

REFERRAL OF A PROJECT FOR A DECISION ON THE NEED FOR ASSESSMENT UNDER THE *ENVIRONMENT EFFECTS ACT 1978*

REFERRAL FORM

The *Environment Effects Act 1978* provides that where proposed works may have a significant effect on the environment, either a proponent or a decision-maker may refer these works (or project) to the Minister for Planning for advice as to whether an Environment Effects Statement (EES) is required.

This Referral Form is designed to assist in the provision of relevant information in accordance with the *Ministerial Guidelines for assessment of environmental effects under the Environment Effects Act 1978* (Seventh Edition, 2006). Where a decision-maker is referring a project, they should complete a Referral Form to the best of their ability, recognising that further information may need to be obtained from the proponent.

It will generally be useful for a proponent to discuss the preparation of a Referral with the Department of Transport, Planning and Local Infrastructure (DTPLI) before submitting the Referral.

If a proponent believes that effective measures to address environmental risks are available, sufficient information could be provided in the Referral to substantiate this view. In contrast, if a proponent considers that further detailed environmental studies will be needed as part of project investigations, a more general description of potential effects and possible mitigation measures in the Referral may suffice.

In completing a Referral Form, the following should occur:

- Mark relevant boxes by changing the font colour of the 'cross' to black and provide additional information and explanation where requested.
- As a minimum, a brief response should be provided for each item in the Referral Form, with a more detailed response provided where the item is of particular relevance. Cross-references to sections or pages in supporting documents should also be provided. Information need only be provided once in the Referral Form, although relevant cross-referencing should be included.
- Responses should honestly reflect the potential for adverse environmental effects. A Referral will only be accepted for processing once DTPLI is satisfied that it has been completed appropriately.
- Potentially significant effects should be described in sufficient detail for a reasonable conclusion to be drawn on whether the project could pose a significant risk to environmental assets. Responses should include:
 - a brief description of potential changes or risks to environmental assets resulting from the project;
 - available information on the likelihood and significance of such changes;
 - the sources and accuracy of this information, and associated uncertainties.

- Any attachments, maps and supporting reports should be provided in a secure folder with the Referral Form.
- A CD or DVD copy of all documents will be needed, especially if the size of electronic documents may cause email difficulties. **Individual documents should not exceed 2MB.**
- A completed form would normally be between 15 and 30 pages in length. Responses should not be constrained by the size of the text boxes provided. Text boxes should be extended to allow for an appropriate level of detail.
- The form should be completed in MS Word and not handwritten.

The party referring a project should submit a covering letter to the Minister for Planning together with a completed Referral Form, attaching supporting reports and other information that may be relevant. This should be sent to:

Postal address

Couriers

Minister for Planning
GPO Box 2392
MELBOURNE VIC 3001

Minister for Planning
Level 20, 1 Spring Street
MELBOURNE VIC 3001

In addition to the submission of the hardcopy to the Minister, separate submission of an electronic copy of the Referral via email to ees.referrals@dtpli.vic.gov.au is encouraged. This will assist the timely processing of a referral.

PART 1 PROPONENT DETAILS, PROJECT DESCRIPTION & LOCATION

1. Information on proponent and person making Referral

Name of Proponent:	Bulgana Wind Farm Pty Ltd
Authorised person for proponent:	Brett Thomas
Position:	Managing Director
Postal address:	The Sable Group Pty Ltd
Email address:	brett.thomas@sable.com.au
Phone number:	0418 327 372
Facsimile number:	
Person who prepared Referral:	Fi Cotter Provincial Matters
Position:	Principal
Organisation:	Provincial Matters
Postal address:	P.O.Box 204, Chewton, Vic 3451
Email address:	fi@provinciamatters.com.au
Phone number:	0408 587 095
Facsimile number:	
Available industry & environmental expertise: (areas of 'in-house' expertise & consultancy firms engaged for project)	<p>Brett Lane and Associates</p> <ul style="list-style-type: none"> - Flora and Fauna <p>Urbis</p> <ul style="list-style-type: none"> - Preliminary Landscape Assessment <p>DNV GL Energy</p> <ul style="list-style-type: none"> - Shadow Flicker Assessment <p>Archaeology at Tardis</p> <ul style="list-style-type: none"> - Historic Heritage Assessment and Desktop Cultural Heritage Assessment <p>Aurecon</p> <ul style="list-style-type: none"> - Traffic Impact Assessment <p>Coffey</p> <ul style="list-style-type: none"> - Geotechnical <p>SGS Hart</p> <ul style="list-style-type: none"> - Aviation Impact Assessment <p>Lawrence Derrick & Associates</p> <ul style="list-style-type: none"> - Electro-magnetic interference

2. Project – brief outline

<p>Project title: Bulgana Wind Farm</p>
<p>Project location:(describe location with AMG coordinates and attach A4/A3 map(s) showing project site or investigation area, as well as its regional and local context)</p> <p>The site of the proposed Bulgana Wind farm covers approximately 7,524 hectares of private and public land located within the Bulgana, Joel Joel, South Joel, Concongella and Great Western districts, in central western Victoria. It lies approximately 11.7 kilometres north of Ararat, at its southern extent, and 11.2 kilometres east of Stawell, at its north-west extent. Great Western is the nearest significant sized settlement approximately two kilometres to the south-west of the site.</p> <p>Refer to Figure 1 Project Location Plan for further details.</p>
<p>Short project description (few sentences):</p> <p>The proposed Bulgana Wind Farm comprises a maximum of 67 wind turbines and associated permanent and temporary infrastructure. Permanent infrastructure will include:</p> <ul style="list-style-type: none"> • Approximately 53 km of site access tracks, • Creation and improvement of up to 8 access points from public roads, • Permanent anemometry masts, • Approximately 47 km of underground cabling, • Approximately 11.4 km of overhead wires, • A collector substation and connection of underground cables to overhead line, • A terminal substation and connection to the existing SP Ausnet 220kV high voltage transmission line located at the northern end of the site. <p>Temporary infrastructure will include construction compounds, turbine component lay down areas, and a concrete batching plant/s.</p> <p>The need for and location of borrow pits and dams for use during construction are not proposed at this stage. If it is determined that such facilities are required on site, future approvals will be sought. At this stage it is considered that all material will be sourced off site. The traffic report and analysis assumes all material will be brought to site from external locations. It is the intention of the applicant to only seek consent for these items after planning permit approval is given for the wind farm, at which stage more detailed geotechnical assessments and construction planning will be undertaken.</p> <p>Refer to Figure 2 Project Layout for further details.</p>

3. Project description

<p>Aim/objectives of the project (what is its purpose / intended to achieve?):</p> <p>The objective of the Bulgana wind farm is to generate electricity from renewable energy sources for export via the electricity transmission network. In doing so, the wind farm will reduce the generation of greenhouse gas emissions by offsetting the requirement for fossil fuel generation.</p>
<p>Background/rationale of project (describe the context / basis for the proposal, eg. for siting):</p> <p>The Bulgana area has many characteristics that enable a wind farm to be constructed and operated in a manner that is sensitive to the local community, environment and</p>

ongoing use of the land.

The area is open farmland where turbines can be located appropriate distances from dwellings and other rural buildings. As an area that has been cleared and farmed for many years, the Proponent considers that the project can be developed, constructed and operated to avoid any adverse impacts on ecological, landscape, heritage or amenity values. Where specific areas of native vegetation or habitat occur on the land, the wind farm turbine locations and associated infrastructure will be positioned to avoid impacts or minimise them to acceptable levels.

The area has a strong wind resource, is close to an existing high voltage electricity transmission line, has good vehicle access to and around the area and is well separated from public use areas, local towns and population centres.

Main components of the project (nature, siting & approx. dimensions; attach A4/A3 plan(s) of site layout if available):

The following permanent infrastructure is proposed:

- 67 wind turbines of between 2MW and 4MW rated capacity each.
- Turbine configurations generally consisting of hub heights up to 140 metres, rotor diameters up to 128 metres and tip heights up to 196 metres. The turbines will be constructed from tubular steel or concrete sectional towers and will support a nacelle, nose cone and blade assembly. Four turbine models have been selected to aid in assessment and modelling for environmental and planning purposes, these are listed below. However, the specific height and configuration of the turbines to be installed on the Bulgana Wind Farm site will be determined following a commercial tendering process that will occur after a planning permit is granted. The turbines selected through the commercial tendering process will be within the envelope provided by the aforementioned dimensions. Turbine types that are being considered for the project include, but are not limited to, the following:
 - i. Acciona AW 116 (100m hub height, approximate blade tip height 158m)
 - ii. Acciona AW 125 (120m hub height, approximate blade tip height 182.5m)
 - iii. Siemens SWT 113 (92.5m hub height, approximate blade tip height 149m)
 - iv. Enercon E115 (92m hub height, approximate blade tip height 149.5m)
- Approximately 53 kilometres of internal access tracks with minimum widths of 6 metres, with appropriate widening at corners, junctions and passing areas. These tracks will provide access for the installation of the wind turbine and for ongoing maintenance.
- Creation of up to 9 access points from public roads to facilitate access to the site for construction and operational purposes. This work will be complemented by improvements to local roads at the access points, at local intersections and along road sections as required to meet council requirements and to ensure safe and efficient traffic movements.
- Permanent anemometry masts up to 100 metres high for wind resource and data validation purposes during operation of the wind farm. The actual number will be determined after a planning consent is given for the wind farm, but is not anticipated to be more than three.
- Approximately 47 kilometres of underground cabling between the turbines and to the point of collection prior to transitioning to overhead wires (see below).

- Approximately 11.4 kilometres of overhead wires on approximately 6 metre high poles connecting the wind farm electrical system to the project terminal substation.
- A collector substation will be located at approximately grid coordinate X:673564, Y:5889234, WGS84, UTM Zone 54S, with a footprint of 0.015 hectares, containing a marshalling point for underground cables for connection to overhead line.
- A terminal substation will be located at approximate grid coordinate X:676398, Y:5899357, WGS84, UTM Zone 54S, comprising a compound of approximately 3 hectares, containing metering, control and transformation equipment to connect the wind farm electrical system to the adjacent 220 kV transmission line.

The following temporary infrastructure is also proposed:

- Crane pads at each wind turbine location, 60 metres by 50 metres in dimension, for the purpose of providing a stable foundation for cranes to erect and install all components of the wind turbines.
- Two construction compounds each 1.5 hectares in area. These compounds will host site offices and amenities, tool and materials storage sheds, construction staff car parking, component laydown areas and truck parking.

It is noted, that at this stage borrow pits and concrete batching plants are not provided for on site, and the site analysis and impact assessment assumes that materials will be sourced from surrounding locations. The traffic assessment accompanying this referral assumes traffic volumes and movements to and from the site during the construction period based on off site sourcing.

Ancillary components of the project (eg. upgraded access roads, new high-pressure gas pipeline; off-site resource processing):

Isolated trimming of roadside vegetation and improvements to public roads on the approach to site for construction vehicles. Precise details to be determined following a detailed transportation routing assessment that will occur during detailed design and after an analysis of materials procurement. If any removal of native vegetation is required then separate approvals would be sought.

Key construction activities:

Site preparation

- Creation of entrances to the site from public roads.
- Land clearance at construction compound locations and lay-down areas.
- Establish construction compounds, amenities and utility supplies (water, power, communications).
- Establishment of on-site water supply dams where required.

Site tracks

- Land clearance and topsoil removal along the alignment of the proposed access track network. Stockpiling of ground materials and topsoil for future use and re-topsoiling.
- Soil cut and fill as dictated by site topography.
- Installation of culverts at watercourse crossings and the establishment of overland flow, waterway and drainage control works as required.
- Establish access tracks – excavation and filling, laying of bedding materials and track surface material.

Crane Pads

- Land clearance and topsoil removal and stockpiling at crane pad locations.
- Establish access tracks – excavation, laying of bedding materials and crane pad surface material.

Foundations

- Land clearance and topsoil removal at turbine locations.
- Excavation and preparation of turbine foundations.
- Installation of steel reinforcement, turbine tower anchor structures and base plates.
- Pouring of concrete.
- Curing of concrete following by backfilling to finished ground level.

Electrical Works

- Trenching of cable routes throughout the site, trench preparation and installation of bedding, cable laying, engineered backfilling, topsoil replacement.
- Clearance of overhead wire route and installation of poles and wires.
- Clearance and topsoil removal of terminal substation location.
- Excavate and pour foundations for control building and electrical equipment.
- Construction of control building.
- Installation of electrical equipment.

Turbines

- Delivery of turbine components to site, and temporary stored at lay down areas or turbine crane pads.
- Installation of turbines at each turbine location, involving placement and securing of tower sections, followed by the nacelle, rotor and blades.

Commissioning

- Testing and commissioning of all electrical and mechanical components from each turbine through the internal electrical system to the metering, control and connection point.
- Connection to existing 220kV transmission line adjacent to the proposed terminal substation.
- Completion of all project operational buildings and systems.

Finishing

- Removal of temporary infrastructure, plant and equipment
- Site clean-up and completion of re-topsoiling, and revegetation of the site.

Key operational activities:

Key operational activities will consist of the operation and maintenance of the wind farm including all access track and building infrastructure, permanent waterway and drainage management systems, electrical and mechanical equipment, monitoring and metering systems, control systems and the high voltage (HV) connection works within the project area. SP AusNet Services will also carry out operation and maintenance of the HV connection works at the point of contact to the transmission line.

The operation of the site and the performance of all generation and operational infrastructure will be monitored and controlled from the on-site operational facility. Monitoring of electrical and mechanical systems will also be carried out remotely at a centralised facility.

The operational life span for the wind farm after commissioning will be typically 25 years.

Key decommissioning activities (if applicable):

Decommissioning activities at the end of the wind generation facility's asset life will be completed in accordance with all requirements of the planning consent and with the regulations existing at the time. Activities will include disassembly of the turbines and removal from site, covering of foundations with between 0.6 to 1 metre of topsoil, topsoiling and re-sowing of access tracks where these are no longer required by the landowner for farming or other related land activities, and removal of above ground grid connection infrastructure.

Is the project an element or stage in a larger project?

No Yes If yes, please describe: the overall project strategy for delivery of all stages and components; the concept design for the overall project; and the intended scheduling of the design and development of project stages).

Is the project related to any other past, current or mooted proposals in the region?

No Yes If yes, please identify related proposals.

4. Project alternatives

Brief description of key alternatives considered to date (eg. locational, scale or design alternatives. If relevant, attach A4/A3 plans):

No alternatives to the Bulgana Wind Farm are proposed at or within the general vicinity of the project site.

Enerfin as the owner of the Bulgana Wind Farm is a global developer, owner and operator of wind energy projects and is continuing to develop additional wind energy projects in the Australian energy market to contribute to the national renewable energy requirement and the decarbonisation of the electricity generation sector.

