, including properties within 2km of a proposed wind turbine should be considered."* ERM carried out an assessment in relation to property value, in consideration of the requirements of DoPI and the Draft NSW Wind Farm Planning Guidelines, which both require assessment of the impact on properties within 2km. In this instance, all of properties within 2km of a wind turbine are associated with the proposal.
Concern raised that there may be loss of tourism to the area as a result of Paling Yards Wind farm and the resultant financial impact for the local tourism operators.	Section 8.3.2 of the EIS addressed the issue of tourism impacts and provides that the project has the potential to increase local tourism and correspondingly increase expenditure on local services. It found that "large numbers of tourists visit wind farms every year in Australia, including: ▪ 50,000 visitors per year to Codrington Wind Farm in Victoria, ▪ 30,000 visitors in three months to the Windy Hill Wind Farm in the Atherton Tablelands, and ▪ 400-500 people to an open day at the existing Crookwell Wind Farm" (AusWEA, 2003). Crookwell 1 Wind Farm in NSW is advertised by both Oberon Tourism and NSW Tourism websites as one of the 'top tourist activities' in Crookwell. These figures indicate that the local tourism market, particularly local accommodation providers, could in fact benefit from the development of the proposed wind farm.

SOCIO-ECONOMIC AND PROPERTY VALUE	
Concern raised with regard to the potential road widening, which may involve private land and suggested that any road widening upon private land should result in financial compensation.	It is important to note that any proposed road widening, would involve the consent of the land owner and could not be carried out without the written consent of the subject land owner. URS Australia Pty Ltd (URS) was commissioned by UFWA to assess the transport related impacts arising from the project. The Transport Impact Assessment identifies and considers the traffic impact of the project both during the construction and operational phases. It also identifies the likely measures required to improve conditions of the access routes to the site. The transport requirement for the identified 'worst-case scenario' for OD vehicle movements, taking into account the requirements of all assessed wind turbine manufacturers, is therefore defined as follows: ▪ Maximum OD Vehicle Length: 64.4 metres ▪ Minimum Height Clearance: 6.6 metres ▪ Minimum Road Width: 5.5 metres ▪ Maximum slope gradient: 6% ▪ Maximum slide inclination: 2% A number of haulage route options have been identified for OD vehicles between Port Kembla and the site, and between the Port of Newcastle and the site. URS advised that a detailed Transport Management Plan, in consultation with local councils and RMS, should be developed to outline the finalised transport details and include management and mitigation measures for the project. URS recommended that this document be prepared before the construction phase of the project, to form the foundations for all traffic related activities for the project. GTA Consultants (GTA) were commissioned by UFWA in October 2014 to further investigate the suitability of the proposed (oversize) heavy vehicle access route and the site access points on Abercrombie Road.

SOCIO-ECONOMIC AND PROPERTY VALUE	
	Further investigations were undertaken by GTA as part of the assessment, using additional data provided by possible suppliers, with the following revised 'worst case scenario' defined: ▪ Maximum OD Vehicle Length: 66.5 metres ▪ Minimum Height Clearance: 5.5 metres ▪ Minimum Road Width: 5.5 metres ▪ Maximum Road Gradient: 6% ▪ Maximum Road Crossfall: 2% As part of the route investigation, GTA undertook a "drive-through" and video recording of the route and liaised with the RMS Special Permits team to confirm the sections of the identified route that have been already approved and deemed appropriate for wind farm haulage and/or other oversize load requirements. The field investigations were conducted on Tuesday, 28 October 2014 to identify potential areas of concern and take measurements wherever necessary. GTA have confirmed that all heavy vehicle activity associated with the proposal will be to and from the site via Abercrombie Road to the north. It is not anticipated that any heavy vehicles will use Taralga Road, and as such, Taralga Road will not require upgrade.
Concern raised with regard to loss of future income as a consequence of the wind farm, i.e. loss of tourism market and loss of soil moisture, which would result in higher agriculture related costs.	As discussed above, it is likely that the development of the wind farm may result in increased tourist activity within the region as a consequence of the significant number of visitors every year wind farms attract. The matter of soil moisture and the impact of the wind farms is detailed in Section 7.6, with research inconclusive in respect of local climate change as a consequence of wind turbines.

7.11. Electricity Price

The responses to the community submissions about electricity price concerns are shown in Table 7.11.1.

Table 7.11.1 - Response to Community Submissions (Electricity Price)

ELECTRICITY PRICE	
Submissions included (ID 97952, 98565, ID 98994) **[Please note that not every submission raised every issue, however for ease of reading all issues are addressed.**	
Community Issues raised:	**UFWA Responses:**
Concern raised that electricity prices would be increased.	Chapter 6 of the EIS details the Project Justification, including: ▪ Climate Change ▪ Renewable Energy ▪ Wind Power Context ▪ Community Attitudes ▪ Project Benefits ▪ Consideration of Alternatives Chapter 6 contains a strategic assessment of the justification for the project and discusses the environmental, economic and social benefits, as well as exploring alternatives to the project in relation to type, location and scale. Sections 6.3.2 and 6.3.3 of the EIS address the Australian and NSW context and provides: *"The Renewable Energy Target (RET) scheme outlines the Australian Government's commitment to reducing greenhouse gas emissions and expanding the use of renewable sources from 2020 and beyond. On 20 August 2009, the Renewable Energy (Electricity) Amendment Bill 2009 was passed in the Commonwealth Parliament, which expanded the MRET (Mandatory Renewable Energy Target) scheme into a single national scheme,*

ELECTRICITY PRICE	
	called the RET. This scheme places a legal liability on wholesale purchasers of electricity to proportionately contribute towards the generation of renewable energy (Sustainability Victoria, 2010). In June 2010, the Government passed an enhanced RET scheme, which created new categories for renewable energy to encourage commercial scale energy development. *The aim of the RET is to ensure that "20 per cent of Australia's electricity comes from renewable sources by 2020" (Commonwealth of Australia, 2013). The RET achieves this by "the creation of online certificates by eligible renewable energy sources based on the amount of electricity in megawatt hours (MWh)" and "placing a legal obligation on liable entities (usually electricity retailers) to purchase and surrender a certain amount of these certificates each year" (Clean Energy Regulator,2012). The RET places an obligation on electricity retailers and large users of electricity to purchase 20% of their electricity from renewable energy sources by 2020 (Minister for Climate Change, Energy Efficiency and Water, June 2010).* *On 1 January 2011 the RET split into two separate schemes, and the 'Large-scale Renewable Energy Target' (LRET) and the 'Small-scale Renewable Energy Scheme' (SRES) became effective. The LRET encourages large scale energy generation to be produced using technologies such as hydro, biomass, solar, tidal and wind power.* *The LRET will drive investment in renewable energy projects like wind farms, commercial solar and geothermal, which will deliver the majority of the 2020 target.* *The annual targets for the LRET increase each year up to 41,000 GWh by 2020 (DCCEE 2010).* *To achieve this target, Australia will require significant investment in renewable generation.* *Billions of dollars of investment of additional wind generation capacity will be required to meet the RET target by 2020 (Infigen Energy, 2012, Origin Energy, 2013). Wind power remains the renewable technology leader in cost competitiveness and is expected to play a significant role in meeting the large scale target.*

ELECTRICITY PRICE	
	In NSW, more than 90% of electricity is generated from coal, and one third of NSW's total greenhouse gas emissions are due to the generation of electricity (NSW Government 2010b). Most of NSW's electricity is sourced from black coal fired power Stations. *Governments have recognised that renewable energy sources should be encouraged in order to reduce the greenhouse gas emissions resulting from increased generation. In lieu of the RET legislation, the NSW government introduced the draft NSW Renewable Energy Target (NRET) in 2007. This scheme required 10% of NSW's electricity to be sourced from renewable energy by 2010, and 15% by 2020 (NSW Government 2006).* *The NSW scheme's target, which applied to all electricity retailers required electricity retailers to purchase 10% of their electricity supply from accredited renewable generation sources (NSW Government 2006)."* A move towards meeting renewable energy targets by 2020 requires a significant investment in power generation from alternative sources. The Clean Energy Council provides that wind power is currently the cheapest source of large-scale renewable energy and in 2013, Australia's wind farms produced over a quarter of the country's clean energy. On a general level, the addition of extra electricity generating capacity, such as the Paling Yards Wind Farm, is expected to add to supply and therefore have a moderating effect on prices. Wind power supplied 4 per cent of Australia's overall electricity during 2013, with $1.5 billion of new investment in wind power, which was almost double that in 2012. The Climate Institute Policy Brief – Electricity Prices: The Facts, provides: *"Australian electricity prices have risen over recent years and will continue to rise in coming years, with or without a price-tag on pollution. However, despite the recent increases, when adjusted for inflation, electricity prices are about the same as they were 25 years ago. Compared to other countries, Australia still enjoys very low electricity prices, with the average household paying around half as much as households in other developed countries."*

