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

Minister for Planning
GPO Box 2392
MELBOURNE VIC 3001

Couriers

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:	Woolnorth Wind Farm Holdings P/L
Authorised person for proponent: **Position:** **Postal address:** **Email address:**	David Mounter Manager Renewable Asset Development (Hydro Tasmania) GPO Box 355 Hobart TAS 7001 David.Mounter@hydro.com.au
Person who prepared Referral: **Position:** **Organisation:** **Postal address:** **Email address:**	David Procter Environmental Consultant Entura 89 Cambridge Park Drive, TAS 7170 david.procter@entura.com.au
Available industry & environmental expertise: (areas of 'in-house' expertise & consultancy firms engaged for project)	Hydro Tasmania has experience developing power infrastructure including planning and design, community consultation, project implementation and environmental management. Appropriately qualified sub-consultants have been engaged to undertake the following assessments: Biosis Research Pty Ltd • Brolga Assessment • Flora and Fauna Existing Conditions • Targeted Surveys and Impact Assessment • Preliminary Cultural Heritage Assessment Environmental GeoSurveys Pty Ltd • Geoheritage Assessment Urbis Pty Ltd • Preliminary Landscape and Visual Assessment Marshall Day Acoustics • Acoustic Considerations and Preliminary Predictions

2. Project – brief outline

Project title: Mt Fyans Wind Farm

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)

The general location of the proposed Mt Fyans Wind Farm is shown in Figure 1.

The Mt Fyans Wind Farm Project (the Project) is located in south west Victoria, approximately 140 km west of Geelong in a region that stretches from western Melbourne to Hamilton, referred to as the Western Volcanic Plains. The region is characterised by a vast flat to undulating cleared agricultural plain, scattered with volcanic features in the form of cones and stony rises.

The Project is located on the northern outskirts of the town of Mortlake (population approx. 1350). Mt Shadwell, which forms the backdrop to Mortlake, is located between the Project and Mortlake. Other smaller towns in the locality include:

- Darlington - 11km to the east
- Woorndoo - 8km to the north
- Hexham - 6km to the west

The Hamilton Highway, which runs between Geelong and Hamilton, forms part of the southern boundary of the Project location. The 500 kV South Australia/Victoria transmission line runs through the Project site. The Mortlake Gas Power Station connects to this transmission line 8 km to the south west of the Project site.

Short project description (few sentences)**:**

The Project will comprise of:

- a maximum of 81 Class II/III wind turbines with a maximum height of 165 m (the tip of the turbine blade in the vertical positon),
- an on-site substation, switchyard and control building housed in one facility,
- an off-site substation located immediately to the east of the existing Mortlake Substation,
- approximately 19 km of overhead electrical line connecting the on-site substation to a new off-site substation adjacent to the existing Mortlake Substation,
- underground cable connecting the turbine clusters,
- approximately 70 km of internal site access tracks, and
- up to two permanent wind monitoring (anemometry) masts.

Temporary infrastructure associated with construction of the Project will include:

- construction facilities including office space, meeting rooms, a first aid room, toilets and parking and materials storage areas,
- laydown areas, and
- on-site concrete batching plants.

3. Project description

Aim/objectives of the project (what is its purpose / intended to achieve?):

The aim of the Project is to develop a renewable energy project that:

- implements federal and state policies for increasing the supply of renewable electricity generation,
- is capable of being connected to the Victoria / South Australia interconnector,
- is responsive and makes a positive contribution to community in which it is located, and
- utilises the proposed site's wind resource to provide cost effective electricity.

Background/rationale of project (describe the context / basis for the proposal, eg. for siting):

Since the Project commenced development in 2009, key activities have focused on:

- collecting wind data – through the use of a 80 m wind monitoring mast and relocatable sodar units,
- undertaking on site surveys and assessments on a range of ecological, cultural and planning matters,
- expanding the site to improve economies of scale and avoid identified environmental/planning risks,
- assessing the conceptual design of the Project for a range of wind turbine and connection options, and
- consulting with landowners and the community about the proposed project.

Based on the results of wind monitoring and assessments completed to date, the proposed Project site is capable of supporting an economically viable wind farm whilst avoiding significant adverse impacts to local community, environmental and heritage values.

The Project site has an excellent wind resource whilst being close to the Mortlake Substation allowing connection to the 500 kV Victoria - South Australia interconnector and the national electricity market. Access to the site from major centres is provided by the Hopkins Highway from Warrnambool and the Hamilton Highway which runs between Geelong and Hamilton.

The Project is separated from Mortlake, the locally significant population centre, by Mt Shadwell to the north. The Project site is predominately used for grazing and cropping neither of which will be significantly disturbed by the development of the Project. Wind turbines and associated permanent and temporary infrastructure can be located within the Project site whilst avoiding significant environmental and heritage values.

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

The main components of the Project are shown in the proposed Development Plan (Figure 2) and described below.

The Project has been designed using development envelopes (Figure 2). A **wind turbine development envelope** delineates the area in which turbines may be developed. No wind turbines will be located outside a wind turbine development envelope. Three wind turbine development envelopes are proposed, each with the following maximum number of turbines:

- TDE A : northern area – maximum 11 turbines
- TDE B : central / southern area – maximum 39 turbines
- TDE C : western area – maximum 31 turbines

A **transmission development envelope** has also been established that delineates the area within which the corridor in which an overhead transmission line may be developed.

Using the development envelope approach allows flexibility to microsite infrastructure within the boundaries during detailed design. Micrositing is required to respond to location specific topographical and land use characteristics, as well as technical /operational requirements whilst avoiding adverse impacts to significant values. This approach is critical for the design of the wind turbine layout given the wide range of turbine models and Classes that may be used for the Project.

To ensure that the overall density / distribution of the turbines within each wind turbine development envelope does not alter significantly during detailed design, the final distribution of turbines will ensure that there will be no more than 10 turbines within a 2 km diameter circle. The turbine layout shown in the Development Plan is a realistic layout for the maximum number of Class II/III turbines within each envelope.

Works exclusion areas have also been established and are shown on the Development Plan (Figure 2). Works exclusion areas are designed to protect ecological or cultural values from physical works. No physical works will occur within a works exclusion area. [Note: due to the scale of current mapping, some works exclusion areas contain existing roads and access ways which do not contain cultural or ecological values and are not intended to be included in works exclusion areas. Detailed mapping will be included as part of planning documentation that shows the boundaries of works exclusion areas and removes existing road and access ways.]

The main components of the Project are described below.

Turbines

The Project site caters for a range of Class II / III turbine models which may range in generation capacity from 1.8 to 4.5 MW.

A maximum of 81 turbines are proposed each with a maximum tip height of 165m. The minimum height of the blade path above ground level will be 30-40m.

Each turbine has the following elements:

- Foundation - a reinforced concrete gravity foundation.
- Tower - a tubular steel structure painted matt off-white.
- Nacelle - the housing for the components of the turbine that convert the wind energy from the blade into electricity. These include the drive train, generator, gearbox, braking system as well as a computer linked to the central Supervisory Control & Data Acquisition (SCADA) system in a control building.
- Rotor and blades - three variable pitched blades are connected to a rotor. The blades capture wind turning the rotor which spins the drive train.

Hardstands

Hardstand areas are required at the base of each turbine to support the cranes, equipment and assets associated with construction. The hardstand is typically a 50 m x 50 m area of crushed rock adjacent to the access track. The final design and layout of each hardstand will be based on the topography and siting of each turbine. Hardstands are generally left in place following construction to enable cranes to be used over the operational life of the wind farm.

Access tracks

A network of internal access tracks will link each turbine with the public road system. Generally the width of the trafficable lanes on access tracks is 5 to 6 m. The width of shoulders and corners will vary to accommodate long or wide wheel base vehicles. The majority of access tracks will be

newly formed however, wherever possible, existing farm lanes will be upgraded. The total length of access tracks required is approximately 70 km.

Vehicular access to the Project site will be designed so that traffic is directed to major arterial roads and away from municipal roads. The proposed access from the Hamilton Highway will link 60% of the turbines to the public road network. Approximately eight access points are proposed from:

- Castle Carey Road
- Mortlake – Ararat Road
- Woorndoo – Darlington Road
- Hamilton Highway

New access points have been located to avoid locations where the road reserve contains habitat with environmental values while meeting traffic / road safety requirements (Figure 2).

Underground cables

Groups of six to 10 turbines will be connected to an on-site substation via a 22/33 kV underground cable. Cables will be generally buried to a depth of at least 800 mm.

Overhead cable

A double circuit 132 kV or single/double circuit 220 kV overhead electrical line is proposed to transmit the electricity from the on-site substation to the grid connection at the Mortlake Substation. The total length of the proposed overhead line is 19 km. The spacing between poles will generally be around 200 m.

The overhead line will use a compact pole design which will reduce both the visual impact of the structure and their physical footprint. Poles will generally be between 25 m to 30 m above natural ground level. The asset will include an overhead communication line which will run along the top of the poles. Depending on the final design and voltage of the transmission line the maximum height may be 35 m high in specific locations.

On-site substation & control building

An on-site substation, switchyard and control building will be housed in one facility within an area of approximately 100 m x 200 m. The substation facility will consist of open air 132/220 kV electrical equipment, a step up transformer that converts electricity from the internal cables to the voltage of the overhead line, 22/33 kV electrical switchgear as well as oil and water separation systems. A chain mesh fence will be constructed around the facility and security and emergency lighting will be installed within the compound.

A control building will be located next to the substation compound. The control building will be fully enclosed and contain office and amenity facilities, rooms for Supervisory Control and Data Acquisition (SCADA) equipment as well as an area for basic on-site maintenance and storage.

Grid connection / off site substation

The Australian Energy Market Operator (AEMO) has identified the Mortlake Terminal Station, operated by AusNet Services, on the 500 kV Victoria - South Australia interconnector as the preferred hub for the connection of new renewable generation in the area. The off-site substation will transform electricity from the overhead transmission line from 132/220 kV to 500 kV and will be developed on land immediately to the east of the existing Mortlake Substation.

The works to connect the Project to the 500 kV Mortlake Substation will comprise the construction of new circuit breaker bays, conductor landing gantry structures, busbars, new step

up transformers and associated fencing, access roads and drainage.

Wind monitoring

Three to four wind monitoring masts will be established within the Project site over the construction and commissioning stage of the Project. One or two of the monitoring masts will be maintained on site to provide a permanent wind record.

Temporary construction facilities

During the construction stage of the Project the following temporary infrastructure is proposed:

- A construction compound containing office space, meeting rooms, a first aid room and toilets. The compound area will also contain an area for parking workers vehicles and for storage of materials.
- Laydown areas for the delivery of wind turbine and electrical equipment, prior to its use in the construction process.
- Two concrete batching plants.

The location of temporary construction facilities is not yet determined but will be within the wind turbine development envelopes.

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

Public road improvement & maintenance

In addition to constructing new access to public roads, it is likely that other road improvements will be required to maintain the safety and efficiency of the existing road network. For example, if Castle Carey Road is used for access, pavement improvement will be needed to cater for heavy vehicles. Due to the high environmental values associated with road reserve habitat, Castle Carey Road would need to be maintained as a single lane road. Road improvements will be determined in consultation with the Moyne Shire Council and VicRoads during the planning application process and following a detailed traffic and transport assessment.

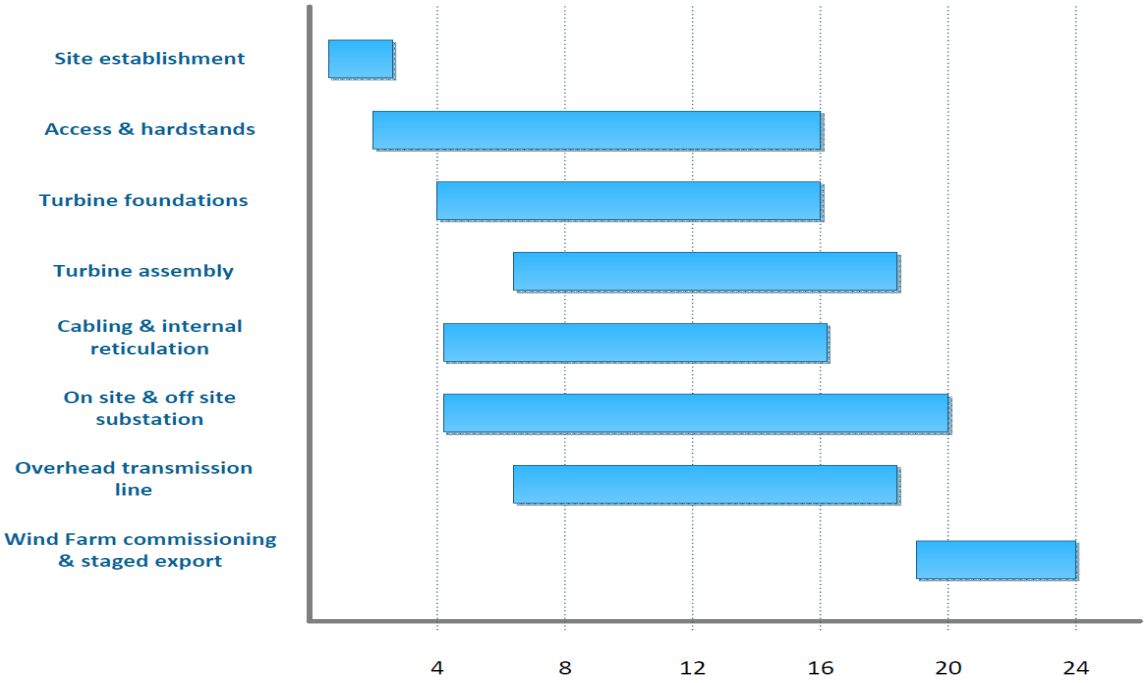
Construction Material

No on-site quarry is proposed.

