Forest Wind

Forest Wind
EPBC Act Referral Report

10 March 2020

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1. Summary of proposed action

1.1 Project Industry Type

Energy Generation and Supply (renewable)

1.2 Provide a detailed description of the proposed action, including all proposed activities

Forest Wind Holdings Pty Limited (**FWH**) (the **Proponent**) proposes to develop and construct a wind farm called Forest Wind (the **Project**) located within an actively managed and operational exotic pine plantation in Queensland State Government (the **State**) owned Toolara, Tuan and Neerdie State Forests situated between Gympie and Maryborough in the Wide Bay Region of Queensland, as shown in Figure 1 in Appendix A.1. The Project is situated on State Forest land tenure (administered by the Queensland Government by Department of Environment and Science (**DES**) as State Forest Land Custodian and managed by a Plantation Licensee). The area of pine plantation is subject to a Plantation Licence and is referred to as the Plantation Licence Area (**PLA**). The Project Area shown in Figure 1 is located wholly within the PLA and is herein referred to as the **Project Area (PLA)**.

Specifically, the Project comprises a wind farm with up to 226 wind turbines and related and ancillary infrastructure. The Project will be located within the Gympie Regional Council and Fraser Coast Regional Council Local Government Areas.

An Overhead Transmission Corridor (**OTC**) will be located in the Project Area (PLA) for the overhead Distribution Lines. The Distribution Lines will span native vegetation or will be underground. The Project Area (PLA) is located almost entirely within existing operational and actively managed exotic pine plantations. A small portion of the Project Area (PLA) is Native State Forest (**NSF**) located within Neerdie State Forest 2 (Lot 1419FTY1697). No activities are proposed for this Project in the NSF portion of the PLA.

Electricity generated by the wind farm will be transmitted to an existing Powerlink Queensland (**Powerlink**) substation located at Woolooga to the west of Gympie by a High Voltage Transmission Line that will be designed, constructed and operated by another entity and does **not** form part of this referral. It is anticipated that the High Voltage Transmission Line will be co-located within the OTC with the overhead distribution lines.

Access to the Project Area (PLA) will be from the Bruce Highway via existing local council-controlled roads to the south western corner of the State Forests. Secondary access points will be also be provided from Tin Can Bay Road and Maryborough Cooloola Road, both State-controlled Roads, and Maryborough Tuan Forest Road, a Fraser Coast Regional Council controlled road.

As part of the planning phase, FWH has identified nominal locations for 226 wind turbines within the Project Area (PLA) and alternative wind turbine locations every 100-200m as shown in Figures 2A and 2B in Appendix A.1. During the final design stages the final layout will comprise up to 226 wind turbines located within 100m of the nominal or alternative wind turbine locations determined with consideration of a range of constraints. A final site selection will be undertaken prior to construction commencing to confirm the location of each wind turbine. Subsequent to this, micro-siting of each wind turbine will occur during the construction phase to allow for local conditions such as ecology, cultural heritage and existing drainage controls. The wind turbines will not be micro-sited more than 100m from a nominal or alternative wind turbine location.

The Project Area (**the Site**) is defined as the land that comprises the Project Area (PLA) as shown in Figure 1 in Appendix A.1.

The Project has been designed to cause minimal impact to the environment, community, cultural heritage and existing land users. A detailed constraint assessment was undertaken as part the design of the Project to identify the nominal wind turbine locations and has included the following key considerations:

- The Project Area (PLA) is located within an existing and actively managed and operational pine plantation which is subject to a range of activities such as ploughing and planting, harvesting and haulage of timber from blocks of pine plantation to road and transport by road to timber users, mechanical and chemical weed control, fire management (including comprehensive controlled burns

regime), quarry activities, and the maintenance and upgrade of forestry access tracks using earthmoving machinery.