Nevertheless, the process by which the Bulgana Wind Farm site was identified involved, amongst other matters, the consideration of the wind energy resource at the site, environmental and social factors, availability of land, proximity to grid connection and transport networks, and feasibility of construction. Therefore the site was selected through a process of elimination of alternatives.

Brief description of key alternatives to be further investigated (if known):

As noted above significant work has already been undertaken which results in the current site layout and location. In broad terms it is not expected that significant alterations to the project will occur from this point onwards, however some work which could influence layout is still underway, and the planning permit application will seek a micro-siting allowance of 50 metres radius per turbine.

The following factors could alter the layout as currently proposed in this referral:

- Ongoing negotiations with neighbours within 2km of proposed turbine locations.
- Completion of the Cultural Heritage Management Plan.
- Detailed pre-construction geotechnical studies.
- The conditions imposed on any planning permit.
- The detailed requirements of SP Ausnet as the Transmission Network System Provider for the proposed transmission connection network regarding the connection

works and the associated land requirements.

- The availability and price of specific turbine models at the time of tendering for turbine supply will determine the precise rated capacity and turbine dimensions to be installed, within the envelope of hub height up to 140 metres, rotor diameters up to 128 metres and tip heights up to 196 metres.

The applicant considers that changes that may result from the above or other factors can be accommodated within the identified site boundaries and general project configuration as submitted in this EES referral without an adverse environmental or social impact.

5. Proposed exclusions

Statement of reasons for the proposed exclusion of any ancillary activities or further project stages from the scope of the project for assessment:

Nil

6. Project implementation

Implementing organisation (ultimately responsible for project, ie. not contractor):

Bulgana Wind Farm Pty Ltd is a wholly owned subsidiary of Enerfín Sociedad de Energía S.L. ('Enerfín'). Enerfín is part of the Elecnor group, which is incorporated in Spain and operates globally in energy, infrastructure and technology. Enerfín is a developer, owner and operator of wind farms in Spain, Canada and Brazil with over 1,100 MW of wind projects in operation and an additional 1,200 MW currently in various stages of development and construction.

Bulgana Wind Farm Pty Ltd is the proponent for the Bulgana Wind Farm and is being supported in the development stage by its development partners Wind Prospect Pty Ltd and The SABBLE Group.

Should a planning permit be granted and all subsequent project contracts be finalised, it is envisaged that Bulgana Wind Farm will be constructed by the parent entity, Elecnor and that Enerfín will remain as the ongoing owner and operator of the facility during its operational life.

Implementation timeframe:

Construction of the wind farm is anticipated to take in the region of 18 months, and following the completion of commissioning works, would then enter its operational period of at least 25 years.

Proposed staging (if applicable):

No staging is proposed.

7. Description of proposed site or area of investigation

Has a preferred site for the project been selected?

No Yes If no, please describe area for investigation.

If yes, please describe the preferred site in the next items (if practicable).

General description of preferred site, (including aspects such as topography/landform, soil types/degradation, drainage/ waterways, native/exotic vegetation cover, physical features, built structures, road frontages; attach ground-level photographs of site, as well as A4/A3 aerial/satellite image(s) and/or map(s) of site & surrounds, showing project footprint):

Figure 3 provides an aerial photo of the site and surrounds.

Large areas of the site are currently utilised for stock grazing (principally sheep) on improved dry-land pastures, with some cropping land in isolated locations. Much of the

site has been cleared of native woodland and forest vegetation. Where vegetation does remain, it is limited in extent to small isolated clumps and linear windbreaks on private land, and linear strips along road reserves. Numerous indigenous scattered trees exist throughout the site and locality. Areas of revegetation are present on the site, and these comprise indigenous and non-indigenous native planted trees between approximately three and 15 years old. **Figure 4** shows the Landscape Character Areas, **Figure 5** Contour Plan, **Figure 6** Elevation of the Terrain and **Figure 7** Slope of the Terrain.

The study area supports a number of soil types, derived principally from sedimentary and granitic underlying geologies. The topography of the majority of the study area comprises gentle to steep sloping hills and ridgelines, and undulating plains dissected by numerous water courses and drainage lines. Named waterways include Concongella Creek, Allanvale Creek, Salt Creek, Surridge Creek, Six Mile Creek, Seven Mile Creek and Wattle Creek, with numerous drainage lines feeding these named waterways. Photos of the site are included in **Figure 8**.

The road network that runs through the site and locality comprises a range of sealed and unsealed local roads including Allanvale Road, Tuckers Hill Road, Wattle Gully Road, Green Hill Lane, Stocks Road, Metcalfe Road, Salt Creek Road, Bulgana Road, Gibsons Road, Joel South Road, Thomas Road, Landsborough Road, Joel Forest Road, Wyndarra Road, Vances Crossing Road and Vineyard Road. To the south and west of the site runs the Western Highway between Melbourne and Adelaide. A plan showing the broad road network is included in **Figure 9**. Other improvements on the site and in the locality comprise typical farm residences and infrastructure including houses, outbuildings, sheds, dams of varying size and depth, fences, private roads and dirt tracks.

Site area (if known): 7,524 (hectares) The proposed site footprint is estimated at 141 hectares (based on wind farm infrastructure plus any buffers) representing 1.9% of the site area.

Route length (for linear infrastructure)

- 53 km of new access tracks approximately 6 m wide
- Approximately 47 km of underground cabling; trenches would be approx. 1 m wide and backfilled.
- Approximately 11.4 km of overhead line; width of easement would be approx. 10 m

Current land use and development:

The land is used for farming and agricultural purposes with some dwellings and outbuildings on farming lots located within 2 km of the proposed turbines.

Description of local setting (eg. adjoining land uses, road access, infrastructure, proximity to residences & urban centres):

The project area of the wind farm is surrounded by agricultural properties predominantly used for cropping and sheep grazing. Farm dwellings and structures are located on surrounding properties.

Built elements within the landscape include the transmission lines of the national electricity grid, the Melbourne to Adelaide Railway line, as well as infrastructure such as silos and large structures associated with agriculture.

The Western Highway traverses the western extent of the project area. The Pyrenees Highway is located south of the site providing the main east west link from the east of the state to Ararat. Local and unmade roads within and around the project area include Landsborough Road, Vances Crossing Road, Thomas Road, Joel South Road, Gibsons Road, Bulgana Road, Salt Creek Road, Metcalfe Road and Tuckers Hill Road.

Within the regional setting, the closest towns are Ararat approximately 11 km to the

south, and Stawell approximately 13km to the west. Great Western is approximately 3.6 km west of the main area to be used for the wind farm.

The township of Great Western is located to the west of the project area. The town has an approximate population of 650 people. The project is located on large, rural landholdings with the most western extent of project land extending to within 100m from Great Western. However, the nearest turbine to the township of Great Western is located at a distance of 3.8 km.

There are eight dwellings within 2 km of proposed wind turbines. Four of these residences belong to wind farm land holders. Agreements with land holders and neighbours within 2 km are in place as per Clause 52.32 Wind Energy Facility.

Planning context

The proposed wind farm is located in the Northern Grampians Shire and subject to the provisions of the Planning and Environment Act 1987. A planning permit will be submitted to Council for the use and development of the land for the purposes of a wind energy facility and associated items, including a minor utility installation.

There are state and local policies in the Northern Grampians Planning Scheme that relate to agriculture, environment, landscape values, biodiversity, cultural heritage, land management, amenity and traffic considerations. These matters are addressed in this referral, and will be expanded upon in the planning assessment as part of the planning application report to be submitted to Council.

The project land is within the area of the Wimmera Southern Mallee Growth Plan which encourages the development of renewable energy resources within the region. .

The land is within the Farming Zone and a planning permit is required for use and development of the land for the purposes of a wind energy facility consistent with Clause 52.32 Wind Energy Facility, and associated items, including a minor utility installation. The decision guidelines under Clause 52.32 requires consideration of Policy and planning guidelines for development of wind energy facilities in Victoria July 2012, and the New Zealand Standard NZS6808:2010 Acoustics- Wind Farm Noise.

The Environmental Significance Overlay Schedule 1, Significant Ridge Environs applies to the site. A permit is triggered by the ESO1 for buildings and works, with the key considerations relating to ridgelines and erosion management. Landscape and environmental matters addressing the considerations of the ESO are included in this referral and will also form part of the planning permit application.

Relevant Clauses of the State Planning Policy Framework include:

- Clause 12 Environmental and Landscape Values including considerations such as the protection of biodiversity, native vegetation management, and the protection of significant environments and landscapes.
- Clause 13 Environmental Risks seeks to ensure that planning adopts best practice environmental management and risk management to avoid or minimise environmental degradation and hazards. The clause includes considerations for the management of erosion and landslip, noise abatement, and bushfire risk.
- Clause 14 Natural Resource Management where planning is to assist in the conservation and wise use of natural resources including energy, water, land, stone and minerals to support both environmental quality and sustainable development. Considerations include the protection of agricultural land, consideration of catchment planning and management, water conservation and quality.
- Clause 18 Transport including the considerations for integrated transport, and car parking.

- Clause 19 Infrastructure includes the consideration of renewable energy with the objective to promote the provision of renewable energy in a manner that ensures appropriate siting and design considerations are met.

Local government area(s):

The proposed wind farm, access roads and powerline corridor are all located within the boundary of the Northern Grampians Shire Council.

8. Existing environment

Overview of key environmental assets/sensitivities in project area and vicinity (cf. general description of project site/study area under section 7):

The key environmental assets and sensitivities within the site and surrounds include:

- The historic and cultural heritage assets within and near to the site.
- The patches of native vegetation and the ecological communities that utilise the site and surrounds, including fauna such as the swift parrot and the barking owl.
- The potential for erosion of the land.
- The undulating topography and visual sensitivity of the landscape.

9. Land availability and control

Is the proposal on, or partly on, Crown land?

No Yes If yes, please provide details.

Current land tenure (provide plan, if practicable):

The land is private freehold land, held under various ownerships.

Intended land tenure (tenure over or access to project land):

Bulgana Wind Farm Pty Ltd has entered into legally binding agreements with project landowners that secure land access and long-term lease arrangements that extend for the duration of the wind farm's lifespan.

Other interests in affected land (eg. easements, native title claims):

None

10. Required approvals

State and Commonwealth approvals required for project components (if known):

- The proposed wind farm and transmission infrastructure require planning permits from the Northern Grampians Shire, pursuant to the *Planning and Environment Act 1987*.
- Approval of a Cultural Heritage Management Plan (CHMP) pursuant to the *Aboriginal Heritage Act 2006* and its associated regulations.
- The proposal will be referred under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) for a decision as to whether it is a 'controlled action'.
- Discussions with the relevant Catchment Management Authority have indicated that any triggers under the *Water Act 1989* would be determined in collaboration with them when more detailed work plans have been prepared.

Have any applications for approval been lodged?

No Yes If yes, please provide details.

Approval agency consultation (agencies with whom the proposal has been discussed):

- Department of Environment and Primary Industries (DEPI)
- Department of Transport, Planning and Local Infrastructure (DTPLI)
- Northern Grampians Shire Council
- Ararat Rural City Council
- Aboriginal Affairs Victoria

Other agencies consulted:

- VicRoads
- Civil Aviation Safety Authority (CASA)
- Airservices Australia
- Barengi Gadjin Land Council
- Stawell Historical Society

PART 2 POTENTIAL ENVIRONMENTAL EFFECTS

11. Potentially significant environmental effects

Overview of potentially significant environmental effects (identify key potential effects and comment on their significance and likelihood, as well as key uncertainties):

Preliminary Flora and Fauna Scoping Assessment

This scoping assessment was based on existing data on species within the general region of the site and provides preliminary desk-top information regarding the extent and condition of native vegetation and fauna habitat in the study area. It identifies an initial level of constraint to the development of the project presented by flora and fauna issues.

This preliminary study was used to guide the preliminary planning for the wind farm proposal. The assessment indicated that suitable habitat occurs within the broad regional setting for 37 listed flora species under the including the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and *Flora and Fauna Guarantee Act 1988* and *DEPI Advisory List*. Six threatened ecological communities were considered to have potential to occur in the study area. The scoping assessment recommends that further investigations be undertaken to assess the thresholds for change to flora and fauna on the site as a result of any development.

Generally the report concludes that the broad areas proposed for turbine and access track locations are considered to have a low level of constraint in relation to flora and fauna issues due to the historical use of the site for agriculture and resulting low density of natural habitat. The majority of areas considered to represent a high level of constraint were recorded along roadside reserves that support remnant patches of native vegetation.

The report, and subsequent surveys and reports have been used to inform and guide the location of wind farm infrastructure in a manner that avoids and minimise impacts on flora and fauna wherever feasible. Further detail is provided in this referral.

Flora and Fauna Assessment

Detailed studies have been undertaken in the study area. In summary these reveal:

Flora species

It is likely that a number of Buloke (FFG-listed) and Golden Cowslips (DEPI Vulnerable) individuals will be removed as a consequence of constructing the proposed wind farm, which would be less than 50 individuals of each species. This would by no means be considered as a major or extensive impact on those species.

Ecological communities

A small area (less than 0.5 hectares) of FFG-listed Grey Box - Buloke Grassy Woodland Community will be removed as a consequence of constructing the proposed wind farm. This would by no means be considered as a major or extensive impact on that ecological community.

Fauna species

As a result of the mitigation measures implemented by Bulgana Wind Farm Pty Ltd (refer to section 12), no significant impacts to threatened or migratory fauna species are considered likely.

Native vegetation

Under the current proposal, a total of **14.562** hectares of remnant native vegetation will be removed. This comprises 7.109 hectares of remnant patch native vegetation and 106 scattered trees, which according to the DEPI *Biodiversity Assessment Guidelines* (the 'Guidelines'), equates to 7.453 hectares. Under the Guidelines, each scattered tree that is proposed to be removed is converted to an area of 0.0703119 hectares.

As a result of the traffic movements and access routes, some native vegetation may be required to be removed from roadsides. This vegetation is yet to be assessed and will be done as part of the future work following any planning approval that may be granted.

Targeted Barking Owl Report

Detailed surveys and analysis of the impact of the wind farm have been undertaken. The Barking Owl is considered to be endangered in Victoria and is listed as a threatened species under the FFG Act (DSE 2011). The Barking Owl was observed within the project area in December 2013 during daytime hours. Further surveys were undertaken by BLA to evaluate the existence of the owl. During the detailed survey at multiple sites, the Barking Owl was heard during one call-playback survey at one location on 12th March 2014. Further targeted surveys of the project area over a 12 week period failed to detect the species again. These detailed surveys were discussed with DEPI and implemented using agreed methodologies and procedures.

Given the propensity of resident Barking Owl pairs to respond to call playback and their high site fidelity, it is considered highly unlikely that the 12 weeks of targeted surveys over 3.5 months would have missed a resident pair of Barking owl with a nesting territory within or near the wind farm.

Given the sitings however, the risk of each individual turbine was determined based on the presence, location and height differential category of suitable hollow bearing trees and associated treed vegetation within 300m of the turbine.