Construction materials are likely to be sourced primarily from the nearby Mt Shadwell Quarry. Material may also be sourced from the Mt Noorat Quarry and Camperdown Quarry. All three quarries have good access to the site via State Government owned arterial roads (refer Section 15).

Key construction activities:

The construction stage of the Project is likely to occur over an 18 to 24 month period. An indicative construction program is outlined below.



Key construction activities will include:

Site establishment

Includes the construction of the main site entrance, establishment of construction site offices and compound area and the establishment of concrete batching plants.

Access tracks & hardstands

Once the site is established, the construction of internal access tracks and turbine hardstands will commence. Construction of the access tracks and hardstands will generally involve stripping of topsoil, placement and compaction of suitable crushed, rock sub base topped with a gravel wearing course. Appropriate drainage and erosion control structures will be installed on access tracks and will be maintained for the duration of construction.

Tower foundations

Each turbine will require the installation of a steel-reinforced concrete gravity base foundation. A typical foundation will require the excavation of an area of approximately 20 m by 20 m and 3 m deep for the foundation. The final dimensions for the footings will be determined as part of the final design and will be dependent upon detailed geotechnical investigation.

Excavated materials will be stockpiled adjacent to the excavation-site and used for back fill, with the top soil stored separately from the substrata. Stone required for access tracks and tower foundations will be sourced from a range of existing local quarries.

Turbine assembly

Turbines will be transported as individual components and assembled on-site. The components for each turbine will consist of three to four tower sections, three blades and the nacelle. Each turbine component will be required to be transported using oversize (over- dimension / over-

weight) vehicles. Generally two different size mobile cranes are used to unload and assemble the wind turbine components over a two day period (approximately).

Cabling & reticulation

Underground cables will be laid in excavated trenches (or rock sawn if required) approximately 0.8 m wide x 1 m deep. The cables will be laid on a base layer of sand, topped by a layer of sand and backfilled to surface level. The trench alignment will then be stabilised to prevent erosion and revegetated.

On-site & off-site substations

The substations and control building will be constructed in parallel with the installation of cables. The construction of both the on-site and off-site substation will include site clearance and excavation (if required), pouring of concrete slabs and control building foundations (on-site only) and installation of the transformers and switchyard (on-site only). Both substations will be fenced and landscaped.

Overhead line

The construction of the overhead line between the on-site and off-site substations will include:

- Site establishment and access: Where no suitable access exists, new access tracks will be constructed. Access tracks are expected to be less than 4m wide. Temporary site compounds will be established along the transmission route to enable storage of poles and electrical infrastructure. Vegetation clearance to establish safe clearance from the overhead line may include the full or partial removal of up to six scattered trees (*Eucalyptus camaldulensis*) (Refer Section 12).
- Foundation excavation and pole erection: The overhead line will be strung on compact steel or concrete poles. The poles will be constructed using either pile or pedestal foundations. The type and dimension of foundations will be determined by the geotechnical conditions at each location.
- Conductor and earth wire installation: Conductors and earth wire will be strung by initially manually feeding a light training line between poles and then pulling the connected conductors into place using specialised vehicles.

Commissioning and export

The commissioning process involves running a series of tests on a range of electrical equipment to ensure components are safe, perform as required and are capable of continuous operation. Individual tests are undertaken on each turbine, the SCADA system and substation equipment / transformers. As each cluster of turbines is installed and commissioned, it is possible to bring turbines on line and commence exporting power.

Site rehabilitation

Rehabilitation of construction areas is an ongoing process. At the completion of construction of each wind turbine, the surrounding area will be rehabilitated. During the commissioning phase all drainage and landscaping works, contractor facilities, waste and surplus materials that are no longer necessary for the ongoing operation of the Project will be removed and the areas rehabilitated.

Key operational activities:

Operational activities associated with the Project will be largely limited to monitoring and maintenance of turbine performance, electrical systems, control systems and access tracks.

Monitoring will be carried out both by on-site staff and remotely using a SCADA system. Routine maintenance will be completed either by on-site staff or specialised contractors. Maintenance of the overhead line will be the responsibility of the Project operator. However, the connection point within the existing Mortlake Substation will be managed by AusNet Services.

Key decommissioning activities (if applicable):

Whilst the design life of individual Project components is expected to be 20 to 25 years, all are able to be replaced to extend the operational life of the Project. Land access agreements have been secured that enable the Project to operate for up to 50 years.

Decommissioning activities will include the removal of all above ground infrastructure (turbines, towers, foundations to ground level, substation and control building). Wherever possible infrastructure would be recycled. Rehabilitation of access tracks would be completed in consultation with landowners and left in place where requested. Decommissioning of the off-site substation and overhead line would be completed in consultation with AusNet Services or the relevant network services provider. The aim of decommissioning work would be to return the Project site to its pre-existing rural land use and to rehabilitate relevant sections of the overhead transmission line footprint with native vegetation.

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

☒ No ☐ Yes

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):

Hydro Tasmania selects potential wind farm development sites based on assessment of the suitability of the wind resource, connection to the electricity grid, potential environmental and heritage constraints and the community response to the proposal. Alternative sites were considered for development however, assessments completed to date indicate that the Project would be able to effectively connect to the electricity grid and have no significant adverse environmental or heritage impacts.

The design of the Project has evolved over time to enable it to:

- have a sufficient level of wind generation capacity in low to moderate wind speeds to effectively connect to the 500 kV Victoria - South Australia interconnector, and
- comply with environmental and planning requirements.

The Project site area has been expanded twice, initially to the south and then to the west to ensure the Project site is sufficient to accommodate the number of turbines required to connect to the 500 kV interconnector whilst avoiding or minimising impacts to environmental and heritage values.

Figure 3 shows how the Project site has been expanded overtime as constraints and opportunities have been identified. The initial Project site included approx. 6000ha of land comprised of stony rises used for sheep grazing in the north and cropping / grazing land in the south. The northern section of this land contained a high level of cultural and ecological values and was also close to another proposed wind farm.

The Project site was first extended to the south and south west involving approx. 4000ha of land. This section of the site involved cleared and relatively flat cropping and grazing land with

good access to the Hamilton Highway. This section had a higher density of surrounding houses than the initial site and also contained isolated areas of significant ecological or cultural heritage values.

The second extension of the site included approximately 3,200ha of grazing/cropping land to the west of the initial site. This area involved a relatively lower density of surrounding houses, few areas of high ecological or cultural values and also brought the site closer to the Mortlake Substation.

Key factors that have combined over time to shape the design of the Project are shown in Figure 3 and Figure 8 and include:

- the location and siting of nearby houses,
- areas with a high level of sensitivity for Aboriginal heritage,
- maintaining view lines of Mt Shadwell from the Hamilton Highway,
- brolga breeding sites and flock sites,
- areas with high geoheritage values,
- areas with threatened species and vegetation communities, and
- consultation with landowners.

During the development of the Project, the location of wind turbine development envelopes has moved away from the northern area which has the highest density of cultural and ecological values to the west where there are fewer cultural and ecological values and less nearby houses.

The location of the transmission development envelope has been altered in response to:

- avoiding impact to a range of threatened species/communities including the Striped Legless Lizard that occupy areas of the road reserve on Castle Carey Road,
- minimising impact to a remnant stand of River Red Gums, and
- achieving a coordinated alignment with transmission infrastructure proposed as part of the Dundonnell Wind Farm project.

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

The key alternative yet to be determined is the specific model and class of wind turbine. The wind turbine model will be determined by a number of factors. The optimal wind turbine class varies across the Project site and between hub heights. For example at an 80 m hub height the majority of the Project site could accommodate Class III wind turbines whilst at a 100 m hub height the majority of the Project site falls within a Class II wind regime. As described in Section 3, wind turbine and transmission development envelopes have been identified within which the turbines and associated infrastructure will be located. Different turbine classes and models have different siting requirements to optimise important performance characteristics such as wake induced turbulences which can degrade the structural properties of the turbine and impact electricity production.

The micro-siting of wind turbines and associated infrastructure within the development envelopes will be determined by the class and model of wind turbine selected, the results of detailed geotechnical studies, identification of additional cultural Aboriginal heritage values through the finalisation of Cultural Heritage Management Plans, and by any conditions imposed through the development approval.

The use of development envelopes, as described in Section 3, allows the optimal siting of the selected wind turbine within the development envelope without additional environmental, heritage or social impacts or contrary to planning requirements.

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:

No project or ancillary components or further project stages have been excluded from the scope of the Project described in this Referral.

6. Project implementation

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

Woolnorth Wind Farms Holding Pty Ltd (Woolnorth) is the implementing organisation.

Hydro Tasmania commenced development of the Project in 2009. In 2016, the Project was transferred to Woolnorth.

Woolnorth was established in 2012 to operate wind farms in Tasmania. Woolnorth currently operate three wind farms across northern Tasmania. These wind farms have a combined capacity of 308MW and generate approximately 9% of Tasmania's energy needs.

Woolnorth is a joint venture between:

- Hydro Tasmania: a state government owned business enterprise and Australia's largest generator of renewable energy, and
- Gouhua Energy Investment Corporation: A subsidiary of Shenhau Group Corporation and one of China's largest state owned energy companies. By the end of 2017, Gouhua plans to have 7000MW of wind and 400MW of solar developed within China.

Implementation timeframe:

Woolnorth aims to commence construction within six months of receiving a planning permit. Construction of the Project is expected to take approximately 18 to 24 months. Once commissioned the Project is expected to operate for at least 25 years.

Proposed staging (if applicable):

Not applicable

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 4 shows the Project site and surrounds. On site photos, including representative viewpoints, are included in the Preliminary Landscape and Visual Assessment (Attachment E).

The Project site and surrounding region has been shaped by three inter-related factors:

- Volcanic activity: the landscape of the Project site and region has been created through many thousands of years of volcanic activity, which has produced a vast basaltic plain. While the area is flat to undulating, the landform has been built up from successive periods of volcanic activity which has resulted in a complex juxtaposition of old landforms consisting of weathered material and deep soils, alongside more recent lava flows which have formed areas call Stony Rises.
- Aboriginal land use: The vegetation on the fertile soils of the region was managed over many thousands of years by Aborigines. The use of fire by Aborigines has maintained open grasslands.
- European land use: the fertile soils and open grassy plains were attractive to early European settlers who quickly established large pastoral sheep grazing properties. Over a short period of time bushland was substantially cleared and native grasslands were replaced by improved pastures.

The Stony Rise areas in the northern part of the Project site were created over the past 300,000 years from the Mt Fyans lava flows. The natural freshwater depressions in this area helped to support Aboriginal populations. Since European settlement the rocky nature of the terrain resulted in the land being primarily used for sheep grazing. Throughout Stony Rises areas there is a lower level of pasture improvement, earthworks and generally a low level of housing density. Across the Stony Rises area the desire to improve grazing pastures saw stones removed and piled into an extensive network of drystone walls, which is now regarded as an iconic feature of the landscape. Small remnants of native vegetation remain scattered across this landscape.

The landforms in the southern and western parts of the Project site were predominantly formed by lava flows 1 to 3 million years ago. This landform generally has a 2 to 3 m layer of soil/weathered materials and numerous small shallow wetlands on gently undulating plains. The rich volcanic plains and open grasslands were rapidly transformed into sheep gazing pastures by early European settlers. Native grassland and woodlands were replaced by introduced pastures with shelter belts of exotic and native trees cutting across the land forming paddocks. Many farms have homesteads built internally on blocks surrounded by extensive exotic/ native gardens.

The Project site is generally quite flat rising from an elevation of approximately 140 m at the southern end of Salt Creek and the boundary with the Hamilton Highway to 190 m on the Woorndoo-Darlington Road in the north.

The major landforms in the locality are:

- Mt Shadwell, a breached scoria cone volcano, and
- the valley formed by Salt Creek, which is a paleo-valley, formed by a much older drainage system that was subsequently diverted through volcanic activity.

The main waterways in the locality are:

- Salt Creek, which carries the overflow from Lake Bolac, and
- Blind Creek which follows the western boundary of the My Fyans lava flow.

Both Salt Creek and Blind Creek have an intermittent stream flow.

Many of the other mapped waterways in the region have been formed by the excavation of drainage channels over the last 150 years.

The Project site includes a variety of small lakes and wetlands. The northern Stony Rises area contains a large number of shallow and deep depressions with have formed a range of freshwater and saline permanent and seasonal wetlands. In the southern and western area

many naturally occurring shallow wetlands have been either permanently drained or altered so that they now hold water for only short periods of time or during years with very high rainfall.

Most of the Project site has been cleared of native vegetation and is currently managed for grazing and cropping. However, areas of remnant native vegetation persist within the Stony Rises, and in low-lying areas associated with depressions and drainage lines. Several roadsides and former stock routes within the region are known to support high value remnant native grasslands. Very few remnant native trees are present within the Project site with the majority of trees present planted as part of commercial farms.

Site area (if known): 13,050 (hectares)

The total Project site is 13,050 ha, with 3,450 ha nominated as the area of the proposed wind turbine and transmission development envelopes. The area expected to be used by permanent Project infrastructure (wind turbines, access tracks, on site substation) is expected to be approximately 65 ha or around 0.5 % of the total Project site.

Route length (for linear infrastructure) 19 km overhead line **and width** 40 m to 80 m easement

The length of the overhead line alignment is 19 km from the on-site substation to the off-site substation. The width of the easement will be determined by the type of cable and pole design but will likely be between 40 m and 80 m.

The easement is a legal right of access that exists only on land title, it does not describe the extent of physical works or land clearing. The overhead line is located in cleared grazing land and plantation forestry. The overhead line route has been selected to avoid Works Exclusion Areas and native vegetation. It is estimated that a maximum of six River Red Gum may be directly affected by the construction of the overhead line. Construction of a 3m wide access track may be required along some sections of overhead line. The tracks will not be continuous and will not cross wetlands or waterways.