- Access within the Project Area (PLA) will be provided using existing operational forestry tracks, some of which will be required to be widened to enable the delivery of the wind turbine blades, towers and other components.
- Electrical cabling between the wind turbines will mostly be underground along existing forestry access tracks.
- Remnant vegetation will be avoided as far as reasonably practical and will only be cleared if required to widen access tracks and upgrade waterway crossings.
- The Project will include a range of ancillary activities including operation and construction facilities, substations, site entrances and battery storage facilities.
- The following early works will be undertaken to assist with the finalisation of the design of the Project layout and do not form part of the action being referred:
    - Installation and operation of temporary wind monitoring masts
    - Geotechnical investigations

  Clearing of native vegetation will not occur as part of these works. No work will be undertaken within riparian vegetation and there will be no impact to waterways. These early works will not impact MNES.

A detailed description of the Project is provided in Appendix A.2. A summary of the proposed development is provided below.

Table 1 Summary of the proposed development

Component	Description	Number
Wind turbines	— Up to 295m height located along existing forestry tracks	Up to 226
	— Turbine foundations: Reinforced concrete slab to support the wind turbines	Up to 226
	— Crane hardstand with laydown areas: a hardstand for use during construction and operation to store materials and place the crane	Up to 226
Transmission Substation (Primary) fixed	— All electricity generated by the Project feeds to the main substation. For connection by others to a High Voltage Transmission Line.	1
Transmission Substation (Secondary) fixed	— Connects the Distribution Substations to the Transmission Substation (Primary) via overhead Transmission Lines.	Up to 2
Distribution Substation	— Connects the wind turbines to the Transmission Substations — All cabling from the wind turbines to the Distribution Substations will be underground along existing forestry tracks where possible, or overhead within the OTC	Up to 10
Distribution Lines	— Underground cables connecting the turbines to the Distribution Substations — Overhead distribution lines within the OTC from the Transmission Substation (Secondary) fixed in the north to the Transmission Substation (Primary)	
Main site access	— Local controlled roads from the Bruce Highway to the Project Area (PLA)	
On-site access tracks	— Upgraded existing forestry tracks	
Operations compound (Primary)	— Located in a central location within the Project Area (PLA) to provide office facilities for all relevant administrative and technical staff, an operational control	1

		room, car parking, welfare facilities, storage and maintenance capabilities.	
Operations compound (Secondary)	—	Located to the north and south of the Project Area (PLA) providing storage areas for plant, equipment and materials, maintenance and workshop areas, wash down facilities as well as parking and amenities.	2
Battery storage	—	Battery storage facilities — Relocatable offices, fencing	4
Potable water supply	—	Provision of water to site entrance and operations compounds	At each compound
Wastewater treatment	—	On-site wastewater treatment and disposal or removal	At each compound
Power supply	—	Power supply to the site entrance and operations compounds	At each compound
Chemical storage	—	Chemical storage facility and operations compounds	At each compound
Permanent Meteorological masts	—	Meteorological masts (or LIDAR) will be installed within the Project Area (PLA)	Up to 6

1.3 What is the extent and location of your proposed action? Use the polygon tool on the map below to mark the location of your proposed action

Shape file of the Project Area. included in the online application

1.4 Upload images

Document with images of pine plantation to be added to referral.

1.5 Provide a brief physical description of the property on which the proposed action will take place and the location of the proposed action (e.g. proximity to major towns, or for off-shore actions, shortest distance to mainland).

The Project will be located within an existing actively managed and operational exotic pine plantation in the Toolara, Tuan and Neerdie State Forests which is used for the primary purpose of growing and extracting exotic pine from a major forestry plantation, with two major timber processing facilities within the plantation. The plantation is Australia's largest single plantation forestry operation consisting of a commercial crop, with maintained access for silviculture and harvesting purposes. Most of the plantation is planted with a hybrid of *Pinus elliottii* (slash pine) and *Pinus caribaea* (caribbean pine).