ELECTRICITY PRICE	
	"The existing 20 per cent Renewable Energy Target (RET), which is supported by both the Government and the Opposition, currently accounts for a relatively small fraction of weekly energy bills – around $1.25 a week for the average Sydney household. The RET is also a very minor factor behind current electricity price rises, accounting for around 10 per cent of the regulated price rise in NSW between 2009/10 and 2012/13. The RET is projected to unlock $19 billion in new investment in clean energy and create tens of thousands of new jobs in the process." The renewable energy target at the current time is under review, with a variety of options publically canvassed. If and when this review leads to any legislative change, the current policy setting and support for renewable remain unchanged.

7.12. Traffic and Transport

The responses to the community submissions about Traffic and Transport (Including Road Upgrades) concerns are shown in Table 7.12.1.

Table 7.12.1 - Response to Community Submissions (Traffic and Transport)

TRAFFIC AND TRANSPORT	
Submissions included (ID 98743, ID 98922, ID, 99006) **[Please note that not every submission raised every issue, however for ease of reading all issues are addressed.**	
Community Issues raised:	**UFWA Responses:**
Concerns raised for unsuitability of roads between Taralga and the site for large transport vehicles through the winding and narrow section of this road.	The Project is not proposing to use the road between Taralga and the site for the transport of plant and equipment by heavy and over-dimensional vehicles, however may be used by light vehicles for access to the proposed development during construction and operation. A minor increase in light vehicle traffic would not impact road condition or safety.

7.13. Cumulative

The responses to the community submissions about cumulative (geographic dispersion) concerns are shown in Table 7.13.1.

Table 7.13.1 - Response to Community Submissions (Cumulative)

CUMULATIVE	
Submissions included (ID 98565) **[Please note that not every submission raised every issue, however for ease of reading all issues are addressed.**	
Community Issues raised:	**UFWA Responses:**
One submission raised concerns with regard to the geographic dispersion of wind farms as a consequence of the placement of several wind farms in certain geographically suitable locations.	The cumulative effects are discussed within the EIS at Chapter 21 and describe the proposed location in the NSW Central Tablelands and NSW/ACT Border Region, which has been identified as highly suitable for wind turbines and the generation of renewable energy. Paling Yards is identified in one of the NSW Governments designated renewable energy precincts (Precinct 4), where several wind farms are located/ proposed. The precincts have been identified due to their suitability for the technology. Two proposed wind farms are located within 30km of Paling Yards, and are identified as Golspie Wind Farm and Taralga Wind Farm. Any other wind farm, either proposed or approved, is located greater than 30km from the subject site. The generally anticipated cumulative impacts associated with wind farms include flora and fauna impacts, and visual impacts. As a consequence of the closest wind farm being 25km from the subject site, it is not anticipated that there will be any cumulative impacts with regard to these matters. The submitter relates geographic dispersion specifically to the amount of wind in the precinct and the direct impact on multiple wind farms in the locality. Section 6.2.3. of the EIS addresses the role wind energy plays in the total energy network and provides:

CUMULATIVE	
	Considerable research is underway within the energy industry to improve the management of different types of energy generators as part of the overall modern power generation network. For example, improvements in wind forecasting can increase the ability of grid operators to schedule and accommodate generation from wind, whilst reducing the generation from polluting sources of base load generation. Furthermore, wind generation can be combined with other renewable sources such as hydroelectricity to improve its ability to supply base load power when required. Additionally, advances in energy battery technologies also offer the potential for short term storage of energy to be utilised when the wind is not blowing. Wind power is seen as a key component of a modern energy network that also includes solar, hydro and gas. *As technology advances, the role of wind power in Australia's energy mix is increasing. The University of Melbourne Energy Research Institute team has established an organisation, Beyond Zero Emissions, a non-profit, independent climate change solutions research and advocacy group that has developed the Zero Carbon Australia 2020 Project. The Zero Carbon Australia 2020 Project is a "costed, detailed blueprint for a transition of Australia to a Zero Emissions Economy by 2020 using proven, commercialised technology" (University of Melbourne, 2010).* While there will not always be ideal wind incidence to produce maximum output, the University of Melbourne has found that at least 15% of the installed wind capacity would always be producing power, with the same reliability as conventional 'base load' power.

8. Revised Statement of Commitments

The revised Statement of Commitment (**SoC**) has been prepared to accommodate additional mitigation tasks recommended by consultants working on the project, and to also incorporate the comments provided by government agencies as part of the public exhibition submission process.

The SoC in Table 8.1.1 - Revised Statement of Commitment, outlines a comprehensive list of mitigation and control measures to avoid or minimise potential environmental impacts from the Project through the Project life cycle. Each of the mitigation tasks are proposed for one or more specific phase(s) of the Project, the phases are classified and designated as:

- Detail Design and Pre-Construction phase (P)
- Construction and Site Restoration phase (C),
- Operation and Monitoring phase (O), and
- Decommissioning and Site Rehabilitation phase (D)

The Proponent has the responsibility for delivering the SoC either directly or through its contractual structure for the relevant commitments.

Table 8.1.1 - Revised Statement of Commitment

SoC No.	Issue / Impact Description	Commitment / Mitigation Task	Project Phase
1.0	**General**		
1.1	Minimising harm to the environment	Ensure that micrositing or any minor changes to the Project do not create any material increase in overall environmental impact. In the event of any significant changes to the proposed wind turbine layout, an updated noise assessment and visual impact assessment will be submitted prior to construction.	P
1.2	Compliance with Statutory Requirements	Ensure that Paling Yards Wind Farm activities are compliant with all relevant environmental requirements, and ensure all necessary licences and permits are obtained and kept up to date as required through the different phases of the development.	P / C / O / D

SoC No.	Issue / Impact Description	Commitment / Mitigation Task	Project Phase
2.0	**Pre-Construction Compliance**		
2.1	Pre-Construction Compliance Report	Prepare and submit a **Pre-Construction Compliance Report** (**PCCR**) for each stage of the Project to the Secretary of DoP&E at least two weeks prior to commencement of construction of that stage (or such later time agreed to by the Secretary of DoP&E). The PCCR will include details of the compliance with all pre-construction conditions of approval that are relevant for the specific stage(s) of the Project.	P
2.2	Construction Environmental Management Plan	Prepare a **Construction Environmental Management Plan** (**CEMP**) for each stage of the Project, in consultation with Office of Water, Office of Environment and Heritage, Sydney Catchment Authority, and submit it as a draft for approval to the Secretary of DoP&E at least two weeks prior to the commencement of construction of that stage (or such later time agreed to by the Secretary of DoP&E). The CEMP will address the construction impacts of the relevant stage of the Project including the specific matters set out below, and outlining the roles and responsibilities of those involved in the implementation of the control measures. The CEMP as approved by the Secretary of DoP&E, will be implemented in each stage of the construction phase of the Project.	P / C
3.0	**Pre-Operational Compliance**		
3.1	Operation Environmental Management Plan	Prepare an **Operation Environmental Management Plan** (**OEMP**) in consultation with Office of Water, Office of Environment and Heritage, Sydney Catchment Authority, and submit it as a draft for approval to the Secretary of DoP&E at least one month prior to the commencement of operation (or such later time agreed to by the Secretary of DoP&E). The OEMP will address the operational impacts of the Project including the specific matters set out below, and outlining the roles and responsibilities of those involved in the implementation of the control measures. The OEMP as approved by the Secretary of DoP&E, will be implemented in the operational phase of the Project.	C / O