Current land use and development:

The predominant land use is broad acre cropping and grazing which will be able to continue over the majority of the Project site during construction and operation of the Project.

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

Land adjoining the Project site, and in the wider region, is predominately used for broad acre cropping and grazing.

The closest urban settlement to the Project site is Mortlake which is located approximately 4 km to the south. Terang and Camperdown are located 20 km and 25 km respectively to the south whilst Lake Bolac is located 25 km to the north. Minor settlements in the region include Hexham, Darlington, Woorndoo, Caramut and Derrinallum.

Figure 5 shows the location of dwellings in the vicinity of the Project site. There are 15 dwellings within the Project site. Agreements with the owners of all 15 dwellings are in place.

A further 18 habitable dwellings are located within two km of a wind turbine development envelope. No houses outside the Project site are within one km of a wind turbine development envelope.

The Project site has good access to arterial roads designed for use by heavy vehicles. The Hamilton Highway borders the Project site to the south and the Mortlake Ararat Road runs north west through the Project site. Municipal roads running through or adjacent to the Project site

include Castle Carey Road, Woorndoo – Darlington Road, Six Mile Lane, North Road and South Road.

The 500 kV Victoria - South Australia interconnector runs through the Project site.

Planning context (eg. strategic planning, zoning & overlays, management plans):

The use of land for the development is described under Clause 74 of the Moyne Planning Scheme as a Wind Energy Facility.

The wind farm is a generating system up to and including the off-site substation which connects the system to the Mortlake Substation. All of the assets which form part of the system are necessary to generate electricity. All of the associated assets of the Project are defined as a Wind Energy Facility.

Under Clause 61.01-1 the Minister for Planning is the Responsible authority for the consideration of the wind farm and its associated infrastructure.

The wind farm turbines and overhead line will be located within the Farming Zone (Clause 35.07) of the Moyne Planning Scheme in which a Wind Energy Facility is a Section 2 use (Figure 6).

The proposed off site substation adjacent to the Mortlake Substation is part of the Generation System, therefore a Wind Energy Facility is a Section 2 Use in the Special Use Zone SUZ1 (Figure 6).

The proposed overhead line route will be partly adjacent to the existing Victoria to South Australia 500kV interconnector. The line route will take the cable through an Environmental Significance Overlay ESO3 (Clause 42.01) which is in place to provide an adequate buffer from sensitive uses for the Mortlake Power Station. The overlay does not change the status of the application. No other overlays impact on the Project.

- As a Wind Energy Facility, the Project will need to demonstrate specific compliance with the provisions of:Clause 19.01 of the State Planning Provisions (Renewable Energy)
- Clause 52.32 of the Particular Provisions (Wind Energy Facilities).

The Project will require a limited amount of native vegetation clearance which will be included in the planning permit application. The provisions of Clause 52.17 (Native Vegetation) will be addressed in the planning permit application.

Additional State Planning Provisions of the Moyne Planning Scheme which are likely to have some relevance to the Project, and will be specifically addressed in the application, are:

- Clause 12.01 (Biodiversity)
- Clause 12.02 (Native Vegetation Management)
- Clause 13.04 (Noise and Air)
- Clause 14.01 (Agriculture)
- Clause 15.03 (Heritage)
- Clause 18.01 (Integrated Transport)

The Municipal Strategic Statement will be considered, in particular the provisions of Clause 21.07 Economic Development. Relevant Local Planning Policies include:

- Clause 22.02 Environment
- Clause 22.03 Economic Development

At a State level, the Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria (2016) are relevant, including the model planning permit conditions contained within Appendix B.

Local government area(s): The Project is located wholly in the Shire of Moyne.

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 Project site is within an area of the Victorian Volcanic Plain bioregion which is predominately cleared with few areas of remnant vegetation or habitats managed for conservation (Figure 4). It is characterised by being of low relief and intersected by intermittently flowing creeks and ephemeral and permanent wetlands. The largest nearby conservation areas are the Cobra Killuc Wildlife Reserve, between Hexham and Woorndoo, and the Mortlake Common Flora Reserve to the west of Mortlake. Both conservation areas are located more than 3.5 km from the boundary of a proposed wind turbine development envelope (Figure 4).

The Western District Lakes Ramsar site includes a number of wetlands that are primarily located within the Lake Corangamite Basin, however, the most westerly component of this Ramsar site (Lake Bookar) is located within the Mount Emu Creek catchment (Hopkins River Basin) and is located approximately 25 km south-east of the Project site. There is no direct hydrological connectivity between the Project site and Lake Bookar.

The main waterways within or adjacent to the Project site are Salt Creek and Blind Creek which are in poor to moderate condition due to historical clearing and hydrological change associated with extraction for agriculture. However, these waterways have localised high value habitats which support species of conservation significance (e.g. *Galaxiella pusilla* - dwarf galaxias and *Engaeus sericatus* - hairy burrowing crayfish).

Key terrestrial ecological values identified within the Project site include:

- nine Endangered Ecological Vegetation Class's (EVCs) and one Vulnerable EVC,
- scattered remnant trees,
- eight fauna habitat types, including creeks, wetlands, grasslands and rock walls,
- one threatened flora species (*Pimelea spinescens* subsp. *spinescens* - spiny rice-flower) listed as Critically Endangered on the Victorian Flora and Fauna Guarantee Act 1988 (FFG Act),
- seven threatened fauna species listed under the FFG Act including three that are also listed under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act),
- endangered communities, including Natural Temperate Grasslands of the Victorian Volcanic Plain and Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains.

The Project site is located on the Newer Volcanic Province (NVP) of South Eastern Australia. The Mt Fyans and Mondilibi eruption points and associated lava flows are of regional significance and together with Mt Hamilton and other nearby eruption points form a complex of State significance. A geoheritage assessment identified 11 individual sites and areas within the Project site that are of varying levels of significance and contribute toward the National and State Significance rating of the larger areas.

The wind turbine development envelopes and works exclusion areas avoid all 11 geoheritage sites.

The Eastern Maar Aboriginal Corporation has an existing Native Title Application over the majority of the Project site.

9. Land availability and control

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

☒ No ☒ Yes If yes, please provide details.

The Project will include land used for public roads and administered by Moyne Shire Council or Vic Roads.

Current land tenure (provide plan, if practicable):

Land within the Project site is private freehold land held under various ownerships.

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

Land tenure within the Project site and transmission line easement is intended to remain with the property owners. Agreements have been entered into with landowners to secure land access and long term lease arrangements for the expected lifespan of the Project.

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

AusNet services has an easement on the land containing the 500 kV Victoria to South Australia interconnector.

The Eastern Maar Aboriginal Corporation has an existing Native Title Application over the majority of the Project site.

10. Required approvals

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

Key approvals required for the Project include:

- Approval in accordance with the *Planning and Environment Act 1987*. The proposal requires approval from the Minister for Planning, through the Victorian Department of Environment, Land, Water and Planning (DELWP), in accordance with the Moyne Shire Planning Scheme.
- Approval of a Cultural Heritage Management Plan in accordance with the *Aboriginal Heritage Act 2006*.

The proposal is not anticipated to have an impact on a Matter of National Environmental Significance as defined in the EPBC Act.

Additional works permits and approvals for the development may also be required under the:

- FFG Act – permit to take protected native flora from public land.
- *Water Act 1989* – permit for any works within 20m of a designated waterway.
- *Road Management Act 2004* – permit for works associated with new access to public roads.

The requirements of other Acts, including approvals, which may be applicable to the Project include (but are not limited to):

- *Civil Aviation Act 1988*
- *Electricity Industry Act 2000*
- *Electricity Safety Act 1988*
- *Environmental Protection Act 1970*
- *Heritage Act 1995*

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 Energy (Commonwealth)
- Department of Environment, Land, Water and Planning
- Aboriginal Victoria
- Martang Aboriginal Corporation

Other agencies consulted:

- Moyne Shire Council
- Eastern Maar Aboriginal Corporation
- VicRoads
- Air Services Australia
- Glenelg Hopkins Catchment Management Authority
- Wannon Water

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):

The identification of potential Project sites, as well as the design and siting of the development within the selected Project site, has been informed by an understanding of environmental values and risks. Over a seven year period environmental values and risks associated with the Project site have been assessed to an increasing level of detail. Key risks have been avoided during site identification through the siting and design of the development envelopes. The Project is not expected to have any significant environmental effects.

Key environmental assessments completed to date and included as attachments to this referral are:

- Flora, fauna and existing conditions (Biosis 2017) (Attachment A)
- Targeted surveys and impact assessment (Biosis 2017) (Attachment B)
- Brolga assessment (Biosis 2017) (Attachment C)
- Acoustic Considerations and Preliminary Predictions (Marshall Day Acoustics 2017) (Attachment D)
- Preliminary Landscape and Visual Assessment (Urbis 2017) (Attachment E)
- Geoheritage Assessment (Environmental GeoSurveys 2014) (Attachment F)
- Preliminary Cultural Heritage Assessment (Biosis 2017) (Attachment G)

Other preliminary assessments that have been undertaken by Hydro Tasmania that have informed the development proposal include historic cultural heritage, water values, transport and traffic. These matters will continue to influence detailed designs and construction planning.

A summary of the findings of the key assessments is provided below.

A list of threatened flora and fauna and migratory species that have been recorded or identified as potentially occurring in the local area is included in Section 12.

<u>Flora, fauna and ecosystems</u>

Figure 7 shows the location of listed communities and threatened flora and fauna species.

<u>Listed communities</u>

There are three listed threatened communities identified as occurring within the Project site and adjoining roadside reserves (Figure7):

- Natural Temperate Grassland of the Victorian Volcanic Plain (EPBC Act)
- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains(EPBC Act)
- Western (Basalt) Plains Grassland (FFG Act)

There is one wetland with a vegetation community recognised as having conservation values within the general footprint of the proposed project. (The horse shoe shaped vegetation community on Figure 7 in the southern/central part of the site). The boundary of this and other wetlands containing native communities are based on both field surveys and an assessment of the maximum extent of the relevant ECV community within the wetland.

These listed communities are not located in turbine or transmission development envelopes or have been included in works exclusion areas and will consequently not be affected by the

Project. The EVC's captured in the works exclusion areas include:

- 125 Plains Grassy Wetland (41 ha)
- 132_61 Heavier-soils Plains Grassland (5.9 ha)
- 55_61 Plains Grassy Woodland (0.3 ha)
- 653 Aquatic Herbland (3.1 ha)

Threatened flora

Only one threatened flora species (spiny-riceflower - *Pimelea spinescens* subsp. *spinescens*) was located within the Project site where it was recorded at two locations on roadside reserves. Both of these sites are located outside the wind turbine and transmission development envelopes. Therefore this species will not be affected by the Project.

Threatened fauna

Seven threatened fauna species were identified as occurring within the Project site:

- Brolga (*Grus rubicundus*)
- Corangamite water skink (*Eulamprus tympanum marnieae*)
- Striped legless lizard (*Delma impar*)
- dwarf Galaxias (*Galaxiella pusilla*)
- eastern great egret (*Ardea modesta*) (also migratory)
- gull-billed tern (*Sterna nilotica*) (also migratory)
- freckled duck (*Stictonetta naevosa*)

With the exception of the striped legless lizard, the locations and habitats of these species have been avoided as they are located outside of the wind turbine development envelope. Approximately 19.5 ha of striped legless lizard habitat is located within the turbine development envelopes but this habitat has been included in a works exclusion area and is thus avoided. Therefore the Project is not expected to impact on threatened fauna species or their habitats.

Listed migratory species

Eighteen migratory species have been recorded or identified as having the potential to occur in suitable habitat within the Project site. Targeted surveys that were undertaken for migratory species recorded four of the potentially occurring species within the Project site:

- the common sandpiper (*Actitis hypoleucos*)
- sharp-tailed sandpiper (*Calidris acuminata*)
- red-necked stint (*Calidris ruficollis*)
- Latham's snipe (*Gallinago hardwickii*)

However, the results of the targeted surveys, combined with the review of pre-existing database records, found that there were no wetlands within the Project site or adjacent to it that could be considered 'important habitat' for listed migratory species. The wetlands where the listed migratory species and other waterbirds were recorded are located in the northern part of the Project site and well outside the wind turbine development envelopes. Therefore it is unlikely that the Project will affect listed migratory species.

Brolgas

The Interim Guidelines for the Assessment, Avoidance, Mitigation and Offsetting of Potential Wind Farm Impacts on the Victorian Brolga Population[1] (the Guidelines) state that a Brolga Flock Roost Site is a wetland that is known to be used by a Brolga Flock for nocturnal roosting.

The criteria and supporting intent statements provided in the Guideline and used to identify a Brolga Flock Roost Site, include:

- *More than one year of recording* – to ensure the selection of traditional and regularly used sites.
- *One or more records of counts equal to or greater than 10 birds* – to include sites which have been used often or traditionally by flocking Brolgas.
- *Recorded in more than one month* – to include sites used for the majority of the flocking season.

The criteria and supporting intent statements provided in the Guidelines define a Brolga Flock Roost Site as a wetland known to be used regularly and traditionally each year for the nocturnal roosting of flocks (generally at least 10 birds) of Brolgas for the majority of the flocking season between December and June.

At a regional level the majority of flocking sites in the locality are located more than 10 km to south and west of the Project site (refer to Figure 6 in the Attachment C). Three Brolga Flock Roost Sites have been identified within 10 km of the Project site Lake Sheepwash, Lake Barnie Bolac and Long Dam.

To manage the cumulative impacts of multiple wind farms, the Guidelines recommend a turbine free buffer that is set 'to exclude any significant impact on the survivorship of Brolga's whilst occupying a flocking site'. The wind turbine development envelopes have been designed to locate turbines beyond the generally recommended five km buffer as set by the Guidelines for Brolga Flock Roost sites (Figure 7).