This exotic modified landscape will continue into the foreseeable future under various forestry stewardship and certification programs and Queensland *Biosecurity Act 2014*, on the terms of a licence until 2109. The plantation activities include:

- ploughing and planting
- harvesting and haulage of timber from blocks to road verge
- extensive haulage on forestry roads for
    - transportation of logs timber processors
    - transportation of timber waste and products to other timber processes
- invasive weed management, including mechanical and chemical weed control

- fire management (including comprehensive controlled prescribed burning regime);
- quarrying activities
- ongoing forestry road maintenance using earthmoving machinery.

The Plantation Licensee undertakes the following management schedule of works on plantation compartments.

Table 2 Plantation Management Schedule

Task	Typical crop age
Preplant overall weed control for grass and woody vegetation	Year 0
Tree row cultivation on selected blocks	Year 0
Tree row herbicide treatment by band tending method #1	Year 0
Tree row herbicide treatment by band tending method #2	Year 0
Machine inter-row mechanical weed control	Year 2-3
Prescribed burn#1	Year 8-10 (10m high)
Prescribed burn#2 (+3yrs)	Year 11-13
Prescribed burn#3 (+3yrs or as required)	Year 14+
Thinning mechanical on compartments with higher stocking	Year 17-20
Clearfell	Year 27

Over 27 years there are 9-10 intervention events to make the plantation safe and optimise productivity. On average non-plantation woody species are treated every 3-4 years.

Approximately 3,000 ha of crop is cleared per year under the current harvesting program by the licensee. The proposed area of pine plantation clearing for the Project is a one-off event, consisting of up to 500haor less than 1% of the pine plantation. There is only marginal increase in the pine plantation clearing rate as a consequence of the Project, one-sixth of the annual cleared crop area.

Tuan, Toolara and Neerdie State Forest roads and internal service tracks occupy approximately 4.5% of the aggregate plantation/road area. Roads and tracks provide access for forest management and fire protection. Primary haul roads within the PLA are predominnatly dirt/gravel lane surfaces that incur continuous daily traffic from heavy log-haul and light vehicle. Maintenance is ongoing with regular road pavement resurfacing, watering and compacting to accommodate the high vehicle frequency. Secondary haul roads in the PLA are generally single lane formed and gravelled surfaces used intermittently for silviculture and harvesting. Maintenance includes periodic surface inspections for pavement integrity and positive drainage with repairs effected as required to ensure the pavement is safe for general forest management traffic. Prior to a harvesting event (the year prior) upgrades to the pavement surface and drainage will be completed to ensure the secondary road is consolidated and serviceable for the planned harvest event. There are also internal compartment tracks and breaks which are generally single lane bare earth surfaces with table drains that discharge into adjoining compartments and native vegetation filter strips. Internal tracks are often parallel riparian native vegetation separating the plantation trees from creek lines and waterways.

Several invasive species which are a threat to Matters of National Environmental Significance (**MNES**) have been recorded on site during surveys including feral cats, wild dogs, pigs and wild horses. Wild horses are likely responsible for trampling riparian areas within the Project Area (PLA) as they were often observed in low-lying areas within the Project Area (PLA).

The Project's closest wind turbines are situated approximately 28km to the northeast of Gympie and 9km to the southeast of Maryborough town centres. There are no communities, nor private residences or sensitive land users, within 3km of any wind turbine which is double the distance identified for development applications to be code assessable under the Queensland State planning code for wind farms as outlined in Section 1.12 and shown in Figure 3 in Appendix A.1 of this referral The nearest communities include Kia Ora, Anderleigh, Glenwood, Talegalla Weir, Magnolia, Bidwell, Boonooroo Plains, Maaroom, Boonooroo, Tuan, Poona and Wallu.

The Project is within two local government areas Gympie Regional Council and Fraser Coast Regional Council l within the broader Queensland region of Wide Bay-Burnett.

State-controlled roads bound the Project Area (PLA), including Maryborough Cooloola Road to the north and east and Tin Can Bay Road to the south.

The main access to the Project will be from the Bruce Highway via local council-controlled roads. Secondary access points will also be provided to access the Operations Compounds from Tin Can Bay Road and Maryborough Cooloola Road, both State-controlled Roads, and Maryborough Tuan Forest Road, a council-controlled road.