SoC No.	Issue / Impact Description	Commitment / Mitigation Task	Project Phase
4.0	**Socio-Economic**		
4.1	Effect on local economy	Full time jobs and contractors for the construction and future decommissioning will be sourced locally where economical and if the skills and available labour exist within the community.	C / O / D
4.2	Economy and livelihoods	Assess the viability of conducting aerial agricultural operations on properties adjacent to the site, particularly by the use of helicopters. In the event the immediate neighbouring landowner(s) would require aerial agriculture spraying of their land adjacent to the Project and there is an increase in cost associated with the proximity to turbines, the Proponent will cover the reasonable cost increase for the aerial agriculture activity. The landowner seeking compensation for the cost increase must demonstrate and justify this increase with previous records.	O
4.3	Community Consultation	Develop and maintain a community consultation and engagement program aimed at: ▪ Providing the community with factual information about the Project; and ▪ Gathering feedback from the community and stakeholders about their concerns and interest, which can be subsequently addressed in the approvals process. A dedicated email address, website and free call 1800 number will be available and responded to for the life of the Project.	P / C / O / D
4.4	Community Consultative Committee	Establish a **Community Consultative Committee (CCC)** in accordance with the Draft Guidelines. The purpose of the CCC is to provide a forum for discussion between the Proponent, the community, Council and other stakeholders about the Project, if the Project is approved. The CCC would provide a forum for ongoing communication with the community during the life cycle of the Project, the frequency of the CCC meetings is expected to be more regular during the Construction phase.	P / C / O / D
4.5	Community Enhancement Fund	Contribute an annual monetary contribution of amount of $1,900 (adjusted annually to changes in the CPI) per operating turbine forming part of the Paling Yards Wind Farm. These annual contributions will be paid into the Oberon Council **Community Enhancement Fund** (**CEF**) [to be established by Oberon	O

SoC No.	Issue / Impact Description	Commitment / Mitigation Task	Project Phase
		Council] that forms part of the **Voluntary Planning Agreement** (**VPA**) which will fund local projects within a radius of 50km of the Paling Yards Wind Farm within the Oberon Local Government Area. UFWA proposes that the local projects which will eligible for funding from the CEF will be projects aimed at: ▪ Enhancing any aspect of the local environment including, but not limited to, ameliorating any impacts from the Paling Yards Wind Farm; or ▪ Providing any community service or facility.	
5.0	**Visual**		
5.1	Visual impact to nearby properties	Undertake screening planting in locations agreed between the Proponent and local landowners within 5km of the proposed turbines where the planting is seen as effective and is desired by the landowner to limit the view to the proposed wind turbines. It will involve a variety of dense native vegetation, including both trees and shrubs, and will be carried out at the cost to the Proponent. The maintenance and upkeep of the planted vegetation is the responsibility and at the expense of the respective landowner.	C / O
5.2	Visual impact to nearby properties	The wind generator blades, tower and nacelle will be treated / painted with a non-reflective white or off white colour and matt finish to reduce glare and minimise blade glint.	C
5.3	Visual impact to nearby properties	No advertising, signs or logos will be mounted on turbine structures, except those required for safety purposes.	P / C
5.4	Visual impact to nearby properties	Substations, site control building and facilities will be designed and constructed sympathetically with the nature of the locality, and landscaped to minimise direct views from roads and residential dwellings.	P / C
5.5	Visual impact to nearby properties	Transmission line route selection process will avoid sensitive view locations and loss of existing vegetation where possible.	P / C

SoC No.	Issue / Impact Description	Commitment / Mitigation Task	Project Phase
5.6	Visual impact to nearby properties	Transmission lines infrastructure angle positions will be selected in strategic locations (where possible) to minimise potential visual impact and to provide a maximum setback from residential dwellings and road corridors, and use of tree or shrub planting where deemed necessary between view locations and the transmission line.	P / C
5.7	Visual impact to nearby properties	Suitable component materials with low reflective properties will be selected for the substation and transmission lines.	C
5.8	Visual impact to nearby properties	The height of earth stockpiles will be restricted to minimise visibility from outside the site.	C
5.9	Visual impact to nearby properties	Cut and fill for site tracks will be minimised and disturbed soils will be revegetated as soon as practicable to ensure effective cover is achieved.	C
5.10	Visual impact to nearby properties	Consult with local residence and authorities to plan and implement the reasonable options for planting screening vegetation in the vicinity of nearby residences and along roadsides to ameliorate any identified visual impacts from turbines and associated infrastructure.	P / C / O
5.11	Visual impact to nearby properties	Suitable storage areas for materials will be selected with minimum visibility from residences and roads, with plant screening used where necessary.	C
5.12	Visual impact to nearby properties	Activities that require night time lighting will be minimised, and low lux (intensity) lighting designed with the light projecting inwards will be used where necessary to minimise glare at night.	C / O / D
5.13	Visual impact to nearby properties	Should obstacle lighting be required, the lighting will comply with CASA standards to minimise unnecessary light spill. The downward component of light will be restricted to either, or both, of the following: ▪ Such that no more than 5% of the nominal intensity is emitted at or below 5° below the horizontal; and ▪ Such that no light is emitted at or below 10° below the horizontal.	O

SoC No.	Issue / Impact Description	Commitment / Mitigation Task	Project Phase
5.14	Cumulative visual impact to nearby properties	Should obstacle lighting be required, the flashing of obstacle lights of wind farms within close proximity will be synchronised to each other (wherever possible) to minimise visual impact.	O
6.0	**Noise**		
6.1	Operational Noise	When the final turbine model and layout are selected, prepare a revised **Noise Impact Assessment (NIA)**. The NIA will demonstrate, through appropriate modelling and in accordance with the Environmental Noise Guidelines: WindFarms (SA EPA 2003), that the final turbine model and layout can meet the noise limits derived in accordance with those guidelines.	P
6.2	Construction Noise	Prepare a **Construction Noise Management Plan (CNMP)** that forms part of CEMP. The CNMP will establish protocols and measures that include: ▪ Mechanisms to prevent any unreasonable impact of construction noise on sensitive receivers. ▪ Undertake construction activities associated with the Project that would generate audible noise at any non-involved residence during the standard construction hours as outlined below: ▪ Monday to Friday: 7:00am to 6:00pm ▪ Saturdays: 7:00am to 1:00pm ▪ Sundays: No construction ▪ In the event that it is required to undertake other audible works outside the above construction hours, prior approval will be obtained from the relevant authority. ▪ Ensure that any blasting complies with the ANZECC guideline. Ensure that during any blasting event the airblast overpressure must not exceed 115dB (Linear Peak) and ground vibration peak particle velocity must not exceed 5 millimeters per second (peak particle velocity) when measured at the nearest residential premise.	P / C

SoC No.	Issue / Impact Description	Commitment / Mitigation Task	Project Phase
6.3	Operational Noise	Prepare an **Operational Noise Management Plan (ONMP)** as part of the OEMP, in consultation with EPA. The OEMP will be undertaken generally in accordance with the Environmental Noise Guidelines: Wind Farms (SA EPA 2003) and include the following provisions: ▪ ensure that operational noise levels will comply with the South Australia EPA Environmental Noise Guidelines principal acceptability criteria that the wind farm LA90 (10 min) noise should not exceed the greater of an amenity limit of 35 dBA or the pre-existing background noise by more than 5 dBA at each integer wind speed from cut in to rated power at any non-host property or residential receiver where noise agreements (in accordance with Section 2.3 of the SA EPA Guidelines) have not been entered into with the property owner; ▪ 3nsure that the operational noise levels comply with the **World Health Organization (WHO)** Guidelines for Community Noise of 45 dBA or the pre-existing background noise by more than 5 dBA (whichever is the higher) for any host property or residential receiver where noise agreements (in accordance with Section 2.3 of the SA EPA Guidelines) have been entered into with the property owner; ▪ during commissioning the actual received turbine noise level will be verified and determined through extensive monitoring; ▪ compliance monitoring, within one year of commissioning, against the noise limits; ▪ identification and implementation of best practice management techniques for minimisation of noise emissions where reasonable and feasible; ▪ measures to be undertaken to rectify annoying characteristics resulting from the operation of the project such as infrasound, tonality or adverse mechanical noise from component failure; ▪ procedures and corrective actions to be undertaken if non-compliance is detected (i.e. provisions for reasonable response time to alleged noise complaints and mitigation works); and ▪ Undertake routine noise monitoring, assessment and reporting at compliance critical locations.	C