The Guidelines state that a breeding site is the nest of a breeding pair and the wetland it occurs in. The perimeter of wetland forms the boundary of the breeding site. Information on breeding sites and habitat was gained through a range of methods including:

- a survey of landowners within and surrounding the Project
- two aerial surveys
- review of databases
- home range and breeding field surveys.

In the case of breeding habitat, the Guidelines aim to have a turbine free buffer around breeding sites sufficient to have *no significant impact on the likelihood of successful reproduction*.

Hydro Tasmania joined with the owner of the Penshurst Wind Farm to undertake a combined home range assessment of breeding sites and determine an appropriate turbine free breeding site buffer. The results of the home range field survey process and statistical analysis are described in Attachment C. The analysis indicated that for 95% of the time Brolgas were within 600 m of the centre of their home range. To ensure there was a high degree of confidence in the buffers, a range of conservative assumptions were applied to this process (e.g. 99.9% home range statistic, 300 m additional home range buffer), which resulted in a recommended turbine free buffer radius of 1133 m from the boundary of breeding habitats (refer Section 12 –

[1] Department of Environment and Sustainability 2011, Interim Guidelines for the Assessment, Avoidance, Mitigation and Offsetting of Potential Wind Farm Impacts on the Victorian Brolga Population 2011 (Revision 1 February 2012). Government of Victoria, Melbourne.

Threatened Fauna).

Four breeding sites have been identified as having breeding buffers that are within or overlap the boundary of the Project site (Figure 8). However, the four breeding sites are on the boundary of the Project site and, applying a 1333 m buffer, none are within the wind turbine development envelope.

The method for the home range assessment, the scope of the data required and the design of the turbine free buffer for breeding sites was agreed with DELWP. During the survey process regular consultation has occurred with DELWP on the assessment process and findings. In May 2017 a meeting with DELWP officers to discuss Brolga assessment and findings was held and a draft Brolga Assessment Report was provided for informal review.

Following this meeting DELWP advised that it was generally satisfied with the approach, findings and recommendations of the Assessment Report for the referral to the Government on whether an EES is required.

Further consultation with DELWP will occur on application of the Brolga Guidelines as the planning and approval process for the project progresses.

Noise

Marshall Day Acoustics has completed a preliminary desktop noise assessment of the Project that included preliminary predicted noise levels (Attachment D). As the model and type of wind turbine are yet to be determined (refer to Section 3), noise predictions were generated using a GE 3.4-137 model of turbine as it produces sound power levels typical of the class of turbine that will be considered for the Project. The assessment found that all external receivers were below a base noise limit of 40bB LAeq (Figure 8). The results of the preliminary assessment demonstrate that the Project can be viably designed and operated in accordance with the *Victorian Government's Policy and planning guidelines for the development of wind energy facilities in Victoria* (DELWP, 2016).

Preliminary predicted noise levels for on-site and off-site substations indicate that they will be compliant with night time noise limit of 35 dB Leff[2] provided in EPA publication 1411 *Noise from industry in Regional Victoria – Recommended maximum noise levels from commerce, industry and trade premises in regional Victoria*.

A detailed noise impact assessment, including measurement of background noise levels, will be undertaken as part of the planning approval process and will assess compliance of the construction and operation of the Project against the relevant guidance documents.

Landscape

A Preliminary Landscape and Visual Assessment has been completed by Urbis (Attachment E).

The Project site is located in the generally flat Western Plains landscape. Remnants of volcanic activity feature prominently including volcanic cones and ephemeral and permanent wetlands formed in depressions. Broad scale agriculture has resulted in a significant human influence on the landscape. The preliminary assessment identified 10 regional landscape units of which two; Stony Rises – Pastoral and Western Plains Agricultural / Pastoral occur in the Project site. There are no areas of landscape significance listed in the Moyne Planning Scheme or National Trust of Australia (Victoria) database within 15 km of the Project site however, the *Southwest Victoria Landscape Assessment Study - Significant Landscapes* (DTPLI 2013) recognises Mt Shadwell as part of the Southern Cones State Significant Landscape.

[2] Leff is the effective noise level of commercial or industrial noise determined in accordance with SEPP N-1 (Control of Noise from Commerce, Industry and Trade).

Residences within the local (0 to 4 km) and sub-regional (4 to 8 km) areas were included in the preliminary assessment. The majority of residences have well established gardens which are expected to provide full or partial screening of the Project and reduce potential visual impact. Visual impact at the majority or residences was assessed as low or moderate.

The visibility of the Project is diminished and screened from small surrounding settlements such as Woorndoo, Hexham and Darlington by a combination of distance, built form, trees within and surrounding the settlement, and, in the case of Mortlake, by Mt Shadwell. The Project will be visible from locations on the Hamilton Highway and smaller local roads however, topography and screening provided by roadside vegetation are also expected to reduce potential visual impacts. The Project has been designed such that it does not interrupt views of Mt Shadwell from the Hamilton Highway. An analysis of viewpoints from 20 locations considered to have a high level of visual sensitivity also supports the expectation that distance and screening provided by vegetation and built form will significantly reduce potential visual impact.

The preliminary assessment also considered cumulative impacts from nearby approved and constructed wind farms. If all approved projects were constructed there would be locations in the region where turbines from more than one windfarm would be visible. Cumulative impacts from settlements including Woorndoo and Mortlake are expected to be low due to the distance from the projects and restricted views in the direction of the projects. A large proportion of residences outside settlements will have views fully or partially screened and the overall cumulative impact on residences was assessed as low. Cumulative impacts may also occur when traversing the road network, in particular the Hamilton Highway which would provide views of more than one wind farm. Cumulative impacts from the Hamilton Highway are expected to be reduced due to the speed of the viewer is traversing the landscape, distance (a large proportion of the highway is greater than four km from the closest turbine) and distribution of roadside vegetation which will provide partial to full screening at times.

<u>Geoheritage</u>

A geoheritage assessment was completed by Environmental GeoSurveys and is included as Attachment F.

The Project site is located on the Newer Volcanic Province (NVP) of South Eastern Australia which covers an area of 19,000 km2, includes over 700 known eruption points and is a geoscience complex of National Significance. In addition, the Mt Fyans and Mondilibi eruption points and associated lava flows are of regional significance and together with Mt Hamilton and other nearby eruption points form a complex of State Significance.

The geoheritage assessment identified 11 individual sites and areas within the Project site that are of varying levels of significance and contribute toward the National and State Significance rating of the larger areas (Figure 8). The wind turbine and transmission development envelopes avoid all eleven sites. Within the Mt Fyans lava flow area, but outside of the 11 identified sites, the development envelope has been designed to avoid all geoheritage features including:

- crossing lava ridges and elevates plateaus
- enclosed depressions
- crossing high and narrow ridges.

The Project is not expected to have any adverse effect on geoheritage values.

<u>Aboriginal cultural heritage</u>

A Preliminary Cultural Heritage Assessment (Attachment G) has been prepared by Biosis. The preliminary assessment concluded that:

- There is one site registered on the Victorian Aboriginal Heritage Register located within the Project site.

- There are Areas of Sensitivity, notably associated with stony rises and water bodies.
- There is potential for unidentified Aboriginal archaeological material and cultural values to be present within the Project site.

Two Cultural Heritage Management Plans (CHMPs) are currently being prepared based on the boundaries of Traditional Owner Groups. The Martang Aboriginal Corporation will assess the CHMP for the western area of the Project site and, in the absence of an appointed RAP, Aboriginal Victoria will assess the CHMP for the remainder of the Project site.

As part of the development of the CHMPs a Standard Assessment was undertaken which identified a further four Areas of Sensitivity and eight Aboriginal places within the Project site.

The development envelopes and works exclusions areas have been designed so that all Areas of Sensitivity and Aboriginal places have been avoided and managed in accordance with the requirements of the CHMPs (Figure 8).

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)

A comprehensive assessment of the native vegetation (Attachment A and Attachment B) has been undertaken for the Project site including:

- a preliminary vegetation survey of the Project site that was carried out from 12th to 16th March 2012
- a post-grazing removal of vegetation survey carried out in spring 2012 from 15th to 17th of October and 5th to 7th of November 2012
- a vegetation survey of the small extension to the Project site ('western extension') near the Woorndoo-Dundonnell Road from the 15th to 17th October 2012
- a vegetation survey of the western extension on the 29th and 30th of January 2013
- a vegetation survey of roadsides on the 3rd and 4th of June 2013
- a vegetation survey of the transmission line corridor between Project site and Mortlake substation from the 11th to 13th of June 2013.

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

☐ NYD Estimated area …0.424[3] (hectares)

The only native vegetation that may need to be cleared is up to six scattered river red gum (*Eucalyptus camaldulensis*) trees.

The clearance of native vegetation for the project will be subject to the *Permitted Clearing of Native Vegetation – Biodiversity Assessment Guidelines*. In accordance with the biodiversity assessment guidelines scattered trees are assigned a standard clearance area of a *circle with a radius of 15m*. Accordingly each scattered tree was assigned an area of 0.0706Ha with the

[3] In accordance with the *Permitted Clearing of Native Vegetation – Biodiversity Assessment Guidelines* the clearance area of each scattered tree was assumed to be a circle with a radius of 15 m.

maximum total clearance area for all six trees equalling 0.424Ha. (Refer Attachments A and B)

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.

No mapped EVCs will be affected.

Have potential vegetation offsets been identified as yet?

☒ NYD ☐ Yes If yes, please briefly describe.

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

Vegetation mapping was carried out using hand-held (uncorrected) GPS units (WGS84) and aerial photo interpretation. The presence of EVCs (Attachments A and B) was verified by field surveys including:

- preliminary native vegetation mapping was undertaken between 12th and 16th March 2012
- mapping undertaken during spring following the removal of grazing to confirm extent and distribution of EVCs between 15th and 17th October and 5th and 7th November 2012
- EVC mapping of a small extension to the Project site ("Western Extension") near Woorndoo-Dundonnell Road between 15th and 17th October 2012 and on the 29th and 30th January 2013
- EVC mapping of roadsides on the 3rd and 4th June 2013
- EVC mapping of the external transmission line corridor from the 11th to 13th of June 2013.

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)

A comprehensive flora assessment (Attachments A and B) has been undertaken for the Project site including:

- a preliminary flora survey of the site that was carried out from 12th to 16th March 2012
- a post-grazing removal flora survey carried out in spring 2012 from 15th to 17th of October and 5th to 7th of November 2012
- a flora survey of the small extension to the Project site ('western extension') near Woorndoo-Dundonnell Road from the 15th to 17th October 2012
- a flora survey of the western extension on the 29th and 30th of January 2013
- a flora survey of roadsides on the 3rd and 4th of June 2013
- a flora survey of the transmission line corridor between the Project site and substation from the 11th to 13th of June 2013
- a flora survey targeting the threatened spiny rice-flower *Pimelea spinescens* subsp.

spinescens (31st July to 1st August 2013)

- a flora survey targeting 10 species listed under the EPBC Act (12 survey days over the spring and summer of 2014/15).

Fauna surveys (Attachments A and B) were undertaken using a staged approach between March 2012 and January 2015 including:

- a preliminary fauna assessment and mapping of fauna habitat that was undertaken over five days from 12th to 16th of March 2012
- a fauna survey and habitat assessment of the extension to the Project site ('western extension') near Woorndoo-Dundonnell Road between the 15th and 17th of October 2012
- a fauna survey and habitat assessment of the western extension on the 29th and 30th of January 2013
- a fauna survey and habitat assessment and mapping of roadsides on the 3rd and 4th of June 2013
- a fauna survey of the external transmission line corridor between the 11th and 13th of June 2013
- in addition fauna surveys targeting listed threatened fauna species were carried out between March 2012 and January 2015 including:
    - a migratory wader survey across the Project site in August 2012 and January/February 2013
    - a migratory wader survey of the western extension in July 2013 and January/February 2014
    - a survey for the Corangamite water skink in October 2012 and January 2013
    - a survey for the Corangamite water skink in within western extension of Project site in October 2013 and January 2014
    - an aquatic fauna survey for the dwarf galaxias *Galaxiella pusilla*, Yarra pygmy perch *Nannoperca obs*cura, hairy burrowing crayfish *Engaeus sericatus* and screech beetle *Hygrobia australasiae* was undertaken over five days between November 22nd 2012 and January 3rd 2013
    - a survey for the striped legless lizard *Delma impar* was carried out using the tile grid method between October and November 2013
    - a southern bent-wing bat *Miniopterus orianae bassannii* roost site survey of caves, cave complexes and overhangs on and around Mount Fyans including Mt Hamilton on the 4th and 5th September 2013
    - a survey for the golden sun moth *Synemon plana* in the 2014/2015 flight season on the 12th and 22nd of December 2014 and the 2nd and 7th of January 2015.
    - a survey for the growling grass frog *Litoria raniformis* was undertaken over two nights on 7 November and 21 December 2014.

The brolga (*Grus rubicundus*) was identified as a sensitive species early in the development of the Project. Consequently a program of brolga surveys and assessments has been undertaken at and around the Project site particularly aimed at identifying breeding and flocking sites (Attachment C) including:

- Aerial surveys on the 3rd and 4th November 2009 using a Cessna 172 over-wing to fly east-west/west-east transects 500 m apart across the Project site and 3 km buffered survey area around the Project site.
- An on-ground survey on the 5th and 6th of November 2009 by one observer who observed as many wetlands as possible from the road network in the area between the 3 km buffered aerial survey area and the 10 km study area database search buffer.