1.6 What is the size of the proposed action area development footprint (or work area) including disturbance footprint and avoidance footprint (if relevant)?

The Project will be situated within an existing and actively managed operating pine plantation as shown in Figures 2A and 2B in Appendix A.1. Existing plantation forestry land management practices will remain unaffected by the operating wind farm, with the Plantation Licensee operations continuing to use the land for agricultural, harvesting, trucking, haulage and processing of timber products. Up to approximately 500ha of land will be used for the Project within the PLA following the construction phase. The total area proposed to be cleared is less than one percent of the PLA for these State Forests as shown in the table below. The Project will utilise existing forestry access tracks to provide access to the wind turbines and related and ancillary infrastructure and therefore this is not new infrastructure and is not included in the Project footprint.

Table 3 Project footprint

Aspect	Area	Area cleared for Project Infrastructure
Project Area (PLA)	67,131 ha	Up to 500 ha or up to 1% of the Project Area (PLA)
Project footprint (excludes existing access tracks)	Up to 500 ha or up to 1% of the Project Area (PLA)	-
Area of remnant vegetation in the PLA	17.4% of the Project Area (PLA 11,691 ha	0 ha
Exotic pine plantation and cleared tracks in the Project Area (PLA)	82.6% of the Project Area (PLA 55,440 ha	Up to 500 ha or up to 1% of the Project Area (PLA)

1.7 Is the proposed action a street address or lot?

Lot

1.7.1 Street address

Not applicable

1.7.2 Describe the lot number and title

Lot 1004 on FTY1659

Lot 1419 on FTY 1697

Lot 915 on FTY1775

1.8 Primary Jurisdiction

Queensland

1.9 Has the person proposing to take the action received any Australian Government grant funding to undertake this project?

No

1.10 Is the proposed action subject to local government planning approval?

No. The Queensland Government granted development approval for a Material Change of Use (wind farm) under the *Planning Act 2016* (Qld) on 21 February 2020 subject to conditions.

1.11 Provide an estimated start and estimated end date for the proposed action

Start – September 2020

Complete – September 2030

1.12 Provide details of the context, planning framework and State and/or Local government requirements

Queensland State Government

The Project required assessment under the State Development Assessment Provisions (SDAP) under the Queensland *Planning A*ct 2016, as outlined below.

- ***Application for Development Approval for a Material Change of Use for a Wind Farm***

The *Planning Act 2016* establishes the framework for Queensland's planning system.

As per Schedule 24 of the *Planning Act*, a 'Wind Farm'-

> (*a) means the use of premises for generating electricity by wind force, other than electricity that is to be used mainly on the premises for a domestic or rural use; and*
>
> *(b) includes the use of premises for any of the following, if the use relates, or is ancillary, to the use stated in paragraph (a) –*
>
> *i. a wind turbine, wind monitoring tower or anemometer;*
>
> *ii. a building or structure, including, for example, a site office or temporary workers' accommodation;*
>
> *iii. a storage area or maintenance facility, including, for example, a lay down area;*
>
> *iv. infrastructure or works, including, for example, site access, foundations, electrical works, substation or landscaping.*

In accordance with the above definition of a wind farm, the Project will comprise wind turbines and related activities and infrastructure.

Schedule 10, Part 21, Division 1, Item 35 of the *Planning Regulation 2017* prescribes that a material change of use for a wind farm is assessable development requiring assessment by the chief executive administering the Planning Act and that an application for a material change of use for a wind farm is code assessable if—

> *(a) all wind turbines for the wind farm are at least 1,500m from a sensitive land use on a non-host lot; or*
>
> *(b) 1 or more wind turbines for the wind farm are less than 1,500m from a sensitive land use on a non-host lot and the owner of the non-host lot has, by deed, agreed to the turbines being less than 1,500m from the sensitive land use.*

The application for the Project was code assessable as all proposed wind turbines are more than 1,500m from a sensitive land use on a non-host lot.