As a result of this detailed, targeted study, turbines were relocated or removed to minimise potential impacts, resulting in the current project layout.

Remaining turbines that were initially classified as low/moderate risk to Barking Owl, are considered unlikely to impact on the owl for the following reasons:

- Foraging habitat or suitable nesting trees were located at least 200 metres from

the turbine;

- Nearby foraging habitat was in isolated patches less likely to attract Barking Owl
- The location of the turbine in the landscape ie. turbine located uphill of suitable foraging habitat.
- The presence of Powerful Owl in Ararat Regional Park that abuts the south-eastern areas of the site. Powerful Owl is likely to negatively influence the presence of Barking Owl in the southern part of Bulgana Wind Farm.

Noise Impact Assessment

Noise emissions from the proposed turbines of the Bulgana Wind Farm will be subject to a full impact assessment compliant with industry standard guidelines and the New Zealand Standard NZS6808:2010, Acoustics – Wind Farm Noise. Compliance with wind farm noise guidelines and standards is compulsory, therefore significant effects on the amenity of residents from wind turbine noise will not occur.

Preliminary noise predictions for the aforementioned impact assessment are attached as **Figures** 10 through 13. The figures illustrate that of the four candidate turbines referred to above, three generate noise levels less than 40 decibels (dB) at all dwellings around the site. The fourth candidate turbine will generate noise levels between 40 dB and 45 dB at only three dwellings. NZS 6808:2010 recommends that the level of sound from a wind farm, when heard from outside a home, should not exceed the background sound level by more than 5 dB, or a level of 40 dB, whichever is the greater.

As noted above, compliance with NZS 6808:2010 is compulsory and Figures 10 through 13 demonstrate that in almost all instances this can be achieved, without considering background noise levels or potential mitigation. The project wind turbine will be selected and located to ensure compliance with the standard. Consequently significant environmental effects from noise emissions are almost certain to not occur.

Preliminary Landscape Assessment

A Preliminary Landscape Assessment has been prepared as required by the Wind Energy Facility Guidelines 2012 and accompanies this referral.

The proposed wind farm site is located in an area identified by a series of ridges on which a large percentage of the proposed WTG's are to be located.

The recognition of the value placed by the local community on the natural and cultural landscape is the intended focus of the National Assessment Framework (NAF). The study was commissioned by the National Trust (Australia) and Auswind. Broad consultation was undertaken with State and Local Government as well as potentially affected communities with the recommended methodology developed in response to issues raised. The methodology applied in this study is consistent with the goals of the NAF.

The South West Victoria Landscape Assessment Study assesses the landscape and identifies the following landscape types and views of significance within the regional setting of the Project area:

- The Grampians (Gariwerd) & Surrounds Investigation Area – located 30 km to the west of the Project area is defined as being of State significance.
- Southern Pyrenees and Uplands – located mostly south of the Pyrenees Highway, but with a section extending north of Ararat to include Ararat Hill Park as well as the State Forest to the east of Ararat, are defined as being of regional significance.
- Views from Boroka Lookout near the eastern boundary of the Grampians National Park are defined as being of State significance. Views east toward The Pyrenees are

noted.

- Views from Pioneer Lookout on One Tree Hill to the west of Ararat within the Ararat Regional Park, and 10 km to the south of the Project, are defined as being of State significance. Views north to The Pyrenees are noted.

The study defines views within a 16km radius as being of clear visibility. Within a 16 km to 32 km radius on prominent features are defined as being potentially visible.

The Project will change the landscape of the setting at the local, sub regional and, to a lesser extent, the regional level. The location of the wind turbines on the elevated topography of the site will result in the turbines being more visible from distant locations than they would be in a flatter landscape as the upper parts (the blades) will be more visible above intervening vegetation and localised undulations in topography.

The assessment indicates that the turbines will be visible from some townships and public places (outlined further in Section 14 of this referral).

During clear atmospheric conditions, the proposed wind turbines would be visible beyond 20 km but their visual impact would be insignificant. However, during typical atmospheric conditions the wind turbines would be visible up to a distance of approximately 20 km. The area within 5 km of a wind turbine is most likely to be visually impacted.

The impacts of vegetative or building screening were not taken into account on the model and the results of the analysis therefore, include many areas that may not have a view due to intervening screening vegetation or buildings. Therefore, the preliminary TZVI could be considered to be a worst case scenario.

Residences in locations with the greatest potential visual exposure within a 5 km radius are typically screened by a dense band of vegetation surrounding an intimate and secluded home yard. The effect of this, in the majority of cases, has been to effectively contain the view shed from the house and surrounding yard itself, blocking more distant views. Where vegetation does not exist, the visual impact will be high. To mitigate these impacts investigation of appropriate screen planting at sensitive residential viewpoints will be assessed and undertaken if required.

The amelioration measures incorporated into the design process, such as the careful design of access tracks and pad sides to ensure minimisation of track length and depth of cut and fill, in conjunction with recommended actions such as, rapid ground cover restoration with grassing, screen planting at sensitive residential viewpoints and around substations, will have a positive effect on reducing the visual impact of the proposed wind farm, particularly sensitive static viewpoints such as rural residences.

Shadow Flicker Assessment

Shadow flicker is a phenomenon that only requires assessment within a distance of 1,113 m of the turbines, calculated using the blade root chord of the Siemens SWT113 (4.2 m) x 265 (in accordance with the *Draft National Wind Farm Development Guidelines – 2 July 2010*, p152). Applying this distance to the Bulgana Wind Farm turbines results in the identification of only 3 houses that require assessment for shadow flicker. Shadow flicker is a phenomenon that can very easily be mitigated by management of individual operational turbines, such as turning turbines off at times of day when shadow flicker is known to occur. The combination of the low number of houses in the vicinity of the turbines that could theoretically be affected, along with the ease of mitigation, suggests the likelihood of significant environmental effects from shadow flicker is negligible. Furthermore, *Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria* stipulates that shadow flicker experienced at a dwelling must not exceed 30 hours per year. In order for the Bulgana Wind Farm to achieve planning permit approval it must comply with this requirement, therefore no significant effects on residential amenity are anticipated from shadow flicker.

Historic Heritage Assessment

The Historic Heritage Assessment (Attachment A) identifies:

- Stocks Road Bridge and Sheep Feed Troughs were the only historic heritage identified during the investigation.
- Stocks Road Bridge was likely constructed in the mid-20th century and is a typical local bridge and possibly destroyed by a flood.
- The Sheep Feed Troughs were also likely constructed in the mid-20th century and mimic more expensive commercial versions to provide weather protection for feed. The lack of historic heritage primarily reflects the concentration of wind farm infrastructure on ridgelines and other areas that do not have an intensive historic landuse history.
- The focus of historic activity would have been at house lots near road sides outside of the wind farm infrastructure zone. There is likely extensive historic heritage at Allarvale homestead, but this area was not assessed.

The background research and ground surface survey has demonstrated that no known heritage will be harmed by the proposed wind farm development.

Desktop Cultural Heritage Assessment

The desktop assessment (Attachment B) demonstrated that:

1. There are registered places within the Activity Area (see Table 4 in Attachment B). For this assessment the extent of the Activity Area equates to the Bulgana Wind Farm site area shown on **Figure 14** (Map 3 from Attachment B).
2. There are areas of cultural heritage sensitivity being registered places, waterways, hillcrests and ridgelines (see Table 10 in Attachment B)
3. It is reasonably possible that Aboriginal cultural heritage is present.

Based on the results of the desktop assessment, a Standard Assessment was required (r.58(1) Aboriginal Heritage Regulations 2007), which will be published in the Cultural Heritage Management Plan referred to below.

A Cultural Heritage Management Plan is currently being prepared, with fieldwork as part of the Complex Assessment underway, and is anticipated for approval in October/November 2014.

Further information

Following the completion of the Desktop Assessment a standard and complex assessment is being undertaken. Some aboriginal cultural heritage places have been identified on site. These are currently being assessed for scientific and cultural significance.

Traffic Assessment

The construction phase has been assumed to last approximately 18 months and traffic generation will depend on a number of factors. Preliminary analysis of the traffic demands of the various construction phases and tasks suggests that the Bulgana Wind Farm will generate approximately 23,760 heavy vehicle movements and 44,750 light vehicle movements over the entire construction period. This will include 740 – 750 movements by over size and / or over mass (OSOM) vehicles.

During peak construction phases the wind farm will generate approximately 1,800 vehicle movements per week equating to 300 movements per day.

Construction Traffic is anticipated to be distributed on the local road network based on work locations and sources of materials, including delivery port for OSOM components

and construction material sources in the region. The ultimate port and material sources is not available at this stage in the development process but likely distribution has been estimated.

Construction phase impact will primarily be caused by the impact of heavy vehicle movements and the OSOM vehicles. Given the rural nature of the site and relatively light existing traffic volumes, additional light vehicle movements generated during the construction phase are unlikely to have any material impact on the operation of the road or maintenance requirements.

The increase in traffic movements during the construction phase will result in some increased noise to residents in the surrounding area. This will be managed through restrictions on hours of delivery and matters to be addressed in the detailed construction management plans.

The selection of transport routes to the site will result in the need for removal of some native vegetation. The impact of the removal of this native vegetation and any biodiversity impacts will be assessed as future work. Mitigation plans to limit the removal of vegetation will be prepared and authorisations and approvals will be sought based on the design of the project and the associated detailed traffic movements.

Based on the findings of this report it is considered that traffic associated with the construction, operation and decommissioning of the proposed Bulgana Wind Farm can be accommodated on the local road network with some works. By the nature of the project, traffic management measures will be required to enable the manoeuvre of OSOM vehicles transporting components to the site.

The routes identified for access to the site are generally suitable for purpose and where improvements are required to accommodate vehicles more detailed analysis should be undertaken and appropriate treatments provided at the proponent's expense.

It is recognised that the increase in heavy vehicle movements over an 18 month period may result in increased maintenance or damage to some local roads, and may also have noise and emissions impacts. As more details of the construction traffic are confirmed, the need to "make good" damage will need to be reviewed and costs allocated appropriately at such time.

In addition some day to day traffic management mitigation measures may be required. These will be identified within a construction management plan prepared when construction logistics are finalized and may include:

- Road watering to limit dust impact;
- Vegetation pruning; and
- Time restrictions for specific works.

Preliminary Geotechnical Assessment

The general geology of the site comprises:

- Cambrian Age St Arnaud Group (Warrak Formation) comprising Turbiditic siltstone, sandstone and mudstone, and minor schist with associated residual soils;
- Devonian Age Two Eyed Creek Granodiorite comprising medium to coarse grained Hornblende-biotite granodiorite, numerous quartz diorite, biotite granodiorite and country rock xenoliths; strongly foliated in part with associated residual soils;
- Tertiary and Quaternary sedimentary deposits comprising clay, silt, sand, and gravel.

In relation to site erosion the Preliminary Geotechnical Assessment (Attachment C)

states that evidence of severe erosion was observed along drainage channels indicating that the surface and near surface soils are susceptible to erosion. Due to the hilly topography it is expected that water flows along natural drainage channels would be fast and erosion is likely to result. Measures that will be considered to mitigate erosion during construction may include:

- Reduction, where practicable, in the clearing of natural vegetation and surface water runoff in the construction areas;
- Re-vegetation of stripped and filled areas as soon as practicable;
- Construction of silt traps and stilling basins to slow the flow of surface runoff and to reduce sedimentation of the natural waterways;
- Protection of drainage channels by rock beaching, silt dams or similar.

Geotechnical experts observed no evidence of natural slope instability at the site during the site inspection. Given the topography of the site, cut and fill embankments will be required to construct access tracks and hardstand areas. Appropriate batter angles, fill re-compaction and other engineering measures will be adopted to ensure that cut and fill batters are constructed in a manner that will not impact the stability of the natural slopes or the constructed batters.

Aviation Assessment

The overall risk to aviation operations in the vicinity of the proposed Bulgana Wind Farm is low. However, there is the potential for the proposed wind turbines to penetrate the Obstacle Limitation Surfaces (OLS) for Stawell Aerodrome, therefore obstacle lights are considered to be required for the wind turbines. Discussions have been held with CASA in drafting the aviation impact assessment, and CASA will need to be officially advised of the proposed wind farm development in accordance with CASR 139.365.

Discussions have also been held with Airservices Australia about the temporary wind monitoring masts on site and the proposed wind farm. They will need to be advised of the proposed wind farm development as the potential impact on the recently established RNAV (GNSS) instrument approach procedures for Stawell Aerodrome needs to be assessed by Airservices Australia.

The risk to aviation operations will be further reduced, when in the fullness of time, the wind turbines are identified on the relevant aeronautical charts, i.e., both the civil world aeronautical charts and the RAAF produced chart series. This is considered essential risk mitigation. Pending such identification on maps, all aviation operators will be made aware of the proposed existence of the wind farm. Airservices Australia would normally do this via NOTAM action covering both the construction phase and prior to identification on maps.

Any lighting installed will comply with the relevant guidance at the time of installation, which may include National Airports Safeguarding Framework – Guideline D “Managing the Risk to Aviation Safety of Wind Turbine Installations (wind farms) / wind Monitoring Towers”. These guidelines provide for partial shielding of obstacle lights to minimise visual impact on the environment, particularly from ground based receptors.

The visual impact of the lighting is considered acceptable, and will not amplify the level of the visual impact of the wind turbines, rather it will lengthen the time that the site of the wind farm will be visible – for example in the evenings and at night due to the lighting.

Electromagnetic and Communication Assessment

This Assessment (Attachment D) provides an analysis of each of the radio facilities registered near the wind farm. It also establishes recommended clearances based on accepted industry criteria for radio links crossing the wind farm and any required buffer zones for other radiocommunications sites. A study of the signal paths from the main TV stations to the low power TV repeaters has been made to identify any potential

interference to their input signals by wind turbines.

A number of existing *Australian Communications and Media Authority (ACMA)* registered radiocommunication services are located in the general area and one point-to-point radio service crosses the wind farm nominal site boundaries. To ensure that the locations of turbines will not degrade the performance of radio systems minimum separation distances and exclusion zones have been established for the turbine structures.

For the current layout of wind turbines no adverse impacts on point-to-point or omnidirectional radio systems in the area are expected.

TV and radio broadcasting transmitting sites are sufficiently distant from turbines to not have any general service area coverage degradation.

Some individual dwellings close to turbines and in the forward scatter areas of TV transmissions may experience some reception impairment. However mitigation methods are available to return reception to at least preconstruction conditions.

Interconnecting power lines and substations will be constructed and located according to industry standards to ensure that magnetic and electric fields are well below the human exposure limits for public spaces and at private dwellings. EMI levels at power line easement boundaries will be required to meet the appropriate Australian Standard levels which will ensure that radio and TV reception and other radiocommunication services will not be impaired.

12. Native vegetation, flora and fauna

Native vegetation

Is any native vegetation likely to be cleared or otherwise affected by the project?