- Home range surveys were undertaken in December 2009 and January 2010 using a method whereby observers visited each breeding brolga pair at the Penshurst and Mt Fyans study sites as many times as possible from dawn to dusk leaving at least 2 hours between observations at the same nest to ensure independence of behaviours between visits. The results of these surveys were used to map the home range of breeding pairs of brolgas. Observations included:
    - At Penshurst the observations were carried out from 30th of November to the 4th of December 2009, 21st to the 24th of December 2009, 11th to the 15th of January 2010 and from the 18th to the 20th of January 2010.
    - At Mount Fyans the observations were carried out from 14th to the 18th of December 2009, 21st to the 24th of December 2009, 4th to the 8th January 2010, 18th to the 22nd of January 2010, 1st to 6th of February 2010 and from the 15th to the 18th of February 2010.
    - Opportunistic observations of the locations of brolgas were also noted when moving through the Project site during other targeted species surveys that were undertaken between November 2009 and March 2010.
- additional aerial surveys of the Project site were undertaken on the 8th and 9th October 2014 to provide further information on Brolga breeding pairs within and adjacent to the site.
- a survey of landowners within a 5 km radius of the Project site was undertaken between 2nd May 2013 and 20th March 2014 to record their Brolga observations.
- a survey to observe Brolga flocking at Lake Sheepwash was carried over four days from the 27th to the 30th May 2013 to confirm that the site was being used by a number of Brolga as a night roost.

The brolga assessment report (Attachment C) has been updated to include data up to May 2017.

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.

Listed communities

Three listed threatened ecological communities are known to be present within the Project site (Figure 7):

- **Natural Temperate Grassland of the Victorian Volcanic Plain** which is listed as Critically Endangered under EPBC Act. Field surveys found that this community is present within sections of Heavier-soils Plains Grassland EVC; Plains Grassy Wetland and Stony Knoll Shrubland within the Project site and along roadsides.
- **Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains** which is listed as Critically Endangered under EPBC Act. This community occurs within areas of Aquatic Herbland and Plains Grassy Wetland EVCs.
- **Western (Basalt) Plains Grassland** which is listed under FFG Act. This listed community includes vegetation within all patches of Heavier-soils Plains Grassland EVC and some patches of Stony Knoll Shrubland and Plains Grassy Wetland EVCs.

Threatened flora

Twenty-nine listed threatened flora species have either been recorded or have the potential to occur within suitable habitat within the local area including the Project site (see Table below). However, only one listed threatened flora species, the spiny rice-flower (*Pimelea spinescens*

subsp. *spinescens*) was recorded within the Project site during extensive flora surveys (Attachment A) (Figure 7). The spiny rice-flower is listed as Critically Endangered under the EPBC Act and is listed under FFG Act. Eighty-two Spiny Rice-flower plants were recorded within a five hectare area along the Woorndoo-Dundonnell Road reserve and 35 plants were recorded within 2.5 hectares along Castle Carey Road (Attachment B).

Listed threatened flora species recorded or identified as potentially occurring in the local area (from Attachments A and B)

Species	Common name	EPBC Act	FFG Act
Amphibromus fluitans	River swamp wallabygrass	Vulnerable	Listed
Carex tasmanica	Curly sedge	Vulnerable	Listed
Comesperma polygaloides	Small milkwort	Not listed	Listed
Dianella amoena	Matted flax-lily	Endangered	Listed
Diuris basaltica	Small golden moths	Endangered	Listed
Diuris gregaria	Clumping golden moths	Not listed	Listed
Dodonaea procumbens	Trailing hop-bush	Vulnerable	Listed
Glycine latrobeana	Clover glycine	Vulnerable	Listed
Lachnagrostis adamsonii	Adamson's blowngrass	Endangered	Listed
Lachnagrostis punicea subsp. filifolia	Purple blown-grass	Not listed	Listed
Lepidium aschersonii	Spiny peppercress	Vulnerable	Listed
Leucochrysum albicans var. tricolor	White Sunray	Endangered	Listed
Pimelea spinescens subsp. spinescens	Spiny rice-flower	Critically Endangered	Listed
Poa physoclina	Wind-blown tussockgrass	Not listed	Listed
Poa sallacustris	Salt-lake tussockgrass	Vulnerable	Listed
Prasophyllum frenchii	Maroon leek-orchid	Endangered	Listed
Prasophyllum suaveolens	Fragrant leek-orchid	Endangered	Listed
Prasophyllum viretrum	Basalt leek-orchid	Not listed	Listed
Pterostylis baptistii	King greenhood	Not listed	Listed
Pterostylis basaltica	Basalt rustyhood	Endangered	Listed
Pterostylis conferta	Leprechaun greenhood	Not listed	Listed
Pterostylis sp. aff. bicolor (Woorndoo)	Dense greenhood	Not listed	Listed
Ptilotus erubescens	Hairy tails	Not listed	Listed
Senecio psilocarpus	Swamp fireweed	Vulnerable	Listed
Taraxacum	Coast Dandelion	Vulnerable	Listed
Thelymitra epipactoides	Metallic sun-orchid	Endangered	Listed
Thelymitra gregaria	Basalt sun-orchid	Not listed	Listed
Thelymitra matthewsii	Spiral sun-orchid	Vulnerable	Listed

Xerochrysum palustre	Swamp everlasting	Vulnerable	Listed

Threatened fauna

Nineteen listed threatened fauna species have either been recorded or have the potential to occur within suitable habitat within the local area including the Project site (see Table below). Seven listed threatened fauna species were recorded within the Project site:

- eastern great egret
- striped legless lizard
- Corangamite water skink
- dwarf Galaxias
- brolga
- gull-billed tern
- freckled duck.

Figure 7 shows the location of recorded threatened fauna habitat.

Listed threatened fauna species recorded or identified as potentially occurring in the local area (from Attachments A and B)

Species	Common name	EPBC Act	FFG Act	Occurrence
Ardea alba	Eastern great egret	Not listed	Listed	Recorded within wetlands within the Project site.
Botaurus poiciloptilus	Australasian bittern	Endangered	Listed	Not recorded. Limited suitable vegetated wetland habitat available.
Calidris ferruginea	Curlew sandpiper	Critically Endangered	Listed	Not recorded, although suitable wetland habitat present.
Delma impar	Striped legless lizard	Vulnerable	Listed	Recorded within native grassland within western extent of Castle-Carey Road reserve with the Project site.
Egretta garzetta nigripes	Little egret	Not listed	Listed	Not recorded although suitable wetland habitat present.
Eulamprus tympanum marnieae	Corangamite water skink	Endangered	Listed	Recorded within the northern section of the Project site in rocky habitats associated with wetlands.
Galaxiella pusill	Dwarf Galaxias	Vulnerable	Listed	Recorded from two locations within Salt Creek on western boundary of the Project site.
Grus rubicundus	Brolga	Not listed	Listed	Recorded within wetlands and pasture.

				There are three known brolga flocking sites within 10 km of the Project site – Lake Barnie Bolac, Long Dam and Lake Sheepwash. There are also two breeding sites within and one immediately adjacent to the boundary of the Project site.
Litoria raniformis	Growling grass frog	Vulnerable	Listed	Not recorded during targeted surveys although suitable habitat present.
Miniopterus orianae bassanii	Southern bent-wing bat	Critically Endangered	Listed	Three locations around and within the Project site were identified as possible locations that may provide potential roosting and overwintering sites for the southern bent-wing bat. The sites were searched with no evidence of current use. Species may forage and fly through open habitat within the Project site.
Nannoperca obscura	Yarra pygmy perch	Vulnerable	Listed	Not recorded during targeted aquatic survey although suitable habitat present.
Numenius madagascariensis	Eastern curlew	Critically Endangered	Listed	Not recorded, although suitable wetland habitat present.
Oxyura australis	Blue-billed duck	Not listed	Listed	Not recorded, although suitable wetland habitat present.
Pedionomus torquatus	Plains-wanderer	Critically Endangered	Listed	Not recorded. Limited patches of sparse native grassland suitable for this species.
Pseudophryne bibronii	Bibrons toadlet	Not listed	Listed	Not recorded, although potential habitat identified along Boonerah Estate Road in the western extension of the Project site.
Rostratula australis	Australian painted snipe	Endangered	Listed	Not recorded. Limited and marginal wetland habitat present.
Sterna nilotica	Gull-billed tern	Not listed	Listed	Recorded within wetlands within Project

				site.
Stictonetta naevosa	Freckled duck	Not listed	Listed	Recorded within wetlands within Project site.
Synemon plana	Golden sun moth	Critically Endangered	Listed	Not recorded during targeted surveys although suitable habitat present.

Listed migratory species

Eighteen listed migratory species have either been recorded or have the potential to occur within suitable habitat within the local area including the Project site (see Table below). Four migratory species were recorded within the Project site during targeted surveys:

- Sharp-tailed sandpiper - fourteen birds were observed on two occasions at a large wetland at the northern end of the Project site. All were observed actively foraging. No roosting behaviour was observed.
- Latham's snipe - a single bird was flushed from grassland adjacent to the same wetland.
- Red-necked stint - a total of 134 birds were observed over four surveys at a wetland at the northern end of the Project site. All birds seen were foraging or loafing. No roosting was observed.
- Common sandpiper - two birds were observed at the same wetland at which other waders were recorded. They were seen actively foraging and no roosting behaviour was observed.

Listed migratory species recorded or identified as potentially occurring in the local area

Common name	Species
Common Sandpiper	*Actitis hypoleucos*
Fork-tailed Swift	*Apus pacificus*
Sharp-tailed Sandpiper	*Calidris acuminata*
Curlew Sandpiper	*Calidris ferruginea*
Little Stint	*Calidris minuta*
Red-necked Stint	*Calidris ruficollis*
Double-banded Plover	*Charadrius bicinctus*
Latham's Snipe	*Gallinago hardwickii*
Gull-billed Tern	*Gelochelidon nilotica*
White-throated Needletail	*Hirundapus caudacutus*
Yellow Wagtail	*Motacilla flava*
Satin Flycatcher	*Myiagra cyanoleuca*
Eastern Curlew	*Numenius madagascariensis*
Eastern Osprey	*Pandion haliaetus*
Glossy Ibis	*Plegadis falcinellus*
Rufous Fantail	*Rhipidura rufifrons*
Common Greenshank	*Tringa nebularia*
Marsh Sandpiper	*Tringa stagnatilis*

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

The construction of the Project involves the clearing of vegetation for roads and hardstands which has the potential to lead to:

- a loss or fragmentation of listed vegetation communities
- the loss and fragmentation of populations of threatened flora
- the loss and fragmentation of threatened fauna habitats.

These impacts have been avoided through the siting and design of the Project incorporating development envelopes and works exclusion areas. The requirements of the Brolga Guidelines are being followed in order to avoid these impacts.

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.

Listed communities

The areas of the EPBC Act listed **Natural Temperate Grassland of the Victorian Volcanic Plain** that occur within the wind turbine and transmission development envelopes (and adjoining roadside reserves) (55.7 ha) have been included in works exclusion areas. Therefore this listed community will not be affected by the Project.

There is one area (7.7 ha) of the EPBC Act listed **Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains** that occurs within the Project site. This community is located outside of the turbine development envelope and therefore will not be affected by the Project.

The areas (13.6 ha) of the FFG listed **Western (Basalt) Plains Grassland** that occur within the wind turbine development envelope (and adjoining roadside reserves) have been included in the works exclusion areas. Therefore this listed community will not be affected by the Project.

Threatened flora

Only one threatened flora species was located within the Project site during surveys targeting 10 threatened flora species that were considered to potentially occur because of the presence of suitable habitat. The spiny rice-flower was recorded from two locations:

- within the Woorndoo-Dundonnell Road reserve which is outside of the Project site
- within the Castle Carey Road reserve which is located within the Project site but is outside of the wind turbine development envelope.

The Project does not affect either of these populations.

Threatened fauna

Brolga

The brolga surveys (including aerial surveys, on-ground surveys, home range surveys and breeding home range analysis, landowner surveys and flocking surveys) resulted in the identification of three brolga flocking sites and four breeding sites that could potentially be affected by the construction and operation of the Project. The identified flocking and breeding

sites, including buffers, are not located within the wind turbine or transmission development envelopes.

Flocking sites

Brolgas flock at large, permanent wetlands outside of the breeding season where they forage and roost communally. In southern Australia, flocking generally occurs from December to June. There are three known brolga flocking sites within 10 km of the Project site:

- Lake Barnie Bolac - there are records of high numbers of flocking brolgas at this site including a record of an estimated 100 birds 1.5 km south of the lake.
- Long Dam - a fresh water spring-fed wetland on private property that adjoins Lake Barnie Bolac to the north. The statutory Planning Panel established to assess the proposed Mortlake Wind Energy Facility in 2010 determined Long Dam to be a potential Brolga flocking site because of records provided by the landowner and the permanent nature of the wetland.
- Lake Sheepwash – identified during surveys undertaken by Biosis in 2013 as part of the Project studies with over 30 birds were observed roosting at the site over four nights.

The Interim Guidelines for the Assessment, Avoidance, Mitigation and Offsetting of Potential Wind Farm Impacts on the Victorian Brolga Population issued by the Department of Sustainability and Environment in 2012 define a brolga flock roost site as *'A permanent or ephemeral wetland known to be utilised by a Brolga flock for nocturnal roosting*'. The flock site should meet all three of the criteria listed in the table below. The Brolga Guidelines require that a turbine free buffer of five km must be used around flocking sites to protect the species while flocking because of the larger number of individuals and number of flights that are likely to be associated with a flocking site.

Criteria for identifying a Brolga flock roost site (table sourced from DSE 2012)

Criteria	Justification
More than one year of recording.	To ensure the selection of traditional and regularly used sites.
One or more records of counts equal to or greater than 10 birds.	To include sites which have been used often or traditionally by flocking brolgas. The assumption is made that if more than 10 birds are recorded on a wetland, flocking behaviour is likely.
Recorded in more than one month.	To include sites where Brolgas Flock for periods greater than one day or one week, i.e. to include sites used traditionally for the majority of the flocking or non-breeding season.