Schedule 10, Part 21, Division 2, Table 1, Item 2 of the *Planning Regulation* prescribes that the applicable assessment benchmarks are the SDAP. In accordance with Part 4, Division 2, Section 21 of the *Planning Regulation* the assessment manager for a material change of use for wind farms where there is no other assessable development is the chief executive of the Department of State Development, Manufacturing, Infrastructure and Planning (**DSDMIP**).

A Development Application (**DA**) was submitted to DSDMIP on 19 December 2019 for a Development Permit for a Material Change of Use (wind farm) in accordance with the Queensland *Planning Act 2016* and *Planning Regulation 2017* for Forest Wind and a decision under Section 62 of the *Transport Infrastructure Act 1994* for vehicular access to a state-controlled road.

The Project was granted development approval for a Material Change of Use (wind farm) on 21 February 2020 subject to conditions. A copy of the development permit has been provided as Appendix A.4 for information.

The application for the DA provided information to the State Assessment Referral Agency (**SARA**) demonstrating the Project's compliance with SDAP *State Code 23: Wind farm development* Version 2.5, *State code 23: Wind farm development - Planning Guidelines* (June 2018) and SDAP *Code 1: Development in a State Controlled Road Environment.*

The application was supported by technical studies which were undertaken in accordance with the requirements of the Planning Guidelines and include mitigation and management measures to meet the Code's performance outcomes.

State code 23 considers a range of technical aspects, including flora and fauna. Performance Outcome 5 requires the proponent to demonstrate the following:

PO5 Development ensures that impacts on flora, fauna and associated ecological processes are avoided, or minimised and mitigated, through effective siting, design and operation of the development.

In order to meet the requirements of the State code and relevant legislation, including the EPBC Act, FWH has undertaken three years of ecological surveys. Preliminary ecological assessments were undertaken by O2 Ecology (2016) and Premise (2017-2019). The initial assessments informed further survey design and assessments were undertaken by Premise between 2017 and 2019. Additional surveys and targeted assessments were undertaken by Fox & Co Environmental Pty Ltd. All surveys have been undertaken in accordance with Appendix 3 of the Planning Guideline as well as species specific guidelines and relevant legislation.

Detailed surveys have been undertaken over a three-year period between 2016 and 2019 and are documented in the Ecological Assessment Report provided in Appendix A.3 of this referral. The surveys identified that the Project is ideally situated as the operational exotic pine plantations are considered of low ecological value and any remaining native vegetation within the plantation area will be avoided thereby avoiding impacts to flora and fauna. The assessment also concluded that although the risk of collision of some bird species (White-throated needletail and Fork-tailed swift) may occur, the likelihood of impacting the International and/or National population of these species is considered low. The risk of collision-based impacts on grey-headed flying fox colonies within 50km of the turbine area was also considered to be low.

The analysis of the detailed surveys has indicated that the siting, design and operation of the Project will ensure that impacts on flora, fauna and associated ecological processes are avoided, minimised and mitigated, and that the Project therefore complies with State code 23.

As part of the assessment of the DA, the ecology reports were subject to an independent third-party review to ensure compliance with the State code and relevant legislative requirements.

- ***Others***

The Project has also been assessed against the Queensland State Planning Policy and the Wide Bay Burnett Regional Plan. The wind farm's location, characteristics, outcomes and impacts are considered to be consistent with these policies and plans.

Local Government

The Project is located within the Gympie Regional Council and Fraser Coast Regional Council local government areas. Whilst not a mandatory requirement, the proponent has considered the provisions of relevant sections of both planning schemes to ensure that Council issues and requirements have been appropriately addressed in project planning.

The southern portion of the Project Area (PLA) is located within the Gympie Regional Council local government area. The land parcels within the Gympie area are Lot 1004 on FTY1659, Lot 1419 on FTY1697 and Lot 915 on FTY1775. The Project Area (PLA) is zoned Rural under the Planning Scheme. There are a number of planning scheme overlays that relate to the site including flood hazard, conservation significant area, bushfire and mining leases. The Project has been assessed against the Rural Zone Code and is able to comply with all performance outcomes and provide management and mitigation measures to address matters where appropriate.