SoC No.	Issue / Impact Description	Commitment / Mitigation Task	Project Phase
6.4	Operational Noise	Implement the approved ONMP during the operation phase. In circumstances where undue turbine noise impacts are identified during operations (i.e. due to temperature inversion, atmospheric stability or other reasons) then an adaptive management measures will be implemented to achieve compliance with the applicable noise limits. This will include: ▪ Receiving and documenting noise impact complaint through telephone hotline or other designated means. ▪ Investigating the nature of the reported impact. ▪ Identifying exactly what conditions or times lead to undue impacts. ▪ Operating selected turbines in a reduced 'noise optimised' mode during identified times and conditions (sector management). ▪ Providing acoustic upgrades (glazing, façade, masking noise etc.) to affected dwellings. ▪ Turning off turbines that are identified as causing the undue impact during identified times and conditions.	O
7.0	**Air Quality**		
7.1	impact to local amenities	Prepare an **Air Quality Management Plan (AQMP)** as part of the CEMP. The AQMP will include protocols and mitigations measure to: ▪ minimise potential air quality impacts on local amenities during the construction phase; ▪ the use of water spraying for dust suppression; and ▪ implement safeguards to control and minimise fugitive dust emissions. The approved AQMP will be implemented in the construction phase.	P / C
8.0	**Health & Safety**		
8.1	Health and safety of persons	Provide accessible information to the public on wind farm impacts including the benefits, and project details, process and updates.	P / C / O / D

SoC No.	Issue / Impact Description	Commitment / Mitigation Task	Project Phase
8.2	Health and safety of persons	Warning signs will be installed to alert the public to the risk of unauthorised site entry.	C / O
8.3	Health and safety of persons	Access to the wind turbines and associated infrastructure will be restricted to reduce personal injury and public hazards, including: ▪ Locked access to towers and electrical equipment. ▪ Warning signs with postings of 24-hour emergency numbers. ▪ Fenced storage yards for equipment and spare parts.	C / O
8.4	Health and safety of persons	Wind turbines will be equipped with sensors that can react to any imbalance in the rotor blades and shut down the turbine if necessary.	C / O
8.5	Health and safety of persons	Cable markers will identify the path of the underground cabling to prevent accidental digging around the cable trenches.	C
8.6	Health and safety of persons	The turbines and associated infrastructure will be regularly maintained as part of the operation of the wind farm.	O
8.7	Health and safety of persons	Noise levels will comply with the applicable noise guidelines, unless an agreement is in place with the effected landowner(s), and in any case should not be more than the 45dB(A) noise limit (for indoors) recommended by the World Health Organisation (WHO) publication Guidelines for Community Noise.	O
8.8	Health and safety of persons	Shadow flicker at any dwelling will not exceed 30 hours per year unless an agreement is in place with the effected landowner(s).	O
8.9	Blade Throw	The turbine model considered will have rotor over-speed protection and built-in redundancies, and be certified against the relevant standards including: ▪ IEC 61400-23 [Wind turbine generator systems, Full-scale structural testing of rotor blades]; ▪ IEC 62305-1 / 3 / 4 [Protection Against Lightning];	P / C / O

SoC No.	Issue / Impact Description	Commitment / Mitigation Task	Project Phase
8.10	Blade Throw	Incorporate lighting protection and safety shutdown systems.	P / C
8.11	Blade Throw	Repair any degradation to the blades.	O
9.0	**Flora and Fauna**		
9.1	Impact to Environment	Prepare a **Flora and Fauna Management Plan (F&FMP)** as part of the CEMP and OEMP. The F&FMP will establish protocols and measures to minimise the potential impacts during the construction and operation of the Project. The F&FMP will include the following sub-plans: ▪ Vegetation Clearing Plan (VCP) ▪ Native Vegetation Management Plan (NVMP) ▪ Bat Monitoring and Habitat Tree Inspections Plan (BMHTIP) ▪ Bird and Bat Monitoring Strategy (BBMS) ▪ Bird and Bat Management Plan (BBMP) ▪ Riparian Vegetation Management Plan (RVMP) ▪ Ecological Restoration Plan (ERP) ▪ Weed Management Plan (WMP) ▪ Biodiversity Offset Strategy (BOS) ▪ Biodiversity Offset Package (BOP)	P
9.2	Impact to biodiversity	Prepare a **Vegetation Clearing Plan (VCP)** as part of the F&FMP. The VCMP will include the following measures: ▪ all site staff are to be inducted on the procedures of the CEMP in relation to flora and fauna; ▪ the area to be cleared at the site will be clearly demarcated using flagging or fencing, and mapped on construction plans, to prevent breaches of the construction boundary; ▪ laydown or temporary disturbance areas will be located in already disturbed areas to avoid any unnecessary clearing of native vegetation and habitat;	P

SoC No.	Issue / Impact Description	Commitment / Mitigation Task	Project Phase
		▪ vehicles will remain on formed roads or tracks designed specifically for the purposes of the wind farm construction where possible; ▪ care will to be taken when working near wooded areas to prevent damage to adjacent tree roots and indirect impact to habitat areas; ▪ trenches will be excavated at least 15 metres away from the base of trees where possible to prevent root damage; ▪ where practical, suitable fencing to be erected along trenches to prevent fauna falling in; ▪ habitat features such as logs, large rocks and fallen hollows within the proposed clearance footprint will be relocated to adjacent areas to supplement habitat where possible; ▪ any individual hollows removed will be replaced with artificial hollows within adjacent suitable habitat; ▪ Environmental Compliance Manager or field officer qualified in the handling of fauna to be present on-site during clearing to capture and re-release fauna (where appropriate); ▪ regular checking of trenches by the Environmental Compliance Manager to ensure any captured fauna are released according to the CEMP; ▪ pre-clearance surveys (including diurnal and nocturnal) undertaken to determine if roosts, nests or dens are present in any trees proposed for clearing; ▪ implement a two stage approach to clearing works; no non-hollow bearing trees will be cleared before habitat trees to allow fauna an opportunity to move from the hollow bearing trees and allow time to concentrate rescue efforts on the trees that are most likely to be inhabited; and o hollow bearing trees will be felled after a minimum 24 hour delay after clearing of non-habitat trees; ▪ native vegetation that is removed will be chipped and mulched for on-site use where practical; ▪ where practical, native vegetation greater than 3 m in height to be retained during transmission line construction; and	

SoC No.	Issue / Impact Description	Commitment / Mitigation Task	Project Phase
		▪ rehabilitation of internal access roads that are not required following construction to be undertaken.	
9.3	Impact to Native Vegetation	Prepare a **Native Vegetation Management Plan (NVMP)** as part of F&FMP. The NVMP will ensure minimal removal of native vegetation for the construction of the wind farm infrastructure, and measures to ensure native vegetation in the vicinity of the development footprint are not affected. ▪ Where trees are removed the relevant land owner will be consulted and a suitable native species which does not affect the wind resource will be planted in place of the removed vegetation. ▪ All environmental controls will be audited for compliance regularly during construction and after commissioning. This would include micro mapping of vegetation around each turbine to avoid any unnecessary removal of vegetation and also the access tracks. This would also allow for vegetation planting species when the wind farm is decommissioned.	P
9.4	Impact to biodiversity	Prepare a **Bat Monitoring and Habitat Tree Inspections Plan (BMHTIP)** as part of the F&FMP. The BMHTIP will include provisions: ▪ Once the access roads and access tracks are pegged by surveyors potential habitat trees (that require removal) will be identified by an ecological survey. ▪ These trees will be stage watched at dusk using infra-red spotlights and Anabat detectors to determine usage by any threatened microchiropteran bats. ▪ Accessible tree hollows that require removal will be inspected for fauna by infrared telescopic camera prior to removal to ensure that no species are present in the hollow are harmed during removal.	P
9.5	Impact to birds and bats	Prepare a **Bird and Bat Monitoring Strategy (BBMS)** as part of F&FMP in consultation with OEH. The BBMS will be based on the draft provided in Annex C of Appendix 5 to this Report. The BBMS will establish appropriate survey methodologies and frequency, and provides guidance on bird and bat management. It provides a framework that can be used for development of a detailed **Bird and Bat**	P