The turbine development envelope is located greater than five km from Lake Barnie Bolac, Long Dam or Lake Sheepwash flocking sites (Figure 4). Therefore the Project will maintain a five km turbine free buffer around Brolga flock roost sites as required by the Brolga Guidelines.

Breeding sites

The Brolga Guidelines define a breeding site as '*the nest of a Brolga breeding pair and the perimeter of the surrounding wetland*'. Brolga breeding sites also include wetlands with previous records of brolga nests. A wetland remains a breeding site provided it has not been permanently drained and/or planted with trees. The Brolga Guidelines also require that turbine free buffers are applied to breeding sites to avoid significantly affecting the likelihood of successful reproduction that may be caused by a wind farm. The breeding buffer that is applied to a breeding location (wetland) allows for variation in the location of the nest from one breeding

season to another. The Brolga Guidelines state that '*turbine-free buffers should be designed to remove any significant impact on Brolgas within their breeding and non-breeding home ranges*'. The Brolga Guidelines include a general recommendation that a turbine-free buffer of 3.2 km radius be applied to breeding sites.

A review of the current and historical breeding records for Brolgas within 10 km of the Project site along with breeding sites confirmed through aerial and home range surveys identified a total of 24 breeding sites. Four of these sites have general breeding buffers that are within or overlap the wind turbine development envelope.

Where sufficient data has been collected to allow the home range size(s) of Brolga breeding pairs to be determined, the Brolga Guidelines allow for the data to be used to determine appropriate turbine-free buffers instead of the general recommended 3.2 km buffer. A home range analysis of the four breeding sites was undertaken using home range field observations and home range kernel analysis as described in Attachment C. The analysis showed that for 95% of the time, breeding brolgas remained within 600 m of the centre of their home range whilst incubating, brooding and rearing fledglings which is the measure traditionally used to describe a home range. A more conservative approach was adopted for the Project where the buffer was based on the upper limit of the 99.9% home range (833.8 m). A further buffer of 300 m was added to the outer perimeter of the home ranges to provide additional protection to Brolga breeding sites resulting in a buffer of 1133 m. The approach to brolga breeding site protection was discussed and agreed with DELWP (refer Appendix 2 in Attachment C).

No Brolga breeding site is within 1333 m of the turbine development envelope, consequently there will be no turbines within the determined breeding buffer zones of the four breeding sites.

In accordance with the Brolga Guidelines, a site specific collision risk model will be developed in order to assess potential population losses and offset requirements as part of the planning application process.

Corangamite Water Skink

The three wetlands where Corangamite water skinks were recorded are in the north of the Project site outside of development envelopes. Therefore the Project is not expected to affect this species.

Striped Legless Lizard

The striped legless lizard was only recorded within the road reserve along the Castle Carey Road during targeted surveys for the species. There is potential for this cryptic species to occur in suitable grassland habitat within the road reserve at two other locations, one along Castle Carey Road and the other along the Hexham – Woorndoo Road. These locations are either outside the development envelopes or have been included within works exclusion areas and will be not be affected by the Project.

Dwarf Galaxias

The dwarf galaxias was recorded at two sites on Salt Creek. Salt Creek is located outside of the wind turbine and transmission development envelopes and consequently the species will not be affected by the Project.

Avifauna

(note: the number wetlands referred to are shown in figures 4.1, 4.2, 4.3 and 4.5/4.6 of the Biosis Targeted Survey Report)

The threated bird species and listed waders that have been recorded from the Project site have the potential to be affected either through collision with wind turbines or alienation from wetland habitats through noise and visual disturbance.

Three listed threatened waterbird bird species have been recorded within the Project site, the eastern great egret (*Ardea modesta*), gull-billed tern (*Gelochelidon nilotica*) and freckled duck (*Stictonetta naevosa*). Six freckled duck were recorded from Wetland 2 during the targeted wader surveys undertaken in January and February in 2013 and 2014. There were no observations of the eastern great egret and gull-billed tern within the Project site during the any of the bird surveys. However, there is a relatively recent record of the eastern great egret (2012) to the east of the Project site on Emu Creek and suitable habitat exists in the wetlands in the northern part of the Project site (DEWLP Biodiversity Interactive Map). There is also a recent record of the gull-billed tern (2013) to the north of Wetland 2 outside of the Project site.

In addition, as described above four listed migratory species have been recorded within the Project site including; common sandpiper (*Actitis hypoleucos*), sharp-tailed sandpiper (*Calidris acuminata*), red-necked stint (*Calidris ruficollis*) and Latham's snipe (*Gallinago hardwickii*). All sightings of these migratory waders were from Wetland 2 during targeted wader surveys undertaken in January and February in 2013 and 2014. The observations of the listed migratory waders comprised:

- 14 sharp-tailed sandpipers on two occasions
- 134 red-necked stint over four surveys
- two common sandpipers were observed on one occasion
- a single Latham's snipe was flushed opportunistically from grassland adjacent to Wetland 2.

All observations of listed waders were of birds either foraging or loafing and no waders were recorded roosting at any wetland within the Project site.

Nearly all waterbird and wader records from the targeted bird surveys came from Wetland 2 including an observation of 3500 pink eared ducks (*Malacorhynchus membranaceus*) in February 2014. Wetland 2 was assessed as providing the highest quality habitat for waterbirds and waders within the Project site and was the only site that retained water over the life of the bird surveys in 2013 and 2014. Wetland 2 is located approximately 3.5 km from the nearest development envelope. However, Wetland 2 did not meet the criteria for an important site for migratory shorebirds under the EPBC Act which are:

- sites that contain 0.1% of a population of the listed species in the flyway population
- sites that support at least 2000 migratory shorebirds
- an individual site that contains at least 15 species listed in the Significant Impact Guidelines for 36 Migratory Shorebirds (DEWHA 2009a).

There are smaller ephemeral wetlands (Wetland 4 and 5) which are located closer to the nearest proposed turbine location. Wetland 4 and 5 are still approximately 2.2 km from the nearest development envelope. The only record of waders from this site is six red capped plover (*Charadrius ruficapillus*) on Wetland 4 and two on Wetland 5. [Note that this common and widespread shorebird is not a listed threatened or migratory species.]

There is a salt pan (Wetland 6) located just south to the Woorndoo – Darlington Road between the two turbine clusters within the Project site. The only bird species recorded here was 21 banded lapwings (*Vanellus tricolor*) on one occasion.

It is considered that the Project is unlikely to present a significant collision risk to waders and waterbirds because there bird surveys have indicated that there is little suitable habitat within the development envelopes to attract them and put them at risk of collision with wind turbines. In addition, no listed threatened waterbird birds or migratory waders were recorded within the development envelopes. There was only one wetland which was regularly used by waders and waterbirds (Wetland 2) which is located approximately 3.5 km from the development

envelopes.

Migratory waders that use Wetland 2 are unlikely to fly at turbine height across the wind farm as the other local wetland sites which are used by waterbirds and waders such as Lake Sheepwash and Lake Barnie Buloke are south east of Wetland 2 and the Project site is not in the flight line of birds moving between these wetlands. Migratory waders on long distance flights move at night at altitudes of 1 km or more (Langston & Pullan 2004)[4]. Therefore waders flying into Wetland 2 from other sites in western Victoria are likely to be flying above turbine height.

In addition, the Project is unlikely to cause waterbirds and waders to avoid using Wetland 2 because of disturbance affects given that it is approximately 3.5 km from the nearest development envelope which is well outside the 500 m zone where avoidance of wind farms has been detected in bird species, including wading birds (Hötker, et. al. 2006)[5]. Therefore it is not expected that the construction and operation of the Project will have a significant impact on waterbirds and migratory waders that use Wetland 2.

Wetland birds have been recorded at Wetlands 1 to 9 and Salt Creek which are all outside the development envelopes. As noted above the only wetland that contained permanent water was wetland 2. All other wetlands were ephemeral and will contain water for varying periods depending on rainfall and levels of evaporation. As all identified wetlands were outside the development envelopes variation in habitat suitability is unlikely to result in additional impacts to waterbirds and migratory waders.

Eastern great egret and gull-billed tern

The eastern great egret and the gull-billed tern were recorded on wetlands and wet areas on roadside reserves within the Project site. The wetlands and the road reserves are located within the wind turbine development envelope but have been included in works exclusions areas and will therefore not be affected by the Project.

Freckled duck

Six freckled duck were recorded on the large wetland in the northern part of the Project site during a targeted wader survey in February 2013 (Attachment B). This wetland is located outside of the wind turbine development envelope and therefore will be not be affected by the Project.

Listed migratory species

Eighteen migratory species have been recorded or identified as having the potential to occur in suitable habitat within the Project site. Targeted surveys s recorded four migratory species within the Project site including:

- sharptailed sandpiper
- Latham's snipe
- red-necked stint
- common sandpiper.

The results of the targeted surveys, combined with the review of pre-existing database records, found that there were no wetlands within or adjacent to the Project site that could be considered '*important habitat*', as described in the in the Australian Government Department of

[4] •Langston, R.H.W. and Pullan J.D. (2004). Effects of Wind Farms on Birds. Nature and environment, No. 139. Council of Europe Publishing, Stasbourg

[5] •Hötker, H., Thomsen, K.-M. & H. Jeromin (2006): Impacts on biodiversity of exploitation of renewable energy sources: the example of birds and bats - facts, gaps in knowledge, demands for further research, and ornithological guidelines for the development of renewable energy exploitation. Michael-Otto-Institut im NABU, Bergenhusen

Environment Significant Impact Guidelines (2013). The wetlands, including Wetland 2, where the listed migratory species and other waterbirds were recorded is located in the northern part of the Project site outside the wind turbine development envelopes (Figure 4). Wetland 2 is located over three km from the nearest turbine development envelope and therefore it is unlikely that the Project will affect listed migratory species.

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

☒ NYD ☒ No ☒ Yes If yes, please briefly describe.

The Project has been designed to avoid impacts on threatened and migratory species and their habitats including listed communities. With the exception of six scattered trees within the transmission development envelope, all native vegetation and habitat has been avoided. Significant vegetation or habitat within the development envelopes have been included in works exclusion areas.

Construction and operation inductions will detail the location of development envelopes and works exclusion areas. Signs and fencing will be installed to delineate development envelope and works exclusion area boundaries at critical locations (e.g. at the location of threatened communities). Arrangements for undertaking works will be in place to ensure works are not undertaken outside the development envelopes or within works exclusion areas.

Works potentially impacting on wetlands and waterways will be designed and undertaken in accordance with guidance from the Glenelg-Hopkins CMA.

Environmental management measures to protect native vegetation, flora and fauna and their habitats will be included in a Construction Environmental Management Plan.

Potential indirect impacts such as erosion and sedimentation will also be addressed in the Construction Environmental Management Plan.

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

Ecological assessments

Biosis Pty Ltd was commissioned by Hydro Tasmania to undertake a detailed flora and fauna assessment of the Project site. Qualified personnel experienced in flora and fauna assessments and surveys including ecologists, botanists, zoologists and aquatic ecologists undertook the field surveys which provided the data for the assessment of native vegetation, flora and fauna values (refer Attachment B).

Mapping

All mapping of native vegetation and flora and fauna sites and habitats was conducted using hand-held (uncorrected) GPS units (WGS84) and aerial photo interpretation. The accuracy of this mapping is therefore subject to the accuracy of the GPS units (generally ± 7 metres) and is also dependent on the limitations of aerial photo rectification and registration.

13. Water environments

Will the project require significant volumes of fresh water (e.g. > 1 Gl/yr)?

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

During construction of the Project there will be a requirement for fresh water (e.g. for dust suppression, road construction and concrete production) however, the volume of water required is expected to be significantly less than one gigalitre/yr. Based on another project of similar extent developed by Woolnorth, water use is likely to be less than 100 megalitres over the entire construction period.

Once operational, water requirements for the Project will be insignificant.

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

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

There is potential for increased runoff from access tracks and hardstands constructed for the Project, however the risk of the runoff entering water environments is low. The volume of runoff is expected to be insignificant due to the flat nature of the Project site, the small area occupied by access tracks and hardstands, and the pervious nature of the construction materials (e.g. crushed rock).

To prevent runoff entering water environments, access tracks and hardstands will include appropriate drainage structures to ensure run-off is controlled. Erosion and sediment control measures, to be included in a Construction Environmental Management Plan, will be implemented during construction to ensure runoff from construction works does not impact water environments.

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.

The Project site contains ephemeral waterways and wetlands, many associated with the Mt Fyans lava flows in the northern section of this site (refer to Section 7) (Figure 4). The wind turbine and transmission line development envelopes avoid significant wetlands and waterways and the Project is not expected to affect waterway or wetland environments.

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

☐ NYD ☐ No ☒ Yes If yes, specify which water environments.

As identified in Section 12, both Salt Creek and Wetland 2 were found to have populations of threatened species (e.g. dwarf galaxias and migratory waders). The water environments are located outside of the development envelopes therefore the Project is unlikely to impact any threatened species present in water environments.

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.

No Ramsar listed wetlands or wetland listed in 'A Directory of Important Wetlands in Australia' will be impacted by the Project.

Lake Bookar, located approximately 25 km south east of the Project site, forms part of the Western District Lakes Ramsar site. There is no hydrological connection between the Project site

and Lake Bookar.

The closest wetlands listed in 'A Directory of Important Wetlands in Australia' are the Woorndoo-Hopkins Wetlands located approximately 15 km to the north-west, and upstream, of the Project site.

Could the project affect streamflows?

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

It is likely that access tracks and the overhead line will be required to span minor waterways. Works across water ways will be designed and implemented in accordance with guidance from the Glenelg-Hopkins CMA. It is not anticipated that any works will affect streamflows.