The northern portion of the Project Area (PLA) is located within the Fraser Coast Regional Council local government area. The land parcels within the Fraser Coast area are Lot 1004 on FTY1659 and Lot 915 on FTY1775. The area is zoned Rural under the Planning Scheme. The following overlays are within the Project Area, flood hazard, biodiversity areas, bushfire, heritage, coastal protection and water resource catchment. The Project is able to comply with all performance outcomes of the Rural Zone Code and provide management and mitigation measures to address matters where appropriate.

1.13 Describe any public consultation that has been, is being or will be undertaken, including with Indigenous stakeholders

A Local Community Engagement Plan has been implemented and continually revised and updated for the Project to inform stakeholders and to undertake community engagement.

First Nations People

Under the *Native Title Act 1993 (Cth)* (**NT Act**) and the *Native Title (Queensland) Act 1993 (Qld)*, the valid grants of certain interests prior to 23 December 1996 are confirmed as extinguishing any native title which might have existed at the date of the grants. The grants are known as "previous exclusive possession acts" (**PEPAs**). Large portions of the Project Area (PLA) coincide with State lands where no PEPAs have been occurred and therefore Native Title has not been extinguished. The Project Area (PLA) is subject to one determination of Native Title and one active Native Title Claim as listed in the table below and shown in Figure 4 in Appendix A.1.

Table 4 Native Title Details

Claimant	Registration Date	Status	Native Title Tribunal Number	Federal Court Number
Butchulla Native Title Holders	30/06/2010	Determined 13/12/2019	QC2009/005	QUD460/2018
Kabi Kabi First Nation	08/02/2019	Active	QC2018/007	QUD20/2019

The Butchulla people are the traditional owners of the land ranging across Fraser Island and the adjacent mainland, from around Double Island Point in the south, to the mouth of the Burrum River in the north, and west to Bauple Mountain.

Kabi Kabi country is located on the Sunshine Coast and extends North from Brisbane as far North as Fraser Island and inland to Kilcoy.

To comply with the Native Title Act 1993, FWH is seeking Indigenous Land Use Agreements (ILUA) with the native title claim Applicants and Native Title Holders to consent to the future acts associated with the Project. Consultation with both Kabi Kabi and Butchulla has commenced and is ongoing following a resolution passed by each party in May 2019 to commence negotiations for an ILUA and Cultural Heritage Management Plans relating to the Project as required under the *Native Title Act (1993) and the Cultural Heritage Act Qld (2003).* FWH has met regularly with Kabi Kabi Applicants and the Butchulla Applicants, and now Butchulla Native Title Aboriginal Corporation Board over this period.

The Cultural Heritage Management Plans currently under development have been based on extensive consultation with the Native Title parties, involved site visits to the Project Area and consider both tangible and nontangible cultural heritage.

Kabi Kabi Community Forest Wind Information Sessions were conducted in Gympie on 1 February and in Caboolture on 2 February. A Butchulla Community Forest Wind Information Session is planned for March.

Community consultation

Wider community consultation began on 19 December 2019 and has included the following:

- Forest Wind website launched on 19 December 2020, with full planning documentation and technical studies available for download
- briefings with local environment groups
- meetings/ briefings with the Local and Federal Members of Parliament, the National Wind Farm Commissioner, and Gympie and Fraser Coast Regional Councils
- mail out of a Project Brochure and invitation to attend community information sessions to 900+ residents and property owners within a 5km radius of the Project
- community information sessions, with over 200 people attending, were held at:
    - Kia Ora on 8th February 2020
    - Tinana on 8th February 2020
    - Poona on 9th February 2020.
- Kabi Kabi Community Forest Wind information sessions, with over 40 people attending, were held at:
    - Gympie on 1 February 2020
    - Caboolture on 2 February 2020
- Forest Wind newsletter sent to 243 subscribers
- feedback form available on website enquiry and complaint handling system in place and referenced on website.