NYD No Yes If yes, answer the following questions and attach details.

What investigation of native vegetation in the project area has been done? (briefly describe)

Detailed information on the flora and fauna of the study area can be found in Attachment E of this referral. The survey dates and scope are summarised in the table below.

Survey Type	Survey Dates	Survey Method
Preliminary flora and fauna scoping assessment of proposed wind farm	July 2013	Review of existing information from the EPBC Act Protected Matters Search Tool, Victorian Biodiversity Atlas and Viridans Flora Information System within the wind farm and a ten kilometre buffer. Field assessment to determine areas of potential constraint based on flora and fauna habitat.
Detailed flora and native vegetation assessment	Sep - Nov 2013 March 2014 August 2014	Habitat hectare assessment of all vegetation in the proposed infrastructure zone. Detailed micro-siting surveys to avoid areas of native vegetation where possible.
Targeted field surveys for threatened flora species.	Oct – Nov 2013	Targeted surveys for threatened flora species.

What is the maximum area of native vegetation that may need to be cleared?

NYD Estimated area ...14.56 (hectares)

Under the current proposal, a total of **14.562** hectares of remnant native vegetation will be removed. This comprises 7.109 hectares of remnant patch native vegetation and 106 scattered trees, which according to the DEPI *Biodiversity Assessment Guidelines* (the

'Guidelines'), equates to 7.453 hectares. Under the Guidelines, each scattered tree proposed to be removed is converted to an area of 0.0703119 hectares.

How much of this clearing would be authorised under a Forest Management Plan or Fire Protection Plan?

N/A approx. percent (if applicable)

Which Ecological Vegetation Classes may be affected? (if not authorised as above)

NYD Preliminary/detailed assessment completed. If assessed, please list.

Remnant native vegetation proposed to be removed belongs to the following Ecological Vegetation Classes (EVCs):

- Heathy Dry Forest (EVC 20) = 3.763 hectares
- Heathy Woodland (EVC 48) = 0.132 hectares
- Alluvial Terraces Herb-rich Woodland (EVC 67) = 0.198 hectares
- Creekline Grassy Woodland (EVC 68) = 0.366 hectares
- Low-rises Grassy Woodland (EVC 175_61) = 2.384 hectares
- Granitic Grassy Woodland (EVC 175_62) = 0.111 hectares

Have potential vegetation offsets been identified as yet?

NYD Yes If yes, please briefly describe.

A number of potential offset sites have been identified within the proposed wind farm project area, which, subject to landowner agreement, will likely meet the offset target. The offset target has yet to be finalised, but will likely be a general offset, of approximately 3 General Biodiversity Equivalence Units based on calculations from a previous iteration of the wind farm infrastructure layout, which only slightly differs from the current.

Other information/comments? (eg. accuracy of information)

The forthcoming planning permit application for the proposed wind farm will meet all the requirements of the Guidelines, which is demonstrated, in detail, in Attachment E of this referral.

NYD = not yet determined

Flora and fauna

What investigations of flora and fauna in the project area have been done? (provide overview here and attach details of method and results of any surveys for the project & describe their accuracy)

Survey Type	Survey Dates	Survey Method
Preliminary flora and fauna scoping assessment of proposed wind farm	July 2013	Review of existing information from the EPBC Act Protected Matters Search Tool, Victorian Biodiversity Atlas and Viridans Flora Information System within the wind farm and a ten kilometre buffer. Field assessment to determine areas of potential constraint based on flora and fauna habitat.
Detailed flora and native vegetation assessment	Sept –Nov 2013 March & August 2014	Habitat hectare assessment of all vegetation in the proposed infrastructure zone
Targeted field surveys for threatened flora species.	Oct –Nov 2013	Targeted surveys for threatened flora species.

Fauna assessment	Sept –Oct 2013	Field assessment of all areas of fauna habitat.
Swift Parrot survey	May 2014	Targeted survey for Swift Parrot and mapping of habitat.
Spotlighting and call playback surveys for threatened species	Mar – Jun 2014	Targeted surveys for Powerful Owl, Masked Owl, Barking Owl and Bush Stone-curlew. Survey also focussed on mapping of important habitat trees for Barking Owl.
Bird utilisation survey	February 2014	Level 1 bird risk assessment, as per guidelines.
Bat activity survey	Nov – Dec 2013 Jan – Feb 2013	Bat recording at ten sites over two weeks during spring and summer

Have any threatened or migratory species or listed communities been recorded from the local area?

NYD No Yes If yes, please:

- List species/communities recorded in recent surveys and/or past observations.
- Indicate which of these have been recorded from the project site or nearby.

Nine EPBC Act and/or FFG act listed species listed in Table 5 of Attachment E which were considered to potentially occur in the proposed infrastructure zone, four species listed on DEPI's Advisory List were also considered to potentially occur in the infrastructure zone due to historical records in the search region, and suitable habitat in the study area. These 13 listed flora species were as follows. Note that many EPBC Act and FFG Act listed species are also listed on DEPI's Advisory List:

- Brilliant Sun-orchid (EPBC Act - vulnerable, FFG Act listed, DEPI - endangered)
- Buloke (FFG Act listed)
- Clover Glycine (EPBC Act - vulnerable, FFG Act listed, DEPI - vulnerable)
- Crimson Sun-orchid (DEPI - vulnerable)
- Golden Cowslips (DEPI - vulnerable)
- Half-bearded Spear-grass (DEPI - rare)
- Pale Leek-orchid (syn. Pink-lip Leek-orchid) (EPBC Act - vulnerable, FFG Act listed, DEPI - endangered)
- Pale-flower Crane's-bill (DEPI - rare)
- Pomonal Leek-orchid (EPBC Act - endangered, FFG Act listed, DEPI - endangered)
- Purple Eyebright (EPBC Act - endangered, FFG Act listed, DEPI - endangered)
- Small Milkwort (FFG Act listed, DEPI - vulnerable)
- Spiral Sun-orchid (EPBC Act - vulnerable, FFG Act listed, DEPI - vulnerable)
- Trailing Hop-bush (EPBC Act – vulnerable, DEPI - vulnerable).

Of the 13 listed threatened flora species listed above, two were recorded within the proposed infrastructure zone of the proposed wind farm. These were:

- Buloke
- Golden Cowslips

Exhaustive target threatened flora surveys were carried out in suitable habitat in the proposed infrastructure zone for all 13 of the species listed above. Species not recorded during those surveys, are now considered unlikely to occur.

Flora species

Flora species recorded, or considered likely to occur in the wind farm and associated infrastructure is presented in the table below. This is followed by a more detailed discussion of the species considered likely to occur and the species recorded during vegetation surveying.

Existing information from the search region and type and condition of habitat in the proposed infrastructure zone indicated that the following listed threatened fauna species could potentially occur there:

- Barking Owl (FFG Act listed; DEPI – endangered)
- Black-chinned Honeyeater (DEPI – near threatened)
- Brown Treecreeper (DEPI – near threatened)
- Bush Stone-curlew (FFG Act listed; DEPI – endangered)
- Diamond Firetail (FFG Act listed; DEPI – near threatened)
- Hooded Robin (FFG Act listed; DEPI – near threatened)
- Masked Owl (FFG Act listed; DEPI – endangered)
- Powerful Owl (FFG Act listed; DEPI – vulnerable)
- Rainbow Bee-eater (EPBC Act – migratory)
- Speckled Warbler (FFG Act listed; DEPI – vulnerable)
- Swift Parrot (EPBC Act – endangered; FFG Act listed; DEPI – endangered)
- White-throated Needletail (EPBC Act – migratory; DEPI – vulnerable)
- Brush-tailed Phascogale (FFG Act listed; DEPI – vulnerable)
- Common Dunnart (DEPI – vulnerable)
- Fat-tailed Dunnart (DEPI – near threatened)
- Southern Bentwing Bat (EPBC Act – critically endangered; FFG Act listed; DEPI – critically endangered)
- Squirrel Glider (FFG Act listed; DEPI – endangered)
- Eastern Bearded Dragon (DEPI – near threatened)

The vulnerability of the above species to impacts from the construction and operation of Bulgana Wind Farm are detailed below. Targeted surveys were carried out for Bush Stone Curlew, Powerful Owl, Masked Owl, Barking Owl and Swift Parrot to determine their potential presence in the study area and vulnerability to impacts.

Birds

Woodland Birds

Black-chinned Honey Eater, Brown Treecreeper, Diamond Firetail, Hooded Robin and Speckled Warbler are species that are found in woodland areas. These species generally do not leave their woodland habitats and do not fly above the tree canopy. Where possible, Bulgana Wind Farm Pty Ltd has avoided woodland habitats and scattered trees. Significant impacts due to the removal of habitat are considered unlikely. In addition, woodland birds are not considered vulnerable to collision risk with wind turbines as they would not fly rotor swept area height.

White-throated Needletail

The White-throated Needletail is highly nomadic when in Australia and move in flocks ahead of weather fronts, often over heavily forested areas. This species is likely to occur in the study area

occasionally due to the presence of suitable habitat. The removal of the small area of habitat during construction is unlikely to have a measurable impact on population numbers, estimated to be at 10 000 individuals. This species may be affected to a small degree by wind farm operations as they may fly at rotor swept area, however impacts to the species for the construction and operation of the wind farm are unlikely to be significant.

Rainbow Bee-eater

This species is likely to occur in the study area in woodlands areas or cleared land with scattered trees, from October to March. It was recorded during the field assessment at the northern end of the study area. There is ample nesting habitat in the form of eroded creek banks. Bee-eaters are aerial foragers and may be susceptible to occasional turbine casualties, but any impact on their overall population is likely to be minimal.

Swift Parrot

A targeted survey for Swift Parrot was carried out in May 2013, when the species had been confirmed as occurring on the mainland. Habitat for the species was mapped throughout and close to (ie. in adjacent blocks of remnant vegetation) the wind farm. The species was not recorded during the survey, however it may occasionally utilise the large block of remnant vegetation to the north of the study area in Joel Joel Nature Conservation Reserve. The nearest turbine is 1.5 kilometres away from this area. Given the turbines are located on top of ridges and away from areas of suitable habitat that are likely to attract the Swift Parrot, operation of the wind farm is unlikely to have a significant impact on the species.

Nocturnal spotlighting and call playback surveys

Nocturnal spotlighting and call playback surveys were undertaken for Bush Stone-curlew, Powerful Owl, Barking Owl and Masked Owl. Weekly nocturnal spotlighting and call playback surveys were carried out for Powerful Owl, Barking Owl and Bush Stone-curlew from the 12th March 2014 to the 1st May 2014 at a total of 12 sites, representative of remnant vegetation in the study area and in nearby conservation reserves. A second round of weekly nocturnal surveys was carried out from late May to June 2014 for Barking Owl and Masked Owl.

Surveys also included diurnal searches in areas of likely habitat, to locate evidence of usage in the study area (e.g. white-wash, regurgitated pellets), and an assessment of suitable hollow-bearing trees for nesting Barking Owl.

The following details the results of the surveys for each species.

Bush Stone-curlew

The Bush Stone-curlew lives in lowland grassy woodland, often with an overstorey of River Red-gum, Grey Box or Yellow Box and sparse, short, native grassy cover. There are no previous records of the species in the wind farm itself, however two historical records (the most recent being from 1992) exist in the 10 km search region. Despite the presence of suitable habitat within the study area, the Bush Stone-curlew was not recorded during surveys carried out in March and June 2014. Based on the lack of recent records in the region, any population of Bush Stone-curlew in the vicinity of Bulgana wind farm is likely to be small, if present at all. The construction of Bulgana wind farm is therefore unlikely to significantly impact any local population of Bush Stone-curlew.

Powerful Owl

The Powerful Owl prefers open and tall wet sclerophyll forests with sheltered gullies and old growth forest that provide large old hollow-bearing trees required for nesting (Higgins 1999). The Powerful Owl tends to hunt inside the forest for prey such as tree dwelling mammals and rarely leaves its woodland habitats. A single Powerful Owl was heard in response to call-playback on 14th March 2014 in Ararat Regional Park, to the south of the wind farm study area. Powerful Owl has previously been recorded at Ararat Regional Park (VBA 2014), and it is likely that a resident owl resides there. A historical record of Powerful Owl also exists from Joel Joel Nature Conservation Reserve (NCR) in 1997. The southern end of this NCR was surveyed for Powerful Owl on seven occasions during this investigation and Powerful Owl was not recorded. It is therefore considered that the species was absent from the NCR during the survey, and that it may occur infrequently at Joel Joel NCR.

There are no historical records from the area of the wind farm itself between Joel Joel NCR and Ararat Regional Park. A number of nocturnal surveys and daytime searches were carried out in

the intervening areas including Metcalfe Road where large old hollow-bearing trees are present, and no evidence of the Powerful Owl was recorded.

The findings suggest that Powerful Owl is probably resident in Ararat Regional Park immediately to the south of the wind farm (approximately 1.5 kilometres from the closest turbine), but is unlikely to regularly occur in the wind farm itself due to a lack of large continuous forest or woodland blocks, or riparian zones of permanent streams. It may occur infrequently at Joel Joel NCR to the north of the wind farm.

Impacts of Bulgana Wind Farm on Powerful Owl are therefore expected to be negligible due to the low expected incidence of birds passing through the wind farm footprint.

Barking Owl

The conclusions and recommendations from the detailed Barking Owl assessment (Attachment F) are detailed below.

- Barking Owl was recorded twice in the study area. It was sighted in December 2013 in the central part of the wind farm (site B3) and was heard calling from close to the northern boundary in March 2014 (500 metres south-east of Site B1). No further evidence of Barking Owl was recorded, despite 12 weeks of call play/spotlighting surveys over a 3.5 month period and active searches for nesting trees, scats, pellets and feathers.
- Given the propensity of resident Barking Owl pairs to respond to call playback and their high site fidelity, it is considered highly unlikely that the 12 weeks of targeted surveys over 3.5 months would have missed a resident pair of Barking Owl with a nesting territory within or near the wind farm.
- The two records in and near the proposed Bulgana Wind Farm and a recent record of Barking Owl just west of Great Western in March 2011 (DEPI 2014A), indicate that the species occurs in the region at low density, with at least one bird occurring within the wind farm boundary recently. The records are likely to be from either a dispersing juvenile or a 'floater' (non-territorial or unpaired bird).
- A Powerful Owl was detected calling in response to call playback in the northern section of Ararat Regional Park, close to the southern edge of the wind farm and approximately 1.5 kilometres from the nearest turbine. Powerful Owl and Barking Owl home ranges tend to be mutually exclusive, therefore it is unlikely that Barking Owl would use the southern end of the wind farm (roughly 3 – 6 kilometres from the northern section of Ararat Region Park) due to its proximity to a resident Powerful Owl.
- When foraging, the Barking Owl perches on tree branches (including exotic planted trees) and flies out to catch prey up to 200 metres, returning to the branch to eat.
- Schedvin (2007) documented that nightly movements of Barking Owl involve 'stepping stone' movements between trees and woodland remnants to productive foraging areas, followed by a more direct, return flight before dawn to the traditional roost tree. These return movements can be distances of over ten kilometres over open ground (via trees) to remnant forest blocks.
- When foraging for ground-based prey (ie. rabbits or rats), Barking Owl flights from sentry perches are generally low (Ed McNabb, pers. comm. 2014).