Could regional groundwater resources be affected by the project?

☒ NYD ☐ No ☐ Yes If yes, describe in what way.

An assessment of potential impacts to groundwater and hydrological systems will be completed during the planning application process. However, the Project is not expected to have any significant impacts to groundwater resources.

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.

The initial design of the Project has avoided siting wind turbines or access tracks on or through significant depressions or wet areas to minimise potential impacts to water environments.

As outlined above, appropriate drainage structures will be installed on access tracks and hardstands to control runoff and an erosion and sediment control will be included in a Construction Environmental Management Plan.

Other information/comments? (e.g. accuracy of information)

As described in Section 7, the Project site contains water environments including the upper reaches of Blind Creek and tributaries of Salt Creek, as well as several unnamed seasonal and permanent wetlands and farm dams. The initial design of the Project avoids significant water ways and depressions and minimises potential impacts to water environments. The implementation of drainage and erosion control measures during construction and operation of the Project will further minimise potential impacts to water environments.

14. Landscape and soils

Landscape

Has a preliminary landscape assessment been prepared?

☐ No ☒ Yes If yes, please attach.

A Preliminary Landscape and Visual Impact Assessment has been completed and is included as Attachment E.

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.

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

  ☐ NYD ☒ No ☐ Yes If yes, please specify.

A review of zoning overlays in the Moyne Planning Scheme (and adjacent schemes) and the National Trust of Australia (Victoria) database did not identify any areas of landscape significance within the Project site or within a 15 km radius of the regional setting.

- **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.

Is there a potential for effects on landscape values of regional or State importance?

☐ NYD ☒ No ☐ Yes Please briefly explain response.

Is mitigation of potential landscape effects proposed?

☒ NYD ☐ No ☐ Yes If yes, please briefly describe.

Localised planting and screening of infrastructure may be undertaken if required.

Other information/comments? (e.g. accuracy of information)

Key findings from the Preliminary Landscape and Visual Assessment are outlined below.

The Project site is located in the generally flat Western Plains landscape. Regionally the landscape is typified by flat to slightly undulating topography featuring remnants of past volcanic activity including volcanic cones, stony rises and depressions many of which form ephemeral or permanent wetlands. Human influence on the landscape is dominated by broad scale agriculture. Paddocks are separated by post and wires fences and exotic and native shelter belts have been planted, parallel and perpendicular to roads and paddocks.

Ten regional landscape units were identified in the preliminary assessment and assigned scenic quality and local cultural landscape significance ratings. Landscape units and scenic quality were derived from *Landscape Character Types of Victoria* (Leonard and Hammond 1984). Two landscape units were identified in the Project site: Stony Rises – Pastoral in the northern section and Western Plains Agricultural / Pastoral Areas in the remainder. The Stony Rises – Pastoral and Western Plains Agricultural / Pastoral Areas were assessed as having low to moderate and low scenic quality respectively and moderate local cultural landscape significance. With the exception of plantations and the Hopkins River Headwaters, the two landscape units were the lowest quality and significance of the regional landscape units identified.

Residences within the local (0 to 4 km) and sub-regional (4 to 8 km) settings were considered to be within the visual catchment of the Project and were included in the preliminary assessment. There are 90 dwellings within the local catchment and 56 within the subregional catchment (excluding towns & settlements). The majority of residences within the visual catchment sit within established and mature gardens generally consisting of thick evergreen hedges or a mix of exotic and native trees. The height and density of vegetation has a direct relationship to the visual exposure of the residence to the Project. Screening provided by gardens will reduce the potential visual impact of the Project at the majority of residences. The assessment of visual impact does not consider viewer perceptions and therefore the level of impact is assessed as a worst case scenario. Visual impact at residences in the local setting was assessed as moderate (41 residences) or moderate to high (37 residences) and high (9 residences). In the subregional setting, visual impact at the majority of residences was assessed as low or moderate.

As part of giving effect to any planning permit that is granted for the project, offsite landscaping will be offered to neighbouring residences where turbines are visible. As part of current discussions with neighbours, offsite landscaping in advance of the projects construction is being discussed with several households.

The visibility of the Project is diminished and screened from surrounding settlements such as Woorndoo, Hexham and Darlington by a combination of distance, built form, trees within and surrounding, and, in the case of Mortlake, by Mt Shadwell. Mt Shadwell is a significant feature in the region and is visible from a number of locations along the Hamilton and Hopkins Highways (refer Figure 25 in Attachment E). The Project has been designed such that it does not interrupt views of Mt Shadwell when approaching from the east or west.

An analysis of viewpoints from 20 locations (refer Section 5.6 in Attachment E) considered to have a high level of visual sensitivity also supports the expectation that distance and screening provided by vegetation and built form will significantly reduce potential visual impact of the Project.

The preliminary assessment also considered the cumulative impacts arising from nearby wind farms that have either received planning approval or are operational. In particular the three closest proposed projects, Dundonnell, Mortlake South and Salt Creek Wind Farms were assessed. If all the proposed wind farms are constructed there will be locations within the region where more than one wind farm would be visible. Cumulative impacts at Woorndoo and Mortlake (the settlements with greatest potential to be impacted by cumulative impacts) are expected to be low. Mt Shadwell predominately blocks views from Mortlake of the Project as well as views of Salt Creek and Dundonnell Wind Farms whilst views from Woorndoo are restricted and confined to one aspect. Residences outside the settlements may also have views of more than one wind farm however, as identified above, a large proportion of residences will have views fully or partially screened and the overall cumulative impact on residences was assessed as low.

Cumulative impacts (sequential impacts) may also impact road users, particularly on the Hamilton Highway, where more than one wind farm may be temporarily visible. However, cumulative impacts are expected to be reduced by the speed at which the viewer will traverse the landscape, distance (a large proportion of the highway would be greater than 4 km from the closest turbine) and distribution of roadside vegetation which will provide partial to full screening at times.

A Landscape & Visual Impact Assessment will be prepared as part of the planning application process and will include detailed assessment of:

- landscape character and significance analysis and impact assessment,
- view shed & view analysis and impact assessment, and
- cumulative impacts.

Obstacle lighting of turbines, as an aviation risk mitigation technique, is not proposed as part of this proposal. Preliminary assessments undertaken to date indicate that aviation risks are able to be addressed through suitable measures that do not involve lighting turbines.

An Aviation Impact Assessment will be undertaken as part of the planning application process. In accordance with the Victorian Government's *Policy and planning guidelines for the development of wind energy facilities in Victoria* (DELWP, 2016) CASA, AirServices Australia, the Department of Defence and local aerodrome operators will be consulted as part of this assessment process.

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.

A Geoheritage Assessment has been completed for the Project by Environmental GeoSurveys and is included as Attachment F.

The Geoheritage Assessment found that the Project site has low susceptibility to erosion (sheet, gulley and tunnel erosion). Soils on the Project site are considered to have generally good internal drainage however, localised water logging of enclosed depressions occurs. The risk of large scale movement of soil and regolith is considered low as, with the exception of Salt Creek Gorge, the Project site is generally of low relief with no steep slopes. Potential exists for localised movement of boulders and slopes if disturbed by machinery on the stony rises in the north east of the site.

The potential for actual or potential acid sulphate soils to be present on the Project site is considered low. The potential for localised occurrence may be higher at individual saline lakes and in older lava surfaces however, these are generally located outside the development envelopes.

Although the risk of the Project affecting land stability, soil erosion or acid sulphate soils is considered to be low, potential localised impacts will be managed through the implementation of a Construction Environmental Management Plan.

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

☒ NYD ☐ No ☐ Yes If yes, please briefly describe.

The Project site lies on terrain derived from volcanic activity. Potential geotechnical hazards that may impact the Project are the presence of caves/lava tubes and further volcanic or seismic activity.

The Project site is located within the Newer Volcanic Province (NVP) of South Eastern Australia which is one of two major lava cave regions in Australia. Caves in Victoria are often associated with elongate or mounded ridges. The north eastern area of the Project site is located on 'stony rises' terrain and has the potential to contain isolated sub-crustal cavern formation.

A detailed geotechnical investigation will be completed as part of the planning application process to confirm the absence of lava caves / tubes that may constrain the development of the Project.

The Geoheritage Assessment found that the risk of further volcanic or seismic activity was low.

Other information/comments? (e.g. accuracy of information)

The Project site contains features of geoscience significance. It is located on the Newer Volcanic Province (NVP) of South Eastern Australia which covers an area of 19,000 km², includes over 700 known eruption points and is a geoscience complex of National Significance. Eruptions within the NVP are thought to have spanned a period between 4.6 million and approximately 30,000 years ago. Eruption points were short lived and experienced only one or few phases of activity and thus, the ages of volcanic activity within the NVP vary greatly. Areas of newer volcanic activity retain clear expression of volcanic activity such as rocky outcrops, steep sided linear ridges and irregular stony surfaces with little soil cover whilst areas of older volcanic activity are highly weathered and feature deep regolith and soil profiles with mottled clays and ironstone nodules and very little or no surface or near surface basalt stones.

The Project site is located on basalt lava flows of varying age. The northern section of the Project site is shaped by younger flows from the Mt Fyans eruption point which is located approximately five km to the north of the site. There are thought to have been at least two and up to four

phases of lava flow from Mt Fyans which have combined to form a complex terrain of mosaic of ridges, depressions and enclosed basins. The Mondilibi eruption point, located within the Project site, has formed a distinct hill rising 40 m above the surrounding plains. Lava flows from Mondilibi predate Mt Fyans and lack defined / preserved features. The Salt Creek Gorge was created by Salt Creek cutting through the western sections of the Mondilibi lava flow, prior to the creeks catchment being altered by more recent volcanic activity. The meandering 25 m deep gorge is one of the deepest and longest examples of a stream entrenchment into basalt in the Volcanic Plains. The remainder of the site sits on older and significantly weathered lava flows and is an undulating plain with moderate to low geoscience significance.

The Mt Fyans and Mondilibi eruption points and associated lava flows are of regional significance and together with the Mt Hamilton, and other nearby eruption points, form a complex of State Significance. The geoheritage assessment identified 11 individual sites and areas within the Project site that are of varying levels of significance and contribute toward the National and State Significance rating of the larger areas (Figure 8). A detailed description of each site is provided in Attachment F. The wind turbine and transmission line development envelopes avoid all 11 sites. Within the Mt Fyans lava flow area, but outside of the 11 identified sites, the development envelopes have been designed to avoid:

- crossing lava ridges and elevated plateaus
- enclosed depressions
- crossing high and narrow ridges.

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.

Road traffic volumes during construction of the Project are anticipated to be significant at times. The Project's major access points are from the Hamilton Highway and the State owned Mortlake –Ararat Road in order to avoid potential impacts to traffic on local roads, including school bus routes.

A traffic and transport assessment will be undertaken as part of the planning application process. The assessment will quantify the potential impacts on local and state owned roads and recommend appropriate transport options and mitigation / management strategies in consultation with road authorities to inform a Transport Management Plan.

The main haulage route from the port at Portland to the Project site will be via State Highways and State Government owned arterial roads designed for use by heavy vehicles.

It is likely that a large volume of required construction materials will be sourced from the nearby Mt Shadwell Quarry. This quarry has good access to the site via the Hamilton Highway and Mortlake Ararat Road.

Construction material that may also be sourced from other major quarries in the area which also have good access via State owned arterial roads, these include:

- Mt Noorat Quarry – access via Mortlake Terang Road
- Camperdown Quarry – access via Princes Highway and Mortlake Terang Road.

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.

<u>Noise</u>

The construction and operation of the Project has the potential to change sound conditions. Sound during construction will be generated by the use of equipment associated with the installation of turbines and substation as well as the construction of the turbine foundations, cable trenches and on-site access roads and increased traffic to and from the site. Sound arising from the operation of the Project will predominately be aerodynamic noise generated by the interaction between wind and turbine blades however, sound will also be generated by mechanical components of the turbine nacelle (e.g. generators), as well as ancillary infrastructure, including on-site and off-site substations and transformers.

Preliminary predicted sound levels for the Project together with an initial review of noise considerations associated with its construction and operation was completed by Marshall Day Acoustics (Attachment D).

As outlined in Attachment D, the model and type of turbine proposed to be used for the Project has yet to be determined. For the purposes of the preliminary assessment the average sound output of six turbines that could be potentially used for the project were assessed in order to select the turbine with the highest level of output. A GE 3.4-137 turbine with a sound output of 106.5dBA was selected and a further 1dBA was added to the sound output for modelling purposes to account for uncertainty. A total of 238 receivers were included in the assessment which found that predicted noise levels at all external receivers were below a base noise limit of 40 bB LAeq (Figure 8).

The results of the preliminary assessment demonstrate that the Project can be viably designed and operated in accordance with the Victorian Government's *Policy and planning guidelines for the development of wind energy facilities in Victoria* (DELWP, 2016). Noise predictions for the proposed on-site and off-site substations indicate the noise produced will be compliant with night time noise limit of 35 dB Leff provided in EPA publication 1411 *Noise from industry in Regional Victoria – Recommended maximum noise levels from commerce, industry and trade premises in regional Victoria*.

A detailed noise assessment will be undertaken as part of the planning approval process and will assess compliance of the Project against the guidance documents outlined in below.

Component	Guidance documents
Construction	
Wind farm and ancillary infrastructure	EPA publication 1254 *Noise Control Guidelines*
Traffic	NSW Road Noise Policy (ref, 2011)
Operation	
Wind Farm	*Policy and planning guidelines for the development of wind energy facilities in Victoria* (Victorian Environmental Protection Authority, 2016) including New Zealand Standard NZS6808:2010 *Acoustics – Wind farm noise*
Ancillary infrastructure (e.g. substations)	*Noise from industry in Regional Victoria – Recommended maximum noise levels from commerce, industry and trade premises in regional Victoria*

The detailed assessment will include specific noise limits derived from background noise monitoring and consider special audible characteristics applicable to wind farms including amplitude modulation and tonality (if required) as well as the cumulative impacts of the planned Dundonnell and Salt Creek wind farms.