SoC No.	Issue / Impact Description	Commitment / Mitigation Task	Project Phase
		Management Plan (BBMP) for both the construction and operational phases of the wind farm once approved. The BBMS outlines an indicative and adaptive program for monitoring the effects of each turbine and provides a sampling strategy specific to the first two years of operation. The details of ongoing monitoring (after the first two years of operation) will be negotiated and established based on the recommendations of the initial monitoring.	
9.6	Impact to birds and bats	Prepare a **Bird and Bat Management Plan (BBMP)** as part of F&FMP in consultation with OEH. The BBMP will establish protocols to manage and mitigate any bird and bat strikes resulting from the operation of the Project. Carcass search protocol will be implemented to identify more accurately the mortality rates of the bats and birds within the site. The BBMP will: ▪ outline the required monitoring measures, key thresholds for determining permissible impacts and corrective actions that are required in order to achieve the objectives of the plan; ▪ outline the roles and responsibilities for the proponent, operator and agencies in implementing, assessing and enforcing the plan; ▪ determine the frequency of report strike data during the preparation of the monitoring programme. The adaptive management measures that could be implemented will be negotiated with OEH when significant strike rates are detected. Bird and bat strike monitoring will be undertaken with consideration for the monitoring guidelines provided by the Australian Wind Energy Association.	P
9.7	Impact to riparian vegetation	Prepare a **Riparian Vegetation Management Plan (RVMP)** as part of the F&FMP. The RVMP will address the issues associated with the proposed creek crossings where any native vegetation is proposed to be disturbed.	P
9.8	Impact to biodiversity	Prepare an **Ecological Restoration Plan (ERP)** as part of F&FMP. The ERP will address the post-construction works to be undertaken to rehabilitate the areas that are disturbed as part of the construction works once construction is finalised.	P / C / O

SoC No.	Issue / Impact Description	Commitment / Mitigation Task	Project Phase
		The ERP will include provisions: ▪ detailed surveys before any vegetation is removed will record any microhabitat features and provide a detailed plan outlining areas of impacts at a micro level. This will allow for placing of sediment and erosion control fence designs to reduce any indirect impacts on vegetation; ▪ revegetation (including use of locally occurring species); ▪ instructions for how to reuse cleared vegetation in situ (including the spreading of mulched vegetation over cleared areas); ▪ areas of pasture should be re-seeded with pasture grass species removed; and ▪ areas where crane pads have been sited in native vegetation should be mechanically loosened with machinery to alleviate compaction, enhancing seed germination potential in loose soil and microtopography to enhance seed retention from surrounding woodland areas.	
9.9	Increase in spread of weeds	Prepare a **Weed Management Plan (WMP)** as part of F&FMP to ensure that the construction and operation of the Project does not contribute or cause an increase in the weed species within the site. The WMP will establish control measures for minimising weed during and after construction including: ▪ staff induction / training for prevention of spread of weeds and animals. All construction staff and sub-contractors educated on noxious weeds present at the site and ways to prevent spread; ▪ where a specific weed risk has been identified, all machinery, equipment and vehicles are to be washed down before entry and egress of the site; ▪ piling of soil that may contain seeds of exotic species at least 50 m away from creeks, drainage lines and other areas of native vegetation, to prevent spread into adjacent areas during rainfall or wind events; ▪ topsoil recovery will be undertaken in areas that have a high proportion of native vegetation and few weeds in the ground layer of vegetation;	P / C / O / D

SoC No.	Issue / Impact Description	Commitment / Mitigation Task	Project Phase
		▪ where practical, topsoil that has very few weeds to be harvested to salvage the native soil seed bank and reintroduced into disturbed areas. Otherwise, revegetate with locally native endemic species characteristic of the cleared vegetation type; ▪ control of perennial weed grasses within the disturbance zone for 3 to 5 years after construction; ▪ where practical, and in consultation with host landowners, manage stock access during periods of revegetation; and ▪ imported soil and rubble to be certified as free of weeds and weed seeds.	
9.10	Impact to biodiversity	Once the detail design of the Project has been finalised, prepare a revised **Biodiversity Offset Strategy (BOS)** as part of F&FMP and in consultation with OEH. The BOS will be based on the draft provided in Annex D of Appendix 5 to this Report. The BOS will be established with aim to: ▪ provide a summary of the project's ecological impacts; ▪ introduce the OEH principles of biodiversity offsetting; ▪ identify options available to offset the project's biodiversity impacts; ▪ discuss the viability of options including the consideration of separation distances between impacts and offsets; and ▪ provide an outline of the proposed Biodiversity Offset Package (BOP).	P
9.11	Impact to biodiversity	Prepare a **Biodiversity Offset Package (BOP)** as part of F&FMP in consultation with OEH. The BOP will be based on the approved BOS.	P / C / O
9.12	Impact to Box-Gum Grassy Woodland	Avoid placing any turbines within the existing Commonwealth Conservation Agreements containing Box Gum Grassy Woodland EEC located in south-west portion of the Project site boundary.	P / C

SoC No.	Issue / Impact Description	Commitment / Mitigation Task	Project Phase
9.13	Impacts from temporary facilities	All temporary and construction facilities will be located so as to avoid vegetation loss and the land will be rehabilitated to its former state at the conclusion of the construction stage.	P / C
9.14	Impacts from temporary facilities	Where possible, raw materials for the concrete batching plant will be sourced on site, with all materials brought in from external sources being as clean as possible to minimise the potential of introducing weeds to the site. The water for the concrete will either be sought on site subject to a separate licence issued by the NSW Office of Water, or transported to the site via tanker trucks.	C
10.0	**Aviation**		
10.1	Creation of hazard	Once the turbine locations are finalized, the proponent will notify the RAAF Aeronautical Information Service (AIS) of the location and height details of the turbines.	P / C / O
10.2	Creation of hazard	Prior to construction, and when once the final approved turbine layout and design turbine height are known, an aeronautical study will be prepared in the form of a detailed and thorough risk assessment using internationally recognised standards, in consultation with the applicable stakeholders to determine whether obstacle lighting will be required to enhance the level of aviation safety.	P
10.3	Creation of hazard	The rotor blades, nacelle and the supporting mast of the wind turbines will be painted white, off-white or a light grey colour.	P / C
10.4	Creation of hazard	If required, medium intensity obstacle lighting will be installed: ▪ To identify the perimeter of the wind farm; ▪ At longitudinal intervals not exceeding 900m; ▪ So that they are synchronised to flash simultaneously (both within the wind farm and with other wind farms in the vicinity); and ▪ So that any wind turbines of significantly higher elevation are also identified. The obstacle lights will have the characteristics specified in MOS 139, Chapter 9.	P / C

SoC No.	Issue / Impact Description	Commitment / Mitigation Task	Project Phase
10.5	Creation of hazard	A monitoring, reporting and maintenance program will be established in accordance with the requirements set out in MOS 139, Chapter 9 to ensure the ongoing availability of obstacle lights.	P / C / O
10.6	Creation of hazard	The obstacle lighting layout (if required) will meet the CASA objectives of: ▪ Defining the "general definition and extent of the objects" for each cluster or linear array; ▪ Lighted turbines to be spaced "at longitudinal intervals not exceeding 900 m" for each cluster or linear array ; and ▪ Lighting the most prominent (highest for the terrain) turbine in each cluster or linear array. In the event that obstacle lighting is required on wind turbines for this Project, NVG compatible obstacle lighting will be installed that operates at a wavelength of ~855 nanometres (which sits within the range of 655 to 930 nanometres specified by Department of Defence).	P / C / O
10.7	Creation of hazard	Marking the wind monitoring towers according to the requirements set out in MOS 139 Section 8.10 will be considered.	C / O
10.8	Creation of hazard	Marking of electricity transmission lines: ▪ Overhead transmission lines and/or supporting poles that are located where they could adversely affect aerial application operations will be marked in accordance with MOS 139 Section 8.10, or ▪ Alternatively, the AAAA endorsed power line marker reportedly developed in conjunction with Country Energy will be installed.	C / O
10.9	Creation of hazard	Wind farm's maximum height will be kept to 1,221m AHD, if there are any micrositing of the turbine locations prior to construction that would encroach above this maximum height, Airservices Australia will be notified of these changes and a further aviation assessment would be undertaken (if required).	P / C
10.10	Creation of hazard	The need for obstacle lighting will be reviewed at regular intervals by the Proponent.	O