However, insects form a large part of their diet during the non-breeding season. During the warmer months, Barking Owl has been observed flying above the trees hawking large insects, such as beetles. Hawking may occur roughly ten metres above treed vegetation. This behaviour would be confined to seasons and to more densely treed habitat where this prey type was more abundant and readily available.

- Sixty-one trees containing hollows potentially suitable for nesting Barking Owl were mapped within 300 metres of proposed turbines. Trees were classified into categories A, B and C based on the vertical height difference between the lower tip of the turbine (considered to be 35 metres above the ground) and the treetop, accounting for both the elevation (above sea level) of the tree and turbine and a 15 metre vertical foraging buffer to allow for foraging above trees.
- Fifteen hollow-bearing trees were classified as category A, indicating that if Barking Owl were foraging at or above canopy height in these trees, they could potentially be at risk of colliding with a nearby turbine. Foraging at trees classified as category B (34 trees) and C (22 trees) was not likely to put the Barking Owl at risk, as foraging flights would occur below rotor swept area height.
- The risk of each individual turbine was determined based on the presence, location and height differential category of suitable hollow bearing trees and associated treed vegetation within 300 metres of the turbine. Turbines were classified as moderate risk (2 turbines), low-moderate risk (10 turbines), low risk (12 turbines) or very low risk (43 turbines) to Barking Owl.
- Impacts to Barking Owl from turbines classified as low risk and very low risk were considered to be unlikely or negligible and no further action with regard to Barking Owl impacts was considered necessary for these turbines.
- Turbines 14 and 19 were classified as moderate risk and were recommended for relocation or removal. These turbines were located within 100 metres of woodland or densely scattered trees and within 150 metres of category A trees.
- A further ten turbines (15, 17, 18, 20, 28, 29, 43, 55, 64, 68) were considered to represent a low-moderate risk to Barking Owl, based on the presence of foraging and/or nesting habitat within 300 metres of each turbine. Potential risk associated with these turbines was uncertain, therefore further factors such as the isolation of surrounding vegetation from other woodland areas, the position of the turbine in the landscape (ie. topography) and the horizontal separation of the turbine from foraging or nesting habitat were considered.
- Turbine 18 was recommended for relocation or removal due to the turbine's proposed location amongst woodland habitat contiguous with turbine 19 (where Barking Owl was recorded), and the presence of three category B trees within 100 metres of the turbine.

Impacts to Barking Owl from the remaining turbines initially classified as low/moderate risk to Barking Owl, were considered unlikely for the following reasons:

- Foraging habitat or suitable nesting trees were located at least 200 metres from the turbine;
 - Nearby foraging habitat was in isolated patches less likely to attract Barking Owl
 - The location of the turbine in the landscape ie. turbine located uphill of suitable foraging habitat.
 - The presence of Powerful Owl in Ararat Regional Park, which was likely to negatively influence the presence of Barking Owl in the southern part of Bulgana Wind Farm.
- Due to the presence of two Wedge-tailed Eagle nests located 190 and 300 metres respectively from turbine 33 (in trees 72 and 74), this turbine is also recommended for relocation so that it is at least 300 metres away from both nests. Wedge-tailed Eagles are not threatened but are considered species of

concern due to their susceptibility to colliding with turbines.

- Based on the recommendations from the risk assessment of the May 2014 development layout, turbines 14, 18 & 19 were removed from the current development layout (August 2014) and turbine 33 was relocated so that it is 300 metres from both Wedge-tailed Eagle nests.
- An assessment of risk was carried out for 14 turbines that have been relocated under the August 2014 development layout. Of the 14 turbines assessed in the updated development layout because their position was changed, 13 were considered to be low risk to Barking Owl and one (turbine 20) was considered to be low-moderate risk, using the risk matrix of surrounding vegetation vs height differential category of surrounding trees. The risks associated from turbine 20 were further considered in context of the surrounding landscape. Woodland habitat (which increased the risk category of the turbine) was located roughly 150 metres down slope of the proposed turbine 20. Considering horizontal and vertical distance of foraging habitat from turbine, impacts from turbine 20 are now considered unlikely.
- Based on the information available to date, including the location of Barking Owl records on the wind farm, suitable habitat availability, the proposed location of turbines under the finalised August 2014 development layout and knowledge of flight heights above habitat surrounding turbines, the overall risk to Barking Owl from the proposed wind farm is considered to be low.

Masked Owl

Nocturnal surveys and daytime searches for evidence of Masked Owl were carried out from late May and June 2014, during the second round of surveys for Barking Owl. Five weekly call playback and spotlighting surveys were undertaken at 12 sites within and surrounding the wind farm. No confirmed observations of Masked Owl were obtained during the survey, and there are no historical records of the species in the search region.

Based on the lack of records in the region, any population of Masked Owl in the vicinity of Bulgana wind farm is likely to be small, if present at all. The construction and operation of Bulgana wind farm is therefore unlikely to significantly impact any local population of the Masked Owl.

Mammals

Fauna species recorded, or considered likely to occur in the wind farm and associated infrastructure area are included at Table 6 of Attachment E.

Southern Bentwing Bat

Southern Bentwing Bat, was recorded using the wind farm site; the species was restricted in both seasons to one recording site (site 10) and was recorded at comparatively low activity levels (i.e. numbers of calls). There are five historical records of the species from within 100 kilometres of the wind farm, the closest being 67 kilometres south west of the wind farm from 1977. The two maternity caves upon which Southern Bentwing Bats are likely to be dependent, are located at Warrnambool and Naracoote, 130 and 190 kilometres from the wind farm respectively. Habitat for the species on the wind farm is considered to be low quality, given the lack of suitable caves for roosting and the degraded nature of water sources around which the species would preferentially feed. The findings suggest that the species is neither widespread nor abundant on the proposed wind farm site. Significant impacts to the species from the construction and operation of the wind farm are unlikely to be significant, based on consideration of the significant impact criteria (Annex 1: BL&A 2014).

Common Dunnart

There is potential for this species to occur in the woodland areas of the wind farm where there is fallen woody debris and leaf litter. Provided the removal of woodland vegetation is minimised, impacts upon the Common Dunnart would be low and the species is expected to recover from any temporary disturbance to the local population.

Fat-tailed Dunnart

There is potential for this species to occur in areas of the wind farm supporting open, bare ground, rocky habitats and grassland. The habitat available for Fat-tailed Dunnart is fairly consistent throughout the wind farm (ie. one area is not better than the other). Given the presence of recent records in the region, the species is likely to occur. However, the area of Fat-tailed Dunnart habitat that will be impacted is small compared to the amount of habitat available over the wind farm, therefore impacts to the local population are unlikely to be significant.

Brush-tailed Phascogale and Squirrel Glider

There is potential for these species to occur in woodland habitats of the wind farm, particularly along the roadsides with large old hollow-bearing trees with good connectivity to larger areas of suitable habitat such as Ararat Hill Regional Park. Removal of woodland vegetation may impact on these species; however where possible, Bulgana Wind Farm Pty Ltd has avoided woodland areas and scattered trees in development of the wind farm layout. Where potential habitat is to be removed (i.e. large hollow-bearing trees), a salvage protocol during construction works is recommended to further avoid potential impacts. Given the implementation of mitigation measures, significant impacts to these species are unlikely.

Reptiles

Eastern Bearded Dragon

The Eastern Bearded Dragon occurs in woodland habitats in the study area. To minimise impacts to this species it is recommended that woodland habitats are avoided to prevent habitat loss. Where possible, Bulgana Wind Farm Pty Ltd has avoided woodland areas and scattered trees in development of the wind farm layout. This will ensure minimal impacts on the species.

Ecological communities

Based on the review of existing information and the physical attributes of the study area, the following threatened ecological communities listed under the EPBC Act and/or the FFG Act were considered to potentially occur in the study area. *Please note that only habitat zones on public land (road reserves) were considered for FFG Act listed communities, as the Guidelines do not account for FFG Act listed matters on private land:*

- Listed under the EPBC Act:
 - *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland*
 - *Grey Box (Eucalyptus microcarpa) Grassy Woodland and Derived Grasslands Ecological community*
- Listed under the FFG Act:
 - *Victorian Temperate-woodland Bird Community*
 - *Grey Box - Buloke Grassy Woodland Community*
 -

When assessed against specific identification criteria and condition thresholds during the site inspection, the following listed threatened ecological communities were confirmed as occurring in the proposed infrastructure zone:

- *Grey Box - Buloke Grassy Woodland Community*

A small area of this ecological community was recorded along Joel South Road.

If known, what threatening processes affecting these species or communities may be exacerbated by the project? (eg. loss or fragmentation of habitats) Please describe briefly.

The following listed threatening processes affecting these species may be exacerbated by the project without the implementation of mitigation measures:

- Habitat fragmentation as a threatening process for fauna in Victoria.
- Invasion of native vegetation by “environmental weeds”.
- The spread of *Phytophthora cinnamomi* from infected sites into parks and reserves, including roadsides, under the control of a state or local government

authority.

- Use of Phytophthora-infected gravel in construction of roads, bridges and reservoirs.
- Wetland loss and degradation as a result of change in water regime, dredging, draining, filling and grazing (however existing wetlands in the study area are highly modified).

Mitigation measures will be implemented to ensure that these processes are not exacerbated.

Are any threatened or migratory species, other species of conservation significance or listed communities potentially affected by the project?

NYD No Yes If yes, please:

- List these species/communities:
- Indicate which species or communities could be subject to a major or extensive impact (including the loss of a genetically important population of a species listed or nominated for listing) Comment on likelihood of effects and associated uncertainties, if practicable.

Flora species

It is likely that a number of Buloke and Golden Cowslips individuals will be removed as a consequence of constructing the proposed wind farm, which would be less than 50 individuals of each species. This would by no means be considered as a major or extensive impact on those species.

Ecological communities

A small area (less than 0.5 hectares) of Grey Box - Buloke Grassy Woodland Community will be removed as a consequence of constructing the proposed wind farm. This would by no means be considered as a major or extensive impact on that ecological community.

Fauna species

As a result of the mitigation measures implemented by Bulgana Wind Farm Pty Ltd, no significant impacts to threatened or migratory fauna species are considered likely.

Is mitigation of potential effects on indigenous flora and fauna proposed?

NYD No Yes If yes, please briefly describe.

Flora and Ecological Communities

The proposed wind farm development layout has been designed, where possible, to avoid areas of high quality native vegetation and scattered trees. Recommendations outlined by BL&A including avoidance of the high quality native vegetation along Metcalf Rd and micro-siting to avoid scattered trees, have been adopted by the client. In addition, the remnant patch of vegetation that contained habitat for several threatened fauna species (see below) has been avoided.

Should the wind farm, and associated infrastructure, be altered the following assessments will be undertaken:

Vegetation assessment to:

- Determine whether the vegetation qualifies as a listed ecological community
- Habitat hectare assessment to determine any offset requirements (under the Victorian Biodiversity Assessment Guidelines)
- Targeted flora assessment in any areas of suitable habitat.

Fauna

As above, the proposed wind farm development layout has been designed, where possible, to avoid areas of high quality native vegetation and scattered trees that provide habitat for fauna species. The remnant patch of vegetation that contained habitat for several threatened fauna species (see below) has been avoided.

As detailed in the previous section, a nocturnal spotlighting/call playback survey was undertaken to determine the potential impacts to threatened owls from construction and operation of the wind farm. The Barking Owl was recorded twice in the study area and a detailed risk assessment, including mapping of nesting trees and an assessment of potential risk posed by individual turbines, was undertaken. The recommendations from the risk assessment were adopted by Bulgana Wind Farm Pty Ltd, including the removal of three turbines that presented a moderate risk to Barking Owl. As a result of the removal of these three turbines, operation of the wind farm is now considered to be low risk to Barking Owl.

The three turbines that were removed from the layout were surrounded by woodland vegetation. Other threatened woodland birds, including Diamond Firetail, Brown Treecreeper and Hooded Robin were also recorded in the woodland habitat where two of the turbines were located. These threatened woodland birds do not leave their woodland habitats or fly at rotor-swept-area height, and were therefore not considered to be at risk from operating turbines. However, removal of the turbines and access tracks in this area has avoided removal of habitat for threatened species, along with removal of native vegetation and scattered trees.

Additional mitigation measures

Bulgana Wind Farm will adopt a range of measures to mitigate possible impacts on site ecology. These will be selected and applied after consideration of the location and extent of works, and may include those measures listed below. With the implementation of these mitigation measures, the threatening processes, detailed in the section above, will not significantly impact vegetation communities, or listed flora and fauna species.

Consideration should also be given to including the mitigation measures described below (for bats and fauna in general) in a construction and operational environmental management plan for the project.

Pre-construction

- Avoid disturbing the intact native vegetation and scattered trees.
- Avoid removal of large, hollow-bearing indigenous trees, where feasible.
- Construction activities will be sited at least 30 m away from wetlands, creeks and drainage lines.
- The proposed development will be designed in a way that does not alter the site's hydrology in areas that support native vegetation or act as tributaries to rivers, creeks and significant drainage lines. Note that the majority of water sources in the study area are currently highly degraded.
- Construction contractors will be inducted into an environmental management program for construction works.
- All environmental controls will be checked for compliance on a regular basis.

Construction phase

An Environmental Management Plan is required under the Wind Energy Facility Guidelines 2012.

- Environmentally sensitive areas will be securely fenced at 2 m from their perimeter and appropriately signed. All machinery and earthworks are to be excluded from these areas.
- The fencing will be maintained for the duration of the construction phase, and will be inspected by the site manager on a daily basis.
- Any tree pruning will be undertaken by an experienced arborist to prevent disease or unnecessary damage to the tree or disturbance to root zones during tree trimming.
- Where large hollow-bearing trees or woodland habitat is to be removed, a fauna spotter should be present to identify and salvage any arboreal fauna species at risk during construction works.
- Any stockpiling will occur outside environmentally sensitive areas.
- All machinery will enter and exit works sites along defined routes that do not impact on native vegetation or cause soil disturbance and weed spread.
- All machinery brought on site will be weed and pathogen free. This is important for environmental and agricultural protection. Soil borne pathogens such as Cinnamon Fungus and livestock diseases can easily be transported by machinery.
- All machinery wash down, lay down and personnel rest areas will be defined (fenced) and located in disturbed areas.
- Best practice erosion control will be adopted where an erosion hazard is identified and erosion control activities will include:
 - The use of sediment fences down slope of exposed soil and stockpiles
 - Bunding of stockpiles
 - Minimisation of the area of disturbed soil at any one time.