Dust or odours

Dust emissions from roads and construction will be managed via measures outlined in a Construction Environment Management Plan.

Visual

A Preliminary Landscape and Visual Impact Assessment has been completed and is described in Section 14.

Traffic conditions

Local traffic on State Highways and arterials may be impacted during peak periods of the construction stage. Wind turbine components will be transported on over-dimensional vehicles, turning off the Hamilton Highway.

The site has good access to major state highways and arterial roads which will avoid traffic conflicts with users of local roads.

A traffic and transport assessment will be undertaken as part of the planning approval process to further identify and mitigate potential impacts.

Shadow Flicker and Blade Glint

To avoid the risk of blade glint, turbine blades will be treated with anti-reflective coating. The risk and management techniques used to avoid blade gilt will be addressed in a future planning application in accordance with the Victorian Government's *Policy and planning guidelines for the*

development of wind energy facilities in Victoria (DELWP, 2016).

The requirements for shadow flicker are set by the *Policy and planning guidelines for the development of wind energy facilities in Victoria (DELWP, 2016).* A preliminary internal assessment indicates that the current layout complies with the Guidelines. A technical assessment report and full consideration of shadow flicker including any need to relocate turbines to meet acceptable standards will be part of a future Planning Application for the Project.

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.

A small percentage (approximately 0.5%) of the available land within the Project site will be occupied by permanent infrastructure. The impacts to existing land uses are expected to be minor with cropping and grazing able to continue during construction and operation. Income received by landowners associated with the Project will offset the reduced area available for existing land uses. Landowners have provided input into the Project design process and the impact on farming activities has been minimised.

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.

The Project will diversify the income of landowners, providing added financial certainty when farming incomes are low or difficult to predict.

Is mitigation of potential social effects proposed?

☐ NYD ☐ No ☒ Yes If yes, please briefly describe.

Potential social effects during construction of the Project will be primarily mitigated through the implementation of best practice construction techniques that are compliant with relevant guidelines (e.g. working hours, dust control, traffic management). Specialist studies, such as a traffic and transport assessment, will be used to develop Project specific mitigation measures (e.g. selection of appropriate transport routes). Mitigation measures will be documented in a Construction Environmental Management Plan.

Preliminary Acoustic and Landscape and Visual Assessments together with feedback received through community consultation have been used to mitigate potential social effects through the design of the Project. Detailed Acoustic and Landscape and Visual Impact Assessments will be prepared through the planning application process and community consultation is planned to continue for the duration of the Project.

Other information/comments? (e.g. accuracy of information)
NA

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 Martang Aboriginal Corporation is the Registered Aboriginal Party (RAP) for an area that includes the western section of the Project site. There is currently no RAP appointed for the region that includes the remainder of the Project site however, the Kuuyung Maar Aboriginal Corporation has previously lodged applications for RAP status for an area that includes the remainder of the Project site. The Eastern Maar Aboriginal Corporation has an existing Native Title Application over the majority of the proposed Project site. All three groups and Aboriginal Victoria have been consulted.

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)

A Preliminary Cultural Heritage Assessment has been completed and is included as Attachment G. The preliminary assessment included a desktop review of the Victorian Aboriginal Heritage Register as well as previous regional studies and Cultural Heritage Management Plans. Previous regional assessments have found evidence of past Aboriginal land use. The creek systems surrounding the Project site were an important resource for Aboriginal people including the *Girai wurrung*, the socio-dialectical group that occupied the region. One site on the Victorian Aboriginal Heritage Register has been recorded within the Project site.

A spatial predictive model was developed for the Project site based on the results of the desktop review and topographic and spatial data sets. The spatial predictive model was used to broadly predict the type and character of cultural heritage values likely to be found on the Project site. The results of the predictive modelling indicated that the land forms with the greatest potential to contain cultural heritage values were:

- undisturbed stony rises
- waterways, specifically Blind Creek and Salt Creek
- wetlands in the northern area, especially those with permanent fresh water
- Mondillibi Hill
- small patches of stony rises generally overlooking ephemeral wetlands.

A site inspection, undertaken to ground truth the results of the predictive model, was generally supportive of the model findings and identified further areas of potential cultural heritage values. No further Aboriginal sites were identified during the site inspection.

Based on the results of the predictive modelling and site inspection, areas of sensitivity both as defined by the *Aboriginal Heritage Regulations 2007* and as determined by Biosis were identified (Figure 8). The development envelopes (with works exclusion areas) have avoided all identified areas of sensitivity.

Two Cultural Heritage Management Plans (CHMPs) are currently being prepared based on the boundaries of Traditional Owner Groups. The Martang Aboriginal Corporation will assess the CHMP for the western area of the Project site and, in the absence of an appointed RAP, Aboriginal Victoria will assess the CHMP for the remainder of the Project site.

As part of the preparation of the CHMPs a Standard Assessment was undertaken. The assessment was undertaken in two stages with Stage 1 comprising a targeted survey and Stage 2 an intensive field survey. The surveys were completed with the assistance of relevant Aboriginal corporations (Eastern Marr Aboriginal Corporation and Kuuyang Maar Aboriginal Corporation). The results of the Standard Assessment generally supported the findings of the predictive model

and identified further areas of sensitivity including:

- a wetland and stony rise landform to the north of Castle Carey Road
- a relatively undisturbed stony rise area forming a bank of Blind Creek to the north of South Road
- a relatively undistributed stony rise embankment and drainage line to the north of the Hamilton Highway
- a wetland margin to the west of South Road

Eight Aboriginal places were identified as part of the Standard Assessment and are currently being assessed.

The wind turbine and transmission development envelopes and works exclusion areas avoid all the areas of sensitivity and Aboriginal places identified in the preliminary assessment and Standard Assessment.

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

There is one site listed on the Victorian Aboriginal Heritage Register (VAHR 7422-0166) located within the Project site. Two sites are located within 200 m of the Project site.

A further eight sites were identified during the Standard Assessment and are currently being assessed.

During the Standard Assessment process the main types of Aboriginal places identified include:

- a greenstone axe:
- several artefact scatters and isolated artefacts
- several scarred trees.

The wind turbine and transmission development envelopes and works exclusion areas avoid all Aboriginal Places identified in the preliminary assessment and Standard Assessment.

CHMPs are being prepared for the Project and will detail mitigation measures.

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.

There are no cultural heritage places listed on the Victorian Heritage Database, Heritage Register or the Archaeological Inventory within the Project site.

Is mitigation of potential cultural heritage effects proposed?

☐ NYD ☐ No ☒ Yes If yes, please briefly describe.

Clause 52.37 of the Moyne Shire Planning Scheme aims to preserve dry stone wall constructed prior to 1940 and a permit is required to *demolish, remove or alter* a dry stone wall on any land subject to the planning scheme. There are dry stone walls constructed prior to 1940 within the Project site however, none will be disturbed by the project.

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
- ☐ 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.

A small amount of energy from the existing electrical distribution system will be used by:

- on-site offices during the construction of the project
- the control room and office factuality during the operation of the project.

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.

Minor volumes of waste water are likely to be generated from on-site toilet facilities.

Material excavated during construction (e.g. turbine foundations) is expected to be reused on site e.g. access tracks. If excavated material remains it will be removed from site and disposed of at a licenced landfill.

Packaging delivered to site during construction of the Project will be recycled where possible.

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

- ☒ Less than 50,000 tonnes of CO_2 equivalent per annum
- ☐ Between 50,000 and 100,000 tonnes of CO_2 equivalent per annum
- ☐ Between 100,000 and 200,000 tonnes of CO_2 equivalent per annum
- ☐ More than 200,000 tonnes of CO_2 equivalent per annum

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

A very small quantity of CO_2 will be generated during construction of the Project. Emissions have not been assessed but are expected to be significantly less than 50,000 tonnes of CO_2 equivalent. However, the Project will result in a significant net reduction in greenhouse gas emissions during its operating life.

17. Other environmental issues

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

☒ No ☐ Yes If yes, briefly describe.

A range of other environmental related issues will be addressed during the planning application process including:

- Risks to aviation operations including the potential requirement for lighting
- Potential electro-magnetic interference on TV and radio broadcasting transmission sites and management of human exposure limits to magnetic and electric fields at dwellings and public spaces
- Management of bushfire risk including potential impacts to existing firefighting resources.

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 Project site was selected as studies indicate that is has an excellent wind resource and that a wind farm is able to be constructed and operated without causing significant adverse impacts to environmental, heritage or social values. The following characteristics of the Project site contribute toward avoiding and minimising potential environmental impacts:

- The Project site is predominately modified agricultural land and the few significant ecological values are able to be avoided.
- Aboriginal heritage values are associated with waterways stony rises are able to be avoided.
- There are no significant local landscape characteristics that will be disturbed.
- The Mortlake Substation is located close to the Project site reducing the length of overhead line required to connect to the National Electricity Market.

☒ Design: Please describe briefly

The design of the Project has used a development envelope approach to delineate the area in which infrastructure may be developed and works exclusion areas where no infrastructure will be developed. The wind turbine and transmission development envelopes and works exclusion areas have allowed a development area to be delineated which avoids significant impacts to ecological, heritage, geoheritage and social (distance from dwellings, noise) values identified during investigations. The development envelope approach allows flexibility to micro-site infrastructure within envelopes during detailed design to respond to location specific topographical and functional characteristics, as well as operational requirements, whilst avoiding adverse impacts to significant values.

☒ Environmental management: Please describe briefly.

Woolnorth have developed the Mt Fyans Wind Farm Environmental and Social Management Framework (Attachment H) that will be applied to the development, construction and operation of the Project. The framework describes how Woolnorth's Health, Safety and Environment Management System (HSE System) will be applied to avoid, or minimise, the potential adverse environmental and social impacts associated with the Project. Woolnorth's HSE system is consistent with both ISO 14001:2015 *Environmental Management Systems* and OHSAS 18001:2007 *Occupational Health and Management System*.

Consistent with the Mt Fyans Wind Farm Environmental and Social Management Framework Construction and Operational Environmental Management Plans will be prepared that document potential environmental impacts and measures to avoid or minimise impacts. Additionally, the framework outlines compliance with the Victorian Governments *model planning permit conditions for wind energy facilities*[6] which include the requirement for a comprehensive set of management plans.

☐ Other: Please describe briefly

[6] Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria. DELWP, January 2016.

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.

Three other wind farms, Mortlake South, Salt Creek and Dundonnell Wind Farms, have received planning permits and are located within a 40 km radius of the Project site. None of the three wind farms are currently operational.

The preliminary assessments of visual impact and Brolgas described in this referral included consideration of cumulative impacts. Detailed assessments, prepared as part of the planning application process, will further address potential cumulative impacts and include an assessment of potential cumulative communications (electro-magnetic interference) impacts and cumulative impacts to resource availability.

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.

A range of preliminary environmental studies have been completed as outlined in this referral. The following additional studies will be completed as part of the planning permit process:

- Detailed noise assessment
- Detailed landscape and visual impact assessment
- Cultural Heritage Management Plans
- Site specific collision risk modelling for Brolga and assessment of off-set requirements
- Traffic and transport assessment
- Shadow flicker and blade glint assessment
- Aeronautical Impact and Obstacle Marking and Lighting Assessment
- Electromagnetic and Communication Assessment
- Hydrological 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.

Woolnorth has prepared the Mt Fyans Wind Farm Community Consultation Report (Attachment I) which outlines the community consultation activities undertaken to date.

After a decision was made to proceed to the formal planning stage of the Project, Woolnorth commenced a community consultation program in the Mortlake district in early 2017. The objective of the program was to provide preliminary information about the Project to local residents and to establish lines of communication between Woolnorth and local stakeholders.

Residents in the Mortlake region are generally familiar with wind farms due to numerous similar development activities in the region. Woolnorth found there is a range of views in relation to wind farm development with the majority of dwelling-owning neighbours and people in the broader community being supportive of the Project.

Woolnorth's community consultation activities have included face-to-face discussions with immediate neighbours of the Project, meetings with the Moyne Shire Council and staff, distribution of newsletters and letters, establishment of a Project website and stakeholder database and delivery of an informative public display held over two days in Mortlake. A number of residents expressed their appreciation of Woolnorth's communication efforts during this formal planning stage.

Has a program for future consultation been developed?

☐ NYD ☐ No ☒ Yes If yes, briefly describe.

Through the next phase of the Project, consultation activities will include:

- face-to-face meetings
- channels to receive feedback and questions, including a 1800 number and email contact
- maintenance of a stakeholder database including detailed records of all communication between interested stakeholders and Woolnorth staff
- provision of public displays on specific issues of community interest and the key planning issues associated with the Project,
- communication with the community through multiple forms of media including: newsletters, updated website information and email notifications
- (if approved) communication to facilitate the administration of the Neighbour Participation Agreements.

A Mount Fyans Wind Farm Stakeholder Engagement Plan will be developed for the pre-construction & construction phases of the Project. The plan describes how Woolnorth intends to provide timely information about the Project (e.g. website, face to face meeting) as well as a grievance management process and a complaints register, which provides for timely and accurate response to community concerns procedures for receiving, documenting and responding to communications from external sources.

Authorised person for proponent:

I, David Mounter (full name),

Manager Renewable Asset Development (position), confirm that the information contained in this form is, to my knowledge, true and not misleading.

Signature _____

Date 17/7/17

Person who prepared this referral:

I, David Procter (full name),

Environmental Consultant (position), confirm that the information contained in this form is, to my knowledge, true and not misleading.

Signature _____

Date 17/7/17