SoC No.	Issue / Impact Description	Commitment / Mitigation Task	Project Phase
10.11	Creation of hazard	In the event the immediate neighbouring landowner(s) would require aerial agriculture spraying of their land adjacent to the wind farm and there is an increase in cost associated with the proximity to turbines, the proponent will cover the reasonable cost increase for the aerial agriculture activity. The landowner seeking compensation for the cost increase must demonstrate and justify this increase by reference to previous records.	O
11.0	**Transport**		
11.1	Safety and asset protection	Prepare a **Traffic / Transport Management Plan (TMP)** as part of the CEMP and in consultation with appropriate road authorities. The TMP will include: ▪ traffic generation numbers; ▪ transport route details (including other modes of transport); ▪ pre-construction road survey to determine existing condition of local roads; ▪ roadside vegetation assessment; ▪ design of access roads and access tracks; ▪ management and mitigation measures; for the Project. This will be prepared before the construction phase of each stage of the Project and will form the foundations for all traffic related activities.	P / C
11.2	Safety and asset protection	A road profile assessment (road dilapidation report) will be carried out prior to movement of heavy and oversize vehicles for the construction phase and any deterioration in pavement quality as a result of the project's road usage will be fixed.	P / C
11.3	Safety and asset protection	Prepare a **Traffic Control Plan (TCP)** as part of the TMP. The TCP will establish protocol for the transport route through major townships in consultation with relevant council and road authorities, and will include: ▪ code of practice for heavy vehicle drivers;	P / C

SoC No.	Issue / Impact Description	Commitment / Mitigation Task	Project Phase
		▪ speed limit details on all local rural roads and surrounding the wind farm sites;	
11.4	Safety and asset protection	Access tracks will only intersect with government roads at nominated access road entrance locations.	P / C
11.5	Safety and asset protection	Implement the approved TMP to ensure local roads are not adversely impacted by heavy vehicles. Provide prior notification to the local community of changed traffic conditions and proposed road works, and any night-time deliveries via a newsletter or information line.	C
11.6	Safety and asset protection	Carry out any necessary upgrades and strengthening works along the access road and access track network to provide safe access for the construction vehicles.	C
11.7	Safety and asset protection	Carryout intersection and road upgrades along OD route (as required in approved TMP) to safely accommodate the maneuverability of OD vehicles.	C
11.8	Safety and asset protection	The haulage contractor will be confirmed and Haulage Transport Plan prepared, prior to the finalisation of the relevant stage of the TMP for delivery of the OD deliveries.	C
11.9	Safety and asset protection	Regular road inspections will be conducted and compared against the existing conditions (and which representatives are to be present).	C / D
11.10	Safety and asset protection	In consultation with Oberon Council and RMS, nominate and design a viewing platform within the site boundary adjacent to Abercrombie Road reserve.	P / C
12.0	**Tele-communications**		
12.1	Interference with television broadcasting	Pre- and post-construction surveys will be conducted to determine the signal strength and quality of the television signal received at dwellings identified as having the potential to experience television interference.	P / O

SoC No.	Issue / Impact Description	Commitment / Mitigation Task	Project Phase
12.2	Interference with television broadcasting	Where necessary to address any impacts on resident's television reception as a result of the project, the proponent will undertake one or more of the following measures as agreed with the resident at the proponent's cost: ▪ Realigning the householder's TV antenna directly towards their existing transmitter. ▪ Tuning householder's antenna into alternative sources of the same or suitable TV signal. ▪ The installation of more directional and/or higher gain antenna at the affected residence. ▪ Relocating the antenna to a less affected position. ▪ The installation of a digital set top box (and UHF antenna if required). ▪ The installation of cable/satellite TV at the affected residences. ▪ Installation of a TV relay station.	O
12.3	Potential interferences to NSW RFS P2P link	The proponent will consult with NSW RFS to confirm whether the final micrositing will interfere with the NSW RFS P2P link, and whether the tower or interfering turbine(s) should be relocated.	P / C
13.0	**Fire**		
13.1	Firefighting systems, and risk of fire ignition or spread	Prepare a **Bush Fire Emergency Management and Operation Plan (BFEMOP)** as part of the CEMP and OEMP in consultation with State and local rural fire services, and DoP&E, and in accordance with '*Planning for Bushfire Protection*' (RFS, 2006). This would address safety, communication, site access and emergency response protocols including: ▪ Workplace health and safety protocols to minimise the risk of fire for workers during construction, operation, and decommissioning phases; ▪ consult with the RFS during periods of high fire danger, and generally to ensure the RFS are familiar with the development; ▪ consult with the RFS in regard to the adequacy of bushfire prevention measures to be implemented on site during construction, operation and decommissioning;	P / C / O / D

SoC No.	Issue / Impact Description	Commitment / Mitigation Task	Project Phase
		▪ consult with the NSW PWS on the management of bushfires in the adjacent National Park; ▪ Lightning protection will be fitted on each turbine blade; ▪ Vegetation plantings for landscaping purposes to have low fire resistance; ▪ Electrical and communication cables will be under-ground where practicable; ▪ The location and number of tanks or other water supply points will be determined in consultation with the NSW RFS; ▪ Access to adequate water supply, with water access points be located in safe, easily identifiable areas and accessible in all weather conditions by equipment up to 15 tonnes; ▪ A turning circle with a minimum radius of 10 metres will be provided for fire appliances at all water access points; ▪ 5-metres wide internal access tracks to be provided that are driveable and permanently clear of vegetation for heavy firefighting equipment up to 15 tonnes; ▪ Vehicle turn-around facilities will be provided at every turbine tower site. ▪ Provision of wind turbine access tracks that continue onto adjacent paddocks and are not dead-ended where possible; ▪ Careful storage and handling of flammable materials and ignition sources brought onto the site, as per manufacturer's instructions; ▪ Implementing a wide fuel break in accordance with RFS, Council and State Government recommendations to slow the spread of fire; ▪ On-site vegetation management to minimise potential sources of fuel; ▪ Maintenance of vehicles to minimise sparking from exhaust systems; ▪ Construction activities to be re-organised during periods of high fire danger, including ceasing use of explosives, and management of hot work activities such as welding or cutting;	

SoC No.	Issue / Impact Description	Commitment / Mitigation Task	Project Phase
		▪ Storage of appropriate firefighting equipment on-site during the construction phase, ensuring that a minimum of one person on site is trained in its use; ▪ Use of materials and equipment during operation that minimise the likelihood of fire; ▪ Automatic shutdown of any overheating turbine mechanism; ▪ Shut down of turbines during a bush fire in the area; ▪ Periodical inspection of overhead transmission easements to monitor any regrowth of encroaching vegetation. The approved **BFEMOP** will be implemented during the construction, operation, and decommissioning phases accordingly.	
14.0	**Shadow Flicker**		
14.1	Impacts on persons / dwellings	Screening structures or planting of trees to block shadows cast by the turbines will be installed where needed.	O
14.2	Impacts on persons / dwellings	Use of non-reflective paint on turbine blades.	O
14.3	Impacts on persons / dwellings	Turbine control strategies which shut down turbines as necessary will be used.	O
15.0	**Heritage**		
15.1	Impact on heritage items	Prepare a **Cultural Heritage Management Plan (CHMP)** in consultation and collaboration with the Registered Aboriginal Parties (RAPs) and OEH to reduce and mitigate the impacts of the Project on any artefacts which may be detected within disturbance zones. The CHMP will establish protocols and	P / C