Post-construction phase

- Weed control, by an experienced bush regenerator, is to be carried out along disturbed areas after construction to control any weed outbreaks.

Other information/comments? (eg. accuracy of information)

13. Water environments

Will the project require significant volumes of fresh water (eg. > 1 GI/yr)?

NYD No Yes If yes, indicate approximate volume and likely source.

Will the project discharge waste water or runoff to water environments?

NYD No Yes If yes, specify types of discharges and which environments.

Construction of the internal access track network and crane pads has the potential to increase the run off rate from the affected areas relative to those areas in their current state. However, the track network will be formed by crushed rock so will not be

impervious and in the context of the 7,524 hectare site area the additional run off will be negligible. Notwithstanding, in order to prevent any localised issues on the site a detailed drainage management plan will be implemented prior to construction starting on site. It is expected that such a plan could be a requirement of planning permit approval, and drafted after that date in consultation with the Catchment Management Authority. Preliminary discussions with the Catchment Management Authority confirm this approach. The plan would utilise standard mitigation measures like rock chutes, straw bale barriers, sediment basins and establishing/re-establishing ground cover.

Are any waterways, wetlands, estuaries or marine environments likely to be affected?

NYD No Yes If yes, specify which water environments, answer the following questions and attach any relevant details.

Are any potentially affected wetlands listed under the Ramsar Convention or in 'A Directory of Important Wetlands in Australia'?

NYD No Yes If yes, please specify.

Could the project affect streamflows?

NYD No Yes If yes, briefly describe implications for streamflows.

Could regional groundwater resources be affected by the project?

NYD No Yes If yes, describe in what way.

Could environmental values (beneficial uses) of water environments be affected?

NYD No Yes If yes, identify waterways/water bodies and beneficial uses (as recognised by State Environment Protection Policies)

Could aquatic, estuarine or marine ecosystems be affected by the project?

NYD No Yes If yes, describe in what way.

Is there a potential for extensive or major effects on the health or biodiversity of aquatic, estuarine or marine ecosystems over the long-term?

No Yes If yes, please describe. Comment on likelihood of effects and associated uncertainties, if practicable.

Is mitigation of potential effects on water environments proposed?

NYD No Yes If yes, please briefly describe.

As mentioned above a drainage management plan would be drafted post planning permit approval and implemented prior to and during construction of the Bulgana Wind Farm. No significant environmental effects on the water environment are expected from the construction activities, and the plan will focus on localised run-off issues that may occur from the construction activities.

Other information/comments? (eg. accuracy of information)

Due to the generally hilly topography of the site, drainage during rain events is expected to occur relatively quickly and the local creeks would be expected to rise rapidly. As a result, erosion of non-vegetated surfaces is likely to occur. The natural creeks and drainage paths show signs of severe erosion and washout.

No groundwater or evidence of surface springs were noted at the time of the fieldwork. The site was generally well vegetated to sparsely vegetated, which reflects the late summer time of the site inspection and the typical surface materials. For most of the site the permanent groundwater is likely to be at least several metres below ground surface. Locally seasonal perched water tables can occur in the upper parts of the ground profile

particularly in the alluvial soils surrounding creeks and drainage channels.

Are any of these water environments likely to support threatened or migratory species?

NYD No Yes If yes, specify which water environments.

14. Landscape and soils

Landscape

Has a preliminary landscape assessment been prepared?

No Yes If yes, please attach.

A Preliminary Landscape Assessment is included in Attachment G.

Is the project to be located either within or near an area that is:

- **Subject to a Landscape Significance Overlay or Environmental Significance Overlay?**

NYD No Yes If yes, provide plan showing footprint relative to overlay.

Figure 15 shows the Planning controls including the area affected by the Environmental Significance Overlay Schedule x.

- **Identified as of regional or State significance in a reputable study of landscape values?**

NYD No Yes If yes, please specify.

South West Victoria Landscape Assessment Study.

- **Within or adjoining land reserved under the National Parks Act 1975 ?**

NYD No Yes If yes, please specify.

- **Within or adjoining other public land used for conservation or recreational purposes ?**

NYD No Yes If yes, please specify.

Is any clearing vegetation or alteration of landforms likely to affect landscape values?

NYD No Yes If yes, please briefly describe.

The clearing of some native vegetation from the site may change the visual form of the landscape. Visual impacts and mitigations measures are addressed below.

Is there a potential for effects on landscape values of regional or State importance? NYD No Yes Please briefly explain response.

The South West Victoria Landscape Assessment Study assesses the landscape and identifies the following landscape types and views of significance within the regional setting of the Project area:

- The Grampians (Gariwerd) & Surrounds Investigation Area – located 30 km to the west of the Project area is defined as being of State significance.
- Southern Pyrenees and Uplands – located mostly south of the Pyrenees Highway, but with a section extending north of Ararat to include Ararat Hill Park as well as the State Forest to the east of Ararat, are defined as being of regional significance.
- Views from Boroka Lookout near the eastern boundary of the Grampians National Park are defined as being of State significance. Views east toward The Pyrenees are noted.
- Views from Pioneer Lookout on One Tree Hill to the west of Ararat within the Ararat Regional Park, and 10 km to the south of the Project, are defined as being of State significance. Views north to The Pyrenees are noted.

The study defines views within a 16km radius as being of clear visibility. Within a 16 km to 32 km radius on prominent features are defined as being potentially visible.

The review of zoning overlays and the National Trust of Australia (Victoria) database confirms that there are no areas of landscape significance in the project area or within a 15km radius of the regional setting.

Is mitigation of potential landscape effects proposed?

NYD No Yes If yes, please briefly describe.

Amelioration Measures

The amelioration measures incorporated into the design process, such as the careful design of access tracks and pad sides to ensure minimisation of track length and depth of cut and fill, in conjunction with recommended actions such as, rapid ground cover restoration with grassing, screen planting at sensitive residential viewpoints and around substations, will have a positive effect on reducing the visual impact of the proposed wind farm, particularly sensitive static viewpoints such as rural residences.

Other information/comments? (eg. accuracy of information)

Landscape Character of the site and surrounds

The site of the proposed wind farm is located adjacent to the Western Highway, approximately 12.5km North of Ararat and is approximately 7,524 hectares in area and of irregular shape. The site is occupied by approximately 11 landowners and is used primarily for grazing.

The proposed wind farm site is located in an area identified by a series of ridges on which a large percentage of the proposed turbines are to be located. Figure 2 shows the wind farm layout and the site contours. The high point of the site is at about RL 470m at the south east corner of the site at the location of the proposed WTG (BU-67). The low point of RL 213 is in the north east corner of the site where a creek runs north out of the project site near the northern most substation site option. Ground slopes vary greatly from flat generally up to about 30° to the horizontal but locally much steeper in areas of significant erosion. Erosion gullies and washouts are present along drainage paths throughout the site. A contour map is included in **Figure 5**.

The landscape type of the region is at the interface of the Southern Pyrenees range and the Murray Basin Wimmera plains. The plains extending from Stawell to the north west and west are typified by flat to very slightly undulating topography with native and exotic vegetation confined to narrow bands of rectilinear patterning along roadsides, property

and paddock boundaries.

The undulating landscape of the Southern Pyrenees including the Project area, extends to the north, east and south from Stawell and Great Western, with topography ranging typically from 200 m to 500 m Australian Height Datum (AHD), with a number of peaks rising to 750 m to 1,000 m AHD. (Also refer back to **Figures 6** and **7**).

Within both landscape setting types, vegetation is often concentrated around rural residences.

The landscape surrounding the site is used primarily for agriculture, with the main activities being cropping and sheep grazing. Dwellings and rural structures are located on surrounding properties. **Figure 16** shows the existing dwellings surrounding the proposed wind farm.

Figure 1 shows the surrounding townships. Minor settlements occur at Glenorchy, Dadswells Bridge, Crowlands, Warrak, Landsborough, Campbell's Bridge, Deep Lead and Elmhurst.

The closest major towns, within the regional setting, are Ararat 11 km to the south and Horsham in the distant regional setting, 68 km to the west.

Figure 4 shows the Landscape Character areas and agricultural valleys and plains.

The Grampians National Park (Gariwerd) is located approximately 27 km to the west.

The town of Stawell is located approximately 11.2 km to the west of the Project.

The abrupt formation of the north south aligned Grampians Range is the most significant natural landscape element within the regional setting approximately 30 km to the west. The north to south aligned Southern Pyrenees are located 18 km to the east and north east of the Project and Mt Langi Ghiran and Mt Buangor are located approximately 20 km to the south east of the project.

From these higher surrounding forested ranges, which rise to an elevation of approximately 800 m AHD, the topography reduces in elevation to an undulating valley floor with an elevation of approximately 200 m AHD. Whether the topography of the valley floor is flat or undulating, the patterning created by broad scale agriculture is the dominant human influence on the landscape in the region. The landscape is subjected to seasonal change, with the stages of agricultural production creating a cycling transition from the colour of some areas of raw soil resulting from tilling and cultivation, to the bright greens of emerging and growing crops, to the straw brown colour of mature crops awaiting harvesting or dry pastoral grassland.

The Western Highway is a key road for transport and tourism to the northern Grampians, the Wimmera and South Australia. Typical traffic volumes are in the order of 5,500 vehicles per day.

Vineyards in the region that attract tourists include Seppelts, Grampians Estate and Bests, all located in the vicinity of Great Western.

Great Western and Stawell have a number of accommodation providers associated with travellers as well as visitors attracted to the history of the townships as well as the produce of the region, primarily its wines. The broader region also promotes farm stay and bed and breakfast accommodation.

State parks and recreation areas, generally in the regional setting and beyond 20 km radius, provide for four wheel driving, camping, picnicking and opportunities for views from higher vantage points.

Visual Impact Assessment

A key consideration in the assessment of visual impact will be the perception of local residents to the primary components of the project, the wind turbines, which are highly

visible elements that evoke a variety of responses.

Perceptions of Change

Whilst the degree to which a development the scale of the proposed Bulgana Wind Farm is visible from certain vantage points can be quantified, the degree to which the viewers will be impacted is influenced by an individual's perceptions of what change will bring.

As indicated by the research of other case studies of community perception, acceptance to the wind farm will vary widely depending on the viewer's preferences and biases. Therefore, the residents and users of the landscape surrounding the Project will reflect a range of sensitivities and the degree to which the changes to the landscape are perceived negatively will in the end depend on the perceptions of individual users / residents.

Based on the results of the reviewed perception studies, the resident population within close proximity to the Project, up to 5km distance, is likely to have a higher proportion of negative than positive perceptions. Positive perceptual responses from residences could be expected to progressively increase with distance, thereby reducing the level of viewer sensitivity.

Visual Impact

The wind turbines are proposed to be located on land that is generally elevated as per the map included in **Figure 17** Photomontages showing the visual impact of the wind farm from public and private land viewing locations is included in Attachment H.

The sub-regional setting is formed by a series of rolling hills, extending from the Concongella Hills in the north to Mt Boswell to the south of the Project, rise from the surrounding plain at approximately 250 m to approximately 390 m AHD.

The reserves and State Parks throughout the local setting are comprised of a dense tree cover, the geometric shapes of the property boundaries reinforcing the rectilinear patterning of the broader rural landscape.

The landscape of the setting surrounding the project out to approximately 20 km is described as being:

- generally flat to slightly undulating with vegetation generally confined to a rectilinear pattern reflecting property boundaries and roads
- a more random and natural pattern created by remnant vegetation along waterways.
- Within this landscape, overlooking is not possible and even relatively low vegetation (up to eye-height) is effective at screening views.
- Having a moderate to high absorptive capability due to flat topography and minimal potential for overlooking.
- The existing vegetation providing a generally low absorptive capability for cleared agricultural areas. Moderate to high absorptive capability where vegetation exists.

The Preliminary Landscape Assessment examines views from surrounding dwellings, townships and main transport routes being the Western Highway and in summary concludes:

- Based on the results of the reviewed perception studies, the resident population within close proximity to the Project, up to 5km distance, is likely to have a higher proportion of negative than positive perceptions. Positive perceptual responses from residences could be expected to progressively increase with distance, thereby reducing the level of viewer sensitivity. **Figure 18** identifies the dwellings and turbine locations (based upon an earlier turbine number and layout), and the extent of screening by existing vegetation.
- The town of Stawell is located approximately 12 km distant, and although visually

noticeable from an elevated area on the western edge of the town (Big Hill), the turbines are not dominant within the viewshed and the resulting visual impact is expected to be low.

- The township of Great Western is located approximately 4 km away but views towards the Project are generally screened by intervening vegetation and topography. The resulting visual impact is expected to be low to moderate where views to upper parts of the wind turbines are possible.

The project will change the landscape of the setting at the local, sub regional and, to a lesser extent, the regional level. The location of some wind turbines on the elevated topography will result in the turbines being more visible from distant locations than they would be in a flatter landscape as the upper parts (the blades) will be more visible above intervening vegetation and localised undulations in topography.

Residences with the greatest potential visual exposure within a 5 km radius are typically surrounded by a dense band of vegetation surrounding an intimate and secluded home yard. The effect of this, in the majority of cases, has been to effectively contain the view shed from the house and surrounding yard itself, blocking more distant views. Where vegetation does not exist, the visual impact will be high. To mitigate these impacts investigation of appropriate screen planting at sensitive residential viewpoints will be assessed and undertaken if required. This will be considered in the planning application stage of the project.

Additionally, in many instances, the area immediately abutting and outside of the homestead garden is utilised as the works area for the operation of the farm. The presence of the “tools of the trade”, such as material storage areas, farm equipment, silos, sheds, etc., which can take up a considerable portion of the view shed around a house, can have a greater contributing influence on visual modification than other more distant elements. Therefore, the area immediately outside of the home yard may be perceived by some as being a part of a “work scape”, to be changed and managed according to primarily economic drivers. The resulting effect may be the desensitizing of those who live and work within the setting to other more distant changes to the landscape.

The visual impact of the lighting is considered acceptable, and will not amplify the level of the visual impact of the wind turbines, rather it will lengthen the time that the site of the wind farm will be visible – for example in the evenings and at night due to the lighting.

Cumulative Visual Impact

Existing and approved activities that may contribute to simultaneous cumulative impact are:

- Challicum Hills Wind Farm (existing).
- Ararat Wind Farm (planning permit approved).
- Crowlands Wind Farm (planning permit approved).

It is expected that the simultaneous cumulative visual impact resulting from the project in the context of existing and approved wind farms will be moderate due to the project increasing the extent of modified landscape visible, particularly in the area between Crowlands and the Concongella Hills. The change in visual impact is considered to meet the objectives and standards of the Environmental Significance Overlay that applies to some of the land in the project area.

Locations primarily impacted include:

- One Tree Hill, Ararat.

- Residences located between the Project and the Ararat and Crowlands Wind Farms at Crowlands and Dunneworthy
- Sequential Cumulative Impact

The Western Highway, a road with a 100 kmh speed limit, will be the key viewpoint from which sequential cumulative impacts may occur. In addition to the project, existing and proposed wind farms will contribute to sequential cumulative impact to users of the Highway over a distance of approximately 60 km. However, it is expected that the sequential cumulative visual impact resulting from the project will be low, particularly in the context of the speed at which viewers will traverse the landscape and the regular screening by roadside vegetation of views out from the road to the surrounding country side.

Note: A preliminary landscape assessment is a specific requirement for a referral of a wind energy facility. This should provide a description of:

- The landscape character of the site and surrounding areas including landform, vegetation types and coverage, water features, any other notable features and current land use;
- The location of nearby dwellings, townships, recreation areas, major roads, above-ground utilities, tourist routes and walking tracks;
- Views to the site and to the proposed location of wind turbines from key vantage points (including views showing existing nearby dwellings and views from major roads, walking tracks and tourist routes) sufficient to give a sense of the overall site in its setting.

Soils

Is there a potential for effects on land stability, acid sulphate soils or highly erodible soils?

NYD No Yes If yes, please briefly describe.

The proposed wind farm site is located in an area identified by a series of ridges on which a large percentage of the proposed turbines are to be located. **Figure 2** shows the wind farm layout and the site contours. The high point of the site is at about RL 470m at the south east corner of the site at the location of the proposed WTG (BU-67). The low point of RL 213 is in the north east corner of the site where a creek runs north out of the project site near the northern most substation site option. Ground slopes vary greatly from flat generally up to about 30 degrees to the horizontal but locally much steeper in areas of significant erosion. Erosion gullies and washouts are present along drainage paths throughout the site.

Evidence of severe erosion is observed along drainage channels indicating that the surface soils are susceptible to erosion. Due to the hilly topography it is expected that water flows along these drainage channels would be fast and erosion is likely to result. Measures to mitigate erosion during construction may include:

- Reduce as much as practicable the clearing of natural vegetation and surface water runoff in the construction areas;
- re-vegetate stripped and filled areas as soon as practicable;
- Construction of silt traps and stilling basins to slow the flow of surface runoff and to reduce the sedimentation of the natural waterways (Photograph 9 and 10 illustrate 2 typical sediment traps);
- Drainage channels may require protection by rock beaching, silt dams or similar.

No evidence of natural slope instability was observed at the site during the site walkover.

Given the topography of the site, it is considered that a number of cut and fill embankments will be required to construct access tracks and hardstand areas. Care should be taken that appropriate measures are adopted to ensure that cut and full batters are constructed in a manner which will not impact the stability of the natural slopes or the constructed batters.

In addition standard management procedures will be implemented to reduce the erosion during construction. As mentioned above in relation to water environments, a drainage management plan would be drafted post planning permit approval and implemented prior to and during construction of the Bulgana Wind Farm. No significant environmental effects from soil erosion are expected from the construction activities, but the plan will be put in place to focus on localised run-off issues which may occur from the construction activities and access tracks. The plan would utilise standard mitigation measures like rock chutes, straw bale barriers, sediment basins and establishing/re-establishing vegetation.

There is no evidence of slope instability on the site.

Acid sulphate soils are not expected to be present on the site.

Are there geotechnical hazards that may either affect the project or be affected by it?

NYD No Yes If yes, please briefly describe.

Other information/comments? (eg. accuracy of information)

15. Social environments

Is the project likely to generate significant volumes of road traffic, during construction or operation?

NYD No Yes If yes, provide estimate of traffic volume(s) if practicable.

Traffic volumes will increase during the construction of the Bulgana Wind Farm, and a traffic and transport assessment will be submitted with the planning permit application. The assessment will identify what impacts are likely to occur and where, along with potential mitigation and management measures.

The construction phase will be limited to a period of approximately 18 months. The Proponent considers that any amenity impacts arising can be addressed through standard construction management measures such as controlled working hours, selection of local traffic routes during various phases of construction, selection of access track construction materials and road watering. Furthermore, Bulgana Wind Farm Pty Ltd will, where possible, seek to source materials from site and as close to site as possible to minimise the number and duration of vehicle movements.

After completion of the project construction and commissioning works, the operational traffic volumes at the wind farm will be little different in nature to current vehicle movements around the area.

Construction Phase Traffic Generation and Distribution

Traffic Generation

The construction phase has been assumed to last approximately 18 months and traffic generation will depend on a number of factors. Preliminary analysis of the traffic demands of the various construction phases and tasks suggests that the Bulgana Wind Farm will generate approximately 23,760 heavy vehicle movements and 44,750 light vehicle movements over the entire construction period. This will include 740 – 750 movements by over size and / or over mass (OSOM) vehicles.

During peak construction phases the wind farm will generate approximately 1800 vehicle movements per week equating to 300 movements per day.

Table E1 Anticipated Construction Traffic in Attachment I.

Distribution of Construction Traffic

Construction Traffic is anticipated to be distributed on the local road network based on sources of materials, including delivery port for OSOM components and construction material sources in the region. The ultimate port and material sources is not available at this stage in the development process but likely distribution has been calculated.

Table E2: Likely Access to Bulgana Wind Farm Areas is included in Attachment I.

Construction Phase Traffic Impact

Construction phase impact will therefore primarily be caused by the impact of heavy vehicle movements and the OSOM vehicles. Given the rural nature of the site and relatively light existing traffic volumes additional light vehicle movements generated during the construction phase are unlikely to have any material impact on the operation of the road or maintenance requirements.

A preliminary assessment of total construction vehicles on each road during the peak construction phase is indicated in Table E3.

Table E3: Preliminary Estimates of Construction Traffic on Local Roads

Road	Western Highway	Allanvale Road	Tuckers Road	Paxton Street	Metcalfe Road	Sandy Creek Road	Salt Creek Road	Bulgana Road	Gibson Road	Thomas Road	Joel South Road	Landsborough Road	Hall Road	Joel Joel Road
Weekly Construction Vehicles ¹	288	140	104	148	18	132	142	118	40	2	96	38	54	6
Daily Construction Movements	48	24	18	25	4	22	24	20	8	2	16	6	10	2
Notes														
1	Anticipated weekly standard construction vehicle movements per road during peak construction periods													
2	Daily vehicle movements assuming flat profile over a 6 day working week													

The increase in heavy vehicle movements, whether by standard sized heavy road vehicles or OSOM, may require some advance works to ensure that roads and intersections can accommodate vehicles safely and impact on maintenance requirements during the course of construction.

Based on the information available at the time of preparing this report, different routes will experience varying levels of impact. Table E4 gives a qualitative assessment of these impacts and levels of mitigation required.

Table E4: Preliminary Review of Anticipated Mitigation and Additional Maintenance Requirements

Road	Western Highway	Allanvale Road	Tuckers Road	Paxton Street	Metcalfe Road	Sandy Creek Road	Salt Creek Road	Bulgana Road	Gibson Road	Thomas Road	Joel South Road	Landsborough Road	Hall Road	Joel Joel Road
Likely to require upfront works for standard heavy vehicles														
Works required to accommodate OSOM vehicles												N/A		N/A
Strengthening Works OSOM management plans for Bridges and culverts			1		1							N/A		N/A
Potential for increased maintenance requirements														
Key														
Potential Impact	Upfront works for general construction traffic			Works required for OSOM vehicles			Bridge Management Plan Requirement			Maintenance Requirements				
Significant	Road currently likely to be unsuitable for standard road vehicles			Bridges and other major infrastructure upgrades works, including major intersections			Multiple bridges on road that may require strengthening or management plan to accommodate OSOM vehicles			Poor road quality and high increase in heavy vehicle usage				
Moderate	Some widening may be required Access to the site required to be formed			Culverts to be crossed			Single bridge on road that may require strengthening or management plan to accommodate OSOM vehicles			Reasonable to good road quality but significant increase in heavy vehicle usage or good quality unsealed road and reasonable increase in HV movements.				
Minor	Vegetation removal			Vegetation / street furniture removal			Culverts only			Minimal increase in heavy vehicle usage				
None	No material works anticipated			No material works anticipated			No bridges or road not to be used by OSOM vehicles			No material impact on maintenance requirements				
	1 Information not available as no access to this road was possible during the site inspection													

In response to comments provided by Council the access strategy for the proposed wind farm has been refined to identify preferred construction traffic access routes and a reduced total number of nominated access points from 11 to 9 locations, as shown in **Figure 19**.

Land Parcel Access Points

Each of the nine access points has been evaluated against their ability to accommodate the relevant OSOM vehicle. At access points 1 to 7 and 9 the largest vehicle that will need to be accommodated is the blade transportation vehicle, while at access point 8 the electrical substation transportation vehicle will need to be accommodated. The swept path assessment results are summarised in Table 5-7 in Attachment I and also included as **Figure 20**.

Is there a potential for significant effects on the amenity of residents, due to emissions of dust or odours or changes in visual, noise or traffic conditions?

NYD No Yes If yes, briefly describe the nature of the changes in amenity conditions and the possible areas affected.

Figure 16 shows the location of dwellings within a 3km radius of the outer turbines.

Construction Traffic Impact

Construction Traffic Distribution

During peak construction periods it is anticipated that approximately 300 various deliveries will be required per week, which will equate to 600 truck movements (standard road vehicles not OSOM) per week or 100 vehicle movements per day.

These movements will be distributed over the local road network in accordance with the source of materials and the location of individual works.

Table 5-9 identifies the anticipated number of trucks required by each Wind Farm parcel over the entire construction period. The daily number of trips to individual land parcels will depend on the programming of works and is not known at this early stage. However to provide a broad estimate of likely daily volumes it has been assumed that at peak times work will be undertaken at all wind farm parcels.

Table 5-9:-Peak Period Construction Movements

Standard Heavy Vehicles	Total Vehicle Movements To Each Wind Farm Parcel During Construction							Weekly Construction Vehicle Movements During Peak Construction Period						
	A	B	C	D	E	F	Tot	A	B	C	D	E	F	Tot
Quarry Trucks (Rock and Stone)	164 3		254 0	134 5	896	358 6	1001 0	23	0	36	19	13	51	143
Concrete Mixer Trucks (Foundations)	161 8		250 0	132 4	882	353 0	9854	41	0	64	34	23	91	253
Other	477	234	739	391	264	104 2	3144	12	2	19	11	7	27	80
Total	373 8	234	577 9	306 0	203 9	815 8	2300 8	76	2	119	64	43	169	473

At this stage of the development process, general construction material sources have not been agreed and therefore commercially this report cannot specify one particular route for construction material or whether single sources will be used for individual materials for the whole construction period. However a high level review based on possible material sources has been undertaken.

There are a number of quarries in the area, including one within the boundary of the Bulgana Wind Farm, which may produce suitable material for use in the construction of the wind farm. Similarly there are a number of local concrete batching plants or raw material suppliers and sources of electrical equipment that could be used.

It is assumed that all suppliers of material for the development (including quarries) are functioning businesses and that therefore they would be generating trucks on the local road network around each business whether or not the wind farm is constructed. This report therefore will consider the last leg local (to the site) routes for the different land parcels which would be unlikely to be used as part of the general business if the Bulgana Wind Farm was not constructed.

In principle for the purpose of this assessment potential quarries and batching plants have been grouped into three bundles: Ararat based, Stawell based and Avoca based

operations. In the absence of any specific sources of materials it is assumed that construction traffic will be distributed between the three different sources broadly in line with the scale of each centre as follows: Ararat – 50%, Stawell – 40% and Avoca - 10%.

Therefore the potential traffic generated by the individual material source towns has been estimated in Table 5-10.

Table -10: Potential vehicle movements from source towns

Standard Heavy Vehicles	Total Vehicle Movements To Each Wind Farm Parcel During Construction							Weekly Construction Vehicle Movements During Peak Construction Period						
	A	B	C	D	E	F	Tot	A	B	C	D	E	F	Tot
Ararat	1869	117	2890	1530	1021	4079	11504	38	1	60	32	22	85	238
Stawell	1495	94	2312	1224	816	3263	9203	15	1	24	13	9	34	95
Avoca	374	23	578	306	204	816	2301	2	0	2	1	1	3	9
Total	3738	234	5779	3060	2039	8158	23008	76	2	119	64	43	169	473

It is recognised that the increase in heavy vehicle movements over an 18 month period may result in increased maintenance or damage to some local roads, and have noise and emissions impacts. As more details of the construction traffic is confirmed the need to “make good” damage will need to be reviewed and costs allocated appropriately at this time.

In addition some day to day traffic management mitigation measures may be required. These will be identified within a construction management plan prepared when construction logistics are finalized and may include:

- Road watering to limit dust impact;
- Vegetation pruning; and
- Time restrictions for specific works.

Noise

Noise emissions from the proposed turbines of the Bulgana Wind Farm will be subject to a full impact assessment compliant with industry standard guidelines, specifically New Zealand Standard NZS6808:2010, Acoustics – Wind Farm Noise. Compliance with wind farm noise guidelines is compulsory, therefore significant effects on the amenity of residents from wind turbine noise will not occur.

Shadow Flicker

A shadow flicker assessment will be submitted with the planning permit application. Shadow flicker is a phenomenon that only requires assessment within 1,113 m of the turbines, calculated using the blade root chord of the Siemens SWT113 (4.2 m) x 265 (in accordance with the *Draft National Wind Farm Development Guidelines – 2 July 2010*, p152). Applying this distance to the Bulgana Wind Farm turbines returns only 3 houses that could theoretically be affected by shadow flicker. Shadow flicker is a phenomenon that can very easily be mitigated by management of individual operational turbines. The combination of the low number of houses in the vicinity of the turbines that could theoretically be affected, along with the ease of mitigation, suggests the likelihood of significant environmental effects from shadow flicker is negligible. Furthermore, *Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria* stipulates that shadow flicker experienced at a dwelling must not exceed 30 hours per year. In order for the Bulgana Wind Farm to achieve planning permit approval it must comply with

this requirement, therefore no significant effects on residential amenity are anticipated from shadow flicker.

Traffic issues are discussed above, which apply equally to dust. There are no other potential sources of dust or odours related to the proposed Bulgana Wind Farm which could cause significant effects on the amenity of residents.

Visual effects are addressed in relation to landscape effects discussed in section 14.

Is there a potential for exposure of a human community to health or safety hazards, due to emissions to air or water or noise or chemical hazards or associated transport?

NYD No Yes If yes, briefly describe the hazards and possible implications.

Is there a potential for displacement of residences or severance of residential access to community resources due to the proposed development?

NYD No Yes If yes, briefly describe potential effects.

Are non-residential land use activities likely to be displaced as a result of the project?

NYD No Yes If yes, briefly describe the likely effects.

The proposed wind farm is to be located on land, the majority of which is used for farming/agricultural activities. Those existing farming/agricultural activities that occur on the relatively small amount of land taken up by the wind farm footprint will be displaced. However, post construction of the wind farm existing activities will recommence on land outside of the wind farm footprint, which constitutes the vast majority of the site area. Even during construction most existing farming/agricultural activities will continue, only controlled such as to ensure the safety of stock, landowners and those personnel involved in project construction, and to prevent interference with construction of the wind farm.