SoC No.	Issue / Impact Description	Commitment / Mitigation Task	Project Phase
		measures to avoid, minimise and/or mitigate any impact the construction of the Project may have on the indigenous heritage sites, these include: ▪ Once the proposed access track locations and other disturbance areas are pegged on the ground, additional targeted surveys of these areas will be undertaken. Where these additional targeted surveys identify any further sites, test pits will be undertaken in order to determine the extent of significance of any sites which would be potentially impacted. ▪ The final micrositing of the proposed infrastructure will be undertaken in consideration of utilising and upgrading as much as possible the existing farm access tracks where possible to achieve an overall site plan which minimises unnecessary new soil disturbance. ▪ A minimum distance or separation buffer of 100 meters will be maintained from any turbine and site P8. If the separation distance is not practical, then a sub-surface investigation should be undertaken for any turbine proposed within 100m of site P8. ▪ The movement of identified objects is considered to be a suitable mitigation measure in most cases as the distances involved would not be significant, and many of the objects may have been moved in the past via water movement, erosion or vehicle/tractor movements such as road grading and cultivation of the ground. ▪ Avoid, as far as practicable, impacts on the known archaeological sites. If it is not practicable to locate infrastructure so as avoid objects / artefacts then cooperation with the RAPs and OEH will be undertaken to determine the management option for these objects / artefacts (i.e. collection for education purposes or moving the objects / artefacts slightly to outside the zone of disturbance). This may include further investigation in the form of sub-surface digs and analysis. ▪ Outline strategies for the management of any potential unrecorded sites which are identified within the site during construction of the Project. In accordance with the *Draft NSW Wind Farm Planning Guidelines 2011*, the construction program control measures will include provision to temporarily halt the excavation of a specific site in the event that a previously unidentified Aboriginal object(s) and historic relic is uncovered. All works likely to affect the object/relic	

SoC No.	Issue / Impact Description	Commitment / Mitigation Task	Project Phase
		would cease and the OEH officers and the RAPs notified. Works will not recommence at the specific area of site until an appropriate strategy for managing the object/relic has been determined in consultation with OEH and the Aboriginal stakeholders and a permit or written authorisation has been obtained from OEH.	
16.0	**Land Resources and Geotechnical**		
16.1	Soil loss and stability of landform	Prepare a **Sediment and Erosion Control Plan (SECP)** as part of the CEMP in consultation with NSW Office of Water and relevant Catchment Authority. The SECP will detail the measures and techniques to preserve soil resources including: ▪ Further detailed subsurface geotechnical investigation and analysis will be conducted to provide information for the detailed design of footings, access road, access track, slope stability, and other associated infrastructure. ▪ Designing access tracks to stay on the ridge crests where possible and remain clear of potential land slips. If crossing a potential land slip is required then the road formation will be designed to remove any potentially unstable material and found on stable bedrock. ▪ Scheduling site works, including excavation and filling, to reduce the risk of high concentrated surface water runoff. ▪ Remove any soft, wet, and highly compressible material or topsoil material and organics. ▪ Assess moisture contents of the bulk excavated soils and weathered rock. For compaction of any materials other than free draining sands, the moisture content will be in range OMC +/- 2% (wet/dry), where OMC is the optimum moisture content at Standard Compaction. ▪ The complete surface of the sub-grade will be test rolled in order to detect the presence of any soft or loose zones, which will be excavated out and replaced with approved filling. Test rolling will be carried out with a smooth drum roller with a minimum static weight of 8 tonnes.	P / C / O / D

SoC No.	Issue / Impact Description	Commitment / Mitigation Task	Project Phase
		▪ For pavements, the natural foundation soil will be compacted to a minimum dry density ratio of 98% Standard for clay soils or a minimum density index of 75% for sand soils. ▪ For pavements, approved filling excavated from site, will be placed in layers not exceeding 250mm loose thickness, with each layer compacted to a minimum dry density ratio of 98% Standard or a minimum density index of 75% for filling greater than 0.5m below top of finished subgrade level. The final upper 0.5m of filling sub-grade will be compacted to a minimum dry density ratio of 100% Standard or 80% density index. Where filling has a clay content, moisture content within the filling will be maintained within OMC -2% (dry) to OMC +2% (wet) during and after compaction. ▪ All filling beneath structures and footings will be compacted to a dry density ratio of at least 100% Standard or relative density index of at least 80%. This compaction will apply to all filling extending from a nominal horizontal distance of 2m at the edge of each structure with a nominal zone of influence of 1H:1V down and away from the proposed subgrade level. ▪ Any compaction of silty or sandy clay foundation soils at or close to footing formation level will be sealed or covered as soon as practicable, to reduce the opportunity for occurrence of desiccation and cracking. ▪ Level 1 testing and supervision of filling, in accordance with AS3798, is recommended where the filling is to be used for support of structural loads, within the 2m horizontal distance and spread from structures. ▪ All weathered rock, excavated from site for re-use beneath structures and as pavement sub-grade filling, will be processed so that individual particles are in the order of 100mm or less. ▪ Approved rock filling excavated from site will be placed in layers not exceeding 300mm loose thickness with care taken to minimise the occurrence of voids. Fine sands and dispersive clays will not be included in the fill due to the susceptibility to erosion.	

SoC No.	Issue / Impact Description	Commitment / Mitigation Task	Project Phase
		▪ Where pavements are proposed over bulk rock filling, it is recommended that the rock fill will be covered with a nonwoven, needle punched, continuous filament polyester geofabric of sufficient strength to avoid punching failure. ▪ Place a minimum 0.5m thick cover of granular bridging on the geofabric in two layers of 250mm loose thickness, to provide sub-grade support for the pavement. The bridging layers will be compacted to a minimum dry density ratio of 100% Standard or 80% density index (Granular bridging or sub-grade filling will comprise engineered fill material). The approved SECP will be implemented during the construction phase.	
17.0	**Hydrology**		
17.1	Deterioration of water quality	Prepare a **Soil and Water Management Plan (SWMP)** as part of the CEMP and OEMP in consultation with NSW Office of Water and relevant Catchment Authority. The SWMP will establish protocols and measures to control risks to water quality associated with construction and operation and detail the range of techniques used to prevent land and water degradation. The protocols and measures will include: ▪ Vehicles on site will be restricted to established tracks to concentrate any discharge from vehicles and minimise run off into water bodies. ▪ Maintenance or re-fuelling of machinery will be carried out on hard-stand areas. ▪ Concrete batching plants will be designed to capture all concrete wash. ▪ Minimise discharge into creeks, rivers or drainage lines. ▪ Infrastructure will be bundled with silt fencing/hay bales or similar to reduce runoff from these areas and ensure that oil and other chemicals could not escape. ▪ Access roads and access tracks will be completed within the construction phase and will be maintained to avoid any erosion. ▪ The wind farm and transmission line will be designed and constructed to minimise land disturbance and therefore reduce the erosion hazard.	P / C / O

SoC No.	Issue / Impact Description	Commitment / Mitigation Task	Project Phase
		▪ Disturbance during transmission line construction will be minimised by using existing access tracks and roads, and avoiding construction of a permanent access track along the transmission line easement. ▪ The construction activities will be staged to minimise the duration and extent of land disturbance. ▪ Topsoil resources will be managed to minimise the risk of erosion and sedimentation, and maximise reuse of topsoil during rehabilitation. ▪ Upslope (clean) stormwater will be diverted around the disturbed site capture sediment-laden runoff from within the disturbed site for diversion to sediment control devices. ▪ The site will be promptly and progressively rehabilitated as works progress. ▪ The construction of new vehicle watercourse crossings will be avoided where possible. ▪ Any water crossings would be designed to minimise impacts on existing banks, water flow, animal passage and on the movement of flows. ▪ Land disturbance within 20 m of minor streams (first and second order watercourses) and 40 m of third order or higher watercourses will be avoided where possible. ▪ Water will be reused where possible to reduce water consumption. ▪ Appropriate stormwater, collection, treatment and recycling at the concrete batch plant will occur in accordance with relevant best practice guidelines and any requirements of the NSW Office of Environment and Heritage.	
17.11	Deterioration of water quality	Prepare a **Sediment and Erosion Control Plan (SECP)** as part of the CEMP in consultation with NSW Office of Water and relevant Catchment Authority. This plan will detail the necessary management controls and techniques during construction and operation of the wind farm, including: ▪ Revegetating disturbed soils. ▪ Sediment traps to prevent sediment entering waterways.	P / C / O / D