Do any expected changes in non-residential land use activities have a potential to cause adverse effects on local residents/communities, social groups or industries?

NYD No Yes If yes, briefly describe the potential effects.

Is mitigation of potential social effects proposed?

NYD No Yes If yes, please briefly describe.

Mitigation of potential construction traffic impacts will be subject to a detailed traffic management plan to be prepared post planning permit approval, should approval be given.

Compliance with noise standards is compulsory and therefore no mitigation is required.

If compliance with shadow flicker policy discussed above requires mitigation, this will be implemented. There are no other negative social effects likely to result from the proposed Bulgana Wind Farm, therefore no further mitigation measures are proposed.

Other information/comments? (eg. accuracy of information)

Bulgana Wind Farm Pty Ltd is committed to establishing a community support program for the duration of the wind farm's life. Details of the program will be developed post planning permit approval.

Cultural heritage

Have relevant Indigenous organisations been consulted on the occurrence of Aboriginal cultural heritage within the project area?

- No If no, list any organisations that it is proposed to consult.
- Yes If yes, list the organisations so far consulted.

The Barenji Gadjin Land Council have been consulted during the current development phase of the project, and specifically in relation to the preparation of a CHMP.

There is no Registered Aboriginal Party (RAP) appointed whose land includes the activity area. Therefore, the Secretary of the Department of Premier and Cabinet will evaluate the plan. Barenji Gadjin Land Council Aboriginal Corporation has applied for, but not received, RAP status. When there is no RAP with responsibility for the Activity Area and the Secretary is evaluating the CHMP, the Secretary is required to “consult with, and consider the views of, any Aboriginal person or Aboriginal body that the Secretary considers relevant to the application” (s.65(3) *Aboriginal Heritage Act 2007*).

What investigations of cultural heritage in the project area have been done?

(attach details of method and results of any surveys for the project & describe their accuracy)

The Desktop Cultural Heritage Assessment (Attachment B) has been prepared by Archaeology at Tardis which states:

“A *Notice of Intent to Prepare a Cultural Heritage Management Plan* (NoI) was submitted to the Office of Aboriginal Affairs Victoria (OAAV) on 23 July 2013. OAAV notified the Sponsor on 23 July 2013 that they will evaluate the plan when completed and that the CHMP has been allocated Plan Identifier 12715. Landowners and occupiers were also notified that a CHMP was being prepared.

The desktop assessment has demonstrated that:

1. There are registered places within the Activity Area
2. There are areas of cultural heritage sensitivity
3. It is reasonably possible that Aboriginal cultural heritage is present

A standard assessment is required (r.58(1) *Aboriginal Heritage Regulations 2007*):

The results of a desktop assessment show that it is reasonably possible that Aboriginal cultural heritage is present in the Activity Area.”

A CHMP is being prepared by Tardis. During the preparation of this plan parties have been consulted as outlined below. The CHMP is expected to be approved in October/November 2014.

The Bulgana Wind Farm: Desktop Assessment for a Historic Heritage Assessment (HV No. 4354), concludes there are no registered places of historic significance within the wind farm site. ‘Predicted Areas of Historic Cultural Heritage Sensitivity’ are identified on Map 4, page 28 of the same report (also attached as **Figure 21**).

The desktop assessment has demonstrated that:

1. There are no registered historic places within the Activity Area.
2. The Activity Area has not been subject to previous ground surface survey.
3. It is reasonably possible that historic heritage places are present

in the Activity Area.

4. There is potential for the project to impact unknown historic heritage places.

Two historic places were identified: Stocks Road Bridge and Sheep Feed Troughs. Neither of these features have an archaeological component, and therefore have not been registered with Heritage Victoria. Stocks Road Bridge and Sheep Feed Troughs were both assessed as having local historic significance, no social or aesthetic significance, low scientific significance and no archaeological potential.

The background research and ground surface survey has demonstrated that no known heritage will be harmed by the proposed wind farm development.

Stocks Road Bridge and Sheep Feed Troughs identified in this investigation do not require registration on the Heritage Inventory or Northern Grampians Shire Planning Scheme Heritage Overlay. They will not be harmed by the proposed wind farm development and no management measures are required. (excerpts from Bulgana Wind Farm Historic Heritage Assessment, Archaeology at Tardis)

A Historic Heritage Assessment is included as Attachment A.

Is any Aboriginal cultural heritage known from the project area?

NYD No Yes If yes, briefly describe:

- Any sites listed on the AAV Site Register
- Sites or areas of sensitivity recorded in recent surveys from the project site or nearby
- Sites or areas of sensitivity identified by representatives of Indigenous organisations

Aboriginal Cultural Heritage Register and Information System shows there are 26 registered places within the Activity Area and three registered places within 200m of the Activity Area boundary (see Section 5.2 of the Desktop Assessment for CHMP 12715 Attachment B). Some examples of these places within the Activity Area include eight scarred trees, six mounds, two low density artefact distributions and one artefact scatter. The model generated specifically for the Activity Area (Section 5.10) predicts the likely Aboriginal cultural heritage values within the Activity Area in relation to strategic values and landform (Table 10, Map 8):

1. Strategic resources are located primarily outside the Activity Area comprising major waterways in particular the Wimmera River
2. Major tributaries of the Wimmera River that run through the Activity Area have some local strategic value including Concongella Creek, Allanvale Creek, Salt Creek, Surridge Creek, Six Mile Creek, Seven Mile Creek and Wattle Creek
3. Hills and ridgelines may have provided vantage points across the surrounding region provided trees did not obscure views
4. Place types unlikely to be present include rock art, human remains, shell middens and stone features
5. Mounds are registered within the Activity Area. Mounds may be found on floodplains associated with named waterways
6. Aboriginal scarred trees may be found where mature Red Gums, Grey Box and Yellow Gum survive and are more than 150 years old

7. Quarries may be found at high quality quartz outcrops
8. Larger more scientifically significant artefact scatters are found outside the Activity Area along the Wimmera River
9. Low Density Artefact Distributions or isolated stone artefacts can be found throughout Victoria on any landform
10. Artefact scatters in the Activity Area may be found on hill crests and ridgelines, and within 200m of named waterways.
11. Artefact scatters in the Activity Area likely have the following attributes
 - _Data classes dominated by flakes and angular fragments
 - _Quartz is the most likely raw material
 - _Small extents
 - _Maximum depth of 40cm below the surface
 - _Lack high integrity occupation deposits
 - _Stone artefact scatters likely date to the Late Holocene
12. The Activity Area has been subject to land clearance, mining, the development of grazing and agriculture including ploughing and construction farm infrastructure
13. Ground disturbance reduces the spatial and temporal integrity of stone artefact scatters and consequently reduces their scientific significance
14. It is unlikely that any places above moderate scientific significance are present within the Activity Area.

The model predicted the most likely place-type in the Activity Area is previously registered Aboriginal places (high), artefact scatters and low density artefact distributions (high to low), mounds (moderate), quarries (low) and scarred trees (low)(see Table 10).

Map 2 on page 5 of the *Bulgana Wind Farm: Desktop Assessment for a Cultural Heritage Management Plan* illustrates areas of known Aboriginal cultural heritage sensitivity. Registered places are listed on page 8 of the same report.

Following the completion of the Desktop Assessment a standard and complex assessment is being undertaken. Some aboriginal cultural heritage places have been identified on site. These are currently being assessed for scientific and cultural significance.

Are there any cultural heritage places listed on the Heritage Register or the Archaeological Inventory under the *Heritage Act 1995* within the project area?

NYD No Yes If yes, please list.

Is mitigation of potential cultural heritage effects proposed?

NYD No Yes If yes, please briefly describe.

There are places of aboriginal significance that have recently been found on site. These places will be appropriately managed in consultation with the Office of Aboriginal Affairs and relevant aboriginal groups in accordance with the Aboriginal Heritage Act 2007.

Any mitigation measures will form part of the CHMP and the Historic Heritage Assessment.

Other information/comments? (eg. accuracy of information)

16. Energy, wastes & greenhouse gas emissions

What are the main sources of energy that the project facility would consume/generate?

- Electricity network. If possible, estimate power requirement/output
The rated capacity of the Bulgana Wind Farm will be between 134MW and 201MW
- Natural gas network. If possible, estimate gas requirement/output
- Generated on-site. If possible, estimate power capacity/output
- Other. Please describe.

Please add any relevant additional information.

What are the main forms of waste that would be generated by the project facility?

- Wastewater. Describe briefly.
- Solid chemical wastes. Describe briefly.
- Excavated material. Describe briefly.
- Other. Describe briefly.

Please provide relevant further information, including proposed management of wastes.

In operation the Bulgana Wind Farm will not generate any significant volume of waste.

During construction there may be spoil from excavated turbine locations, the majority of this will be used as part of the construction of the wind farm, for example in forming the onsite access tracks. If waste material is left over this will be removed from site to a licensed landfill facility.

What level of greenhouse gas emissions is expected to result directly from operation of the project facility?

- Less than 50,000 tonnes of CO₂ equivalent per annum
- Between 50,000 and 100,000 tonnes of CO₂ equivalent per annum
- Between 100,000 and 200,000 tonnes of CO₂ equivalent per annum
- More than 200,000 tonnes of CO₂ equivalent per annum

Please add any relevant additional information, including any identified mitigation options.

The Bulgana Wind Farm will not generate any greenhouse gas emissions and in fact will offset such emissions from fossil fuel generation sources. Non-material levels of CO₂ emissions will occur during the construction and operation of the project through the use of vehicles, plant and equipment.

Over a 25 year operating life, the Bulgana Wind Farm could generate between 410,844 MWh/yr and 821,688 MWh/yr (assuming a capacity factor of 35%). This generation will result in a net avoidance of CO₂ by offsetting generation from fossil fuel sources.

17. Other environmental issues

Are there any other environmental issues arising from the proposed project?

No Yes If yes, briefly describe.

Aviation impacts from the proposed Bulgana Wind Farm have been considered in full and are detailed in the attached *Aeronautical Impact and Obstacle Marking and Lighting Assessment: Bulgana Wind Farm* (Attachment J). It concludes that the overall risk to aviation operations in the vicinity of the proposed Bulgana Wind Farm is low. The report makes a number of recommendations in relation to maintaining aviation safety, principally requiring the notification of aviation stakeholders and identifying the wind farm on aeronautical maps. These recommendations will be followed at the appropriate time, and subject to planning permit approval.

Potential electro-magnetic interference from the proposed turbines has been fully considered in the attached *Bulgana Wind Farm: Electromagnetic and Communication Assessment* (Attachment D). The report concludes that for the current turbine layout, no adverse impacts on point to point or omnidirectional radio systems in the area are expected.

Furthermore, that TV and radio broadcasting transmitting sites are sufficiently distant from turbines to not have any general service area coverage degradation. Some individual dwellings close to turbines and in the forward scatter areas of TV transmissions may experience some reception impairment. However mitigation methods are available to return reception to at least preconstruction conditions.

And finally that interconnecting power lines and substations will be constructed and located according to industry standards to ensure that magnetic and electric fields are well below the human exposure limits for public spaces and at private dwellings. EMI levels at power line easement boundaries will be required to meet the appropriate Australian Standard levels which will ensure that radio and TV reception and other radiocommunication services will not be impaired.

18. Environmental management

What measures are currently proposed to avoid, minimise or manage the main potential adverse environmental effects? (if not already described above)

Siting: Please describe briefly

The layout included with this EES Referral already incorporates turbine siting and layout design that avoid or minimise environmental impacts. Nevertheless, a micro-siting allowance of 50 metres radius will be sought in the planning permit application which will provide for minor adjustments to turbine and access track siting to mitigate any unforeseen effects, such as may result during the finalisation of the detailed cultural heritage assessment (which is ongoing at the time of writing).

Design: Please describe briefly

Bulgana Wind Farm Pty Ltd is committed to installing modern turbines at the site representing advanced, commercially available wind turbine technology in order to minimise potential noise impacts, whilst maximising the generation of renewable electricity.

Environmental management: Please describe briefly.

A site specific Environmental Management Plan will be prepared post planning permit approval for the Bulgana Wind Farm, which will incorporate any condition of that permit.

Other: Please describe briefly

Add any relevant additional information.

19. Other activities

Are there any other activities in the vicinity of the proposed project that have a potential for cumulative effects?

NYD No Yes If yes, briefly describe.

The site of the proposed Bulgana Wind Farm is located approximately 1.5 km to 16.5 km from the permitted Ararat wind farm and 9.5 to 19.2 km from the Crowlands Wind Farm.

The EMI, LVIA and noise assessment as outlined in this referral have included the consideration of cumulative impacts.

Any further information of possible cumulative effects will form part of the planning application submission.

20. Investigation program

Study program

Have any environmental studies not referred to above been conducted for the project?

No Yes If yes, please list here and attach if relevant.

Has a program for future environmental studies been developed?

No Yes If yes, briefly describe.

Environmental surveying is largely complete, with completion of the CHMP and background noise monitoring the principle outstanding studies, with all other matters in the process of report drafting.

The following studies will be submitted with the planning permit application:

Preliminary Flora and Fauna Scoping Assessment

Flora and Fauna

Noise Impact Assessment

Preliminary Landscape Assessment

Visual Impact Assessment

Shadow Flicker Assessment

Desktop Historic Heritage Assessment

Desktop Cultural Heritage Management Plan

Draft CHMP

Preliminary Transport Route Assessment

Report on Preliminary Geotechnical Assessment

Aeronautical Impact and Obstacle Marking and Lighting Assessment

Electromagnetic and Communication Assessment

Consultation program

Has a consultation program conducted to date for the project?

No Yes If yes, outline the consultation activities and the stakeholder groups or organisations consulted.

Consultation activities have been undertaken during the development phase of the Project.

The applicant has had ongoing discussions with all involved and neighbouring landowners.

A project newsletter was published in April 2014.

A project website went 'live' in April 2014.

A community consultation day was held in Great Western on Sunday 4th May 2014.

Has a program for future consultation been developed?

NYD No X Yes If yes, briefly describe.

Ongoing discussions continue to occur with the Northern Grampians Shire Council, participating and neighbouring land holders as required.

A formal notification period will be conducted as part of any planning application process.

A community "drop-in" session will be conducted during the formal advertising period.

Authorised person for proponent:

I, BRETT FRANK THOMAS (full name),
MANAGING DIRECTOR, THE SABLE GROUP PLC (position), confirm that the information
 contained in this form is, to my knowledge, true and not misleading.

Signature

Brett ThomasDate 8th September 2014**Person who prepared this referral:**

I, FIONA COTTER (full name),
PRINCIPAL, PROVINCIAL MATTERS (position), confirm that the information
 contained in this form is, to my knowledge, true and not misleading.

Signature

Fiona CotterDate 8th Sept 2014