SoC No.	Issue / Impact Description	Commitment / Mitigation Task	Project Phase
		▪ Erosion and sediment control devices will be inspected and maintained for the duration of the Project. The control plans implemented during the construction phase along the access tracks will be monitored and maintained during the operation phase.	
17.2	Deterioration of water quality	Prepare a **Hydrocarbon & Hazardous Substances Management Plan** (HHSMP) as part of the CEMP to protect the quality of surface water and groundwater. The HHSMP will include: ▪ Appropriate procedures will be in place for the transport, storage and handling of fuels, oils and other hazardous substances, including availability of spill cleanup kits.	P
17.10	Deterioration of water quality	Safeguards in the AQMP will be enforced to control and minimise fugitive dust emissions. Dust suppression will be carried out as required through either watering or chemical means (environmentally friendly polymer based additives to the water).	C
17.13	Deterioration of water quality	The water course crossings for access roads and cable installations and any associated instream works will be designs appropriately in consultation with hydrological engineers and consider the flow pattern of the drainage lines and ensure that sufficient allowance is made for unaffected flows for most rain events, and to minimize impacts on existing banks, animal passage, and on the movement of flows. This will be managed through the SECP forming part of the CEMP. The designs to be prepared in accordance with NSW Office of Water's: ▪ *'Guidelines for Controlled Activities on Waterfront Land',* ▪ *'Guidelines for Watercourse Crossings (July 2012)', and* ▪ *'Guidelines for laying pipes and cables in watercourses (July 2012)'*	P / C
17.15	Deterioration of water quality	If rock anchoring is selected for wind tower foundations, a groundwater assessment will be undertaken and endorsed prior to construction. Any necessary licensing requirements under the Water Management Act 2000 will be obtained as required.	P / C

SoC No.	Issue / Impact Description	Commitment / Mitigation Task	Project Phase
17.17	Water extraction	Prior commencing construction that intercepts or extracts groundwater or surface water, the relevant licensing under the Water Act 1912 or Water Management Act 2000 will be obtained from the NSW Office of Water.	P / C
17.19	Water extraction	Obtain any required licence for water sharing plans and temporary transfer of licence from existing licence holders in the area, or alternatively use tankers to import water from external sources. Over-extraction of surface water or groundwater will be avoided to prevent adverse impacts on environmental flows and water availability for existing licensed users.	C
18.0	**Resource Impacts**		
18.1	Waste Generation	Portable toilets will be provided in the temporary construction area.	C
18.2	Building Materials	The existing 60m and 40m monitoring masts will be removed and reused elsewhere once the construction phase is complete.	O
18.3	Building Materials	Where possible, the existing footings, access tracks and other infrastructure would be reused for any replacement turbine(s) during the operation phase.	O
19.0	**Decommissioning & Rehabilitation**		
19.1	Wind Farm not dismantled after permanent cessation of wind turbine operation	The Proponent is responsible for the decommissioning of the wind farm infrastructure, and the landowner is not liable for this obligation (this is demonstrated in the land lease agreements with each of the wind farm participating landowners as shown in the **Decommissioning and Rehabilitation Plan (DRP)** in Appendix 4 of the EIS.	P / D

SoC No.	Issue / Impact Description	Commitment / Mitigation Task	Project Phase
19.2	Not enough funds allocated to decommission the wind farm	The DRP will be reviewed and revised as required every 5 years for the duration of the project. During each review, the effectiveness of the plan will be re-assessed against its objectives, and cost estimates and funding arrangements will also be reviewed by an independent consultant.	O
19.3	Wind Farm not dismantled after permanent cessation of wind turbine operation	The proponent commits to undertaking all decommissioning and rehabilitation works outlined in the DRP within the 18 months after the end of the wind farm's operational life (including any replacement of the turbines as contemplated by commitment 19.5 below).	O / D
19.4	Wind Farm not dismantled after permanent cessation of wind turbine operation	During the operational life of the project, any turbine that cannot be repaired and is deemed permanently unworkable (due to environmental, social, economic or other unforeseen issues) will be decommissioned and dismantled, and its location rehabilitated within 18 months.	O
19.5	Deterioration of landscape from decommissioning	At the completion of the wind farm's operating life, the turbines will either be replaced or the land will be rehabilitated to its previous or better condition.	D
19.6	Deterioration of landscape from decommissioning	Access tracks considered surplus to the farmers' requirements will be rehabilitated and revegetated by introducing soil, mulch and grass seeds or local provenance.	D
19.7	Recycling	During decommissioning, all materials will be removed from the site and recycled appropriately.	D

9. Conclusions

Union Fenosa Wind Australia Pty Ltd (**UFWA**) (the '**Proponent**') and its successors and assigns, is seeking project approval for the construction and operation of a wind farm facility with up to 55 wind turbines known as the Paling Yards Wind Farm (the '**Project**') located ~60km south of Oberon and in the Oberon Local Government Area.

The project is a State Significant Development (**SSD**) under Part 4 of the *Environmental Planning and Assessment Act 1979* (**EP&A**).

This Preferred Project and Submissions Response Report (the **Report**) has detailed the revised Project proposal to incorporate several design changes and commitments raised in the submission comments from various government agencies.

The Environmental Impact Assessment (**EIS**) and the Report have found that the Project would have a range of positive and negative impacts on the site and region. However, it was found that the benefits of the wind farm would outweigh the undesirable impacts, and with appropriate conditions and mitigation measures detailed, the impacts can be minimised. The Project is compatible with the existing land uses of the area and complies with relevant planning and environmental controls applicable to the site.

The Project if approved would have the following specific economic and environmental benefits:

- total capital investment of $275 million in the economy;
- generate up to 65 full time positions during construction, and up to 11 full time ongoing positions during the operation;
- Stimulation of the economy in the Oberon Council as a result of greater income generation and subsequent expenditure in the region;
- Provision of flow on economic benefits in terms of employment and commercial opportunities from the economic investment;
- Up-skilling of the local workforce within a growing energy market;
- Use of a significant portion of locally sourced materials and employment;
- Increases in the local tourism industry, and in turn, increased expenditure on local services such as accommodation and retail in Oberon Council;
- Contribute up to $1,9002 per turbine per year (escalated annually with CPI) to the Oberon Council Community Enhancement Fund (CEF) that forms part of the Voluntary Planning Agreement (VPA);

[2] Based on $1,666 per wind turbine per year precedent set by NSW Land and Environment Court (L&EC) in August 2010 for another wind farm, and escalated by ~3% CPI per year from 2010 to equate to ~$1,900 in 2014. The contribution will be for each operating wind turbine and will commence on the anniversary of the commissioning of the wind farm.

- generate up to 550,833 MWh of clean, renewable energy, enough to power up to 85,344 average households;
- contribute to reducing the dangerous impacts of anthropogenic climate change, such as droughts, floods, extreme weather events and sea level rise by displacing up to 535,961 tonnes of greenhouse gases or the equivalent of taking up to 123,778 cars off the road;

The assessment of potential negative impacts arising from the Project found that the wind farm has the potential to have a low to moderate impact on landscape values, a limited impact on local communications facilities, an increase in noise for some residents (mainly host landowners), and result in the clearing of non-significant vegetation.

The impacts of the Project would be minimised by the extensive range of management plans that would be prepared before construction and ongoing monitoring of the compliance of the wind farm post-construction with the established standards.

This Report concludes that the proposed Paling Yards Wind Farm will offer a number of significant benefits and can be constructed with minimal impact to the existing environment by preparing and implementing the mitigation measures detailed in the revised Statement of Commitments.

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APPENDIX 1 – SLR Consulting Response to EPA Submission

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APPENDIX 2 – SLR Consulting Response to Community Submission

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APPENDIX 3 – SLR Consulting Revised Noise Impact Statement

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APPENDIX 4 – GTA Consultants Response to Traffic Related Submissions

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APPENDIX 5 – ERM Response to Ecology and Heritage Submissions

The ERM response includes the following annexures:

- Annex A - Ecology Response to Submissions
- Annex B - Heritage Response to Submissions
- Annex C - Bird and Bat Monitoring Strategy
- Annex D - Offset Strategy

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