Feedback has been received via the Forest Wind website, the telephone line and from respondents who completed a feedback form at one of the community information sessions. FWH has reported back to the community on the feedback it receives via its newsletter

Consultation with the community and environment groups will be ongoing and includes the following:

- Engagement with landowners along local roads to be used by construction traffic.
- Continued engagement with communities in range of different forums, such as a visit to an operating wind farm, direct meetings and information sessions with community groups and residents.
- Online engagement via the Project website and newsletter to deliver relevant information about the Project to interested community members.
- Ongoing implementation of the enquiry and complaints management system
- Regular reporting back on outcomes of community consultation.

1.14 Describe any environmental impact assessments that have been or will be carried out under Commonwealth, State or Territory legislation including relevant impacts of the project

Ecological assessments of the Project Area (PLA) commenced in 2016. Preliminary ecological assessments were undertaken by O2 Ecology in 2016. The initial assessments informed further survey design and assessments were undertaken by Premise between 2017 and 2019. Additional surveys and targeted assessments have been undertaken in 2019 and 2020 by Fox & Co Environmental Pty Ltd and the University of the Sunshine Coast Detection Dogs for Conservation team.

The assessments and surveys include the following:

- A desktop assessment of available State and Commonwealth databases was undertaken in September 2019 to identify records or potential occurrences of least concern and conservation significant flora and fauna species within and adjacent to the Project Area (PLA) (also referred to as the Study Area in the ecology reports).
- 139 fixed-point bird utilisation surveys (**BUS**) across the Project Area (PLA) (including reference sites) between December 2016 and April 2019.

- Grey-headed Flying Fox (GHFF) surveys in December 2016, and a total of 34 nights between October 2018 and April 2019 at 5 sites using acoustic recorders.
- Total of 80 nights of surveys for microbats across 12 sites between October 2018 and April 2019 with a targeted survey undertaken between 14th February and 26th March 2019 using ultrasonic recorders to record echolocation.
- Total of 34 nights of surveys for frogs across 5 sites between October 2018 and April 2019 using acoustic recorders.
- Field surveys in the NSF section of the Project Area in April and June 2019 (PLA).
- Targeted survey for koalas in the NSF section of the Project Area (PLA) using koala scat detection dogs in June 2019.
- Threatened ecological community (**TEC**) assessment of the Raintree Bridge crossing area on Tinana Creek, January 2020. The TEC Ecological Assessment Report is provided in Appendix A.8.

The surveys identified that the Project is ideally situated as the operational exotic pine plantations are considered of low ecological value and any remaining remnant vegetation within the plantation and NSF area will be avoided.

The results of the surveys are provided in the Ecological Assessment report by Fox and Co Environmental in Appendix A.3 and the Premise Ecological Assessment by Premise in Appendix G of the Ecological Assessment Report. A plan showing the location of the survey sites for the Project is provided in the Significant Impact Assessment Report in Appendix A.6.

The ecology assessments have been assessed by an independent third-party reviewer as part of the assessment of the Development Permit for the Project.

The Ecological Assessment in Appendix A.3 includes the report from the University of the Sunshine Coast Detection Dogs for Conservation team.

1.15 Is this action part of a staged development (or a component of a larger project)?

Yes

1.15.1 Provide information about the larger action and details of any interdependency between the stages/components and the larger action

The Project may be constructed in a series of stages as approved in Condition 1 of the Development Permit. All four potential Stages of the Project are included in the action being referred. The timing of the staging will be dependent on the requirements of commercial and legal agreements with relevant stakeholders including the State, the Plantation Licensee, First Nations people, Powerlink and the buyers of the electricity. Each stakeholder has specific requirements that will determine the timing and location of the final staging which cannot be governed by the Proponent alone. The staging of the works will also be influenced by market need which will dictate the number of wind turbines and program of installation for installed in each stage. An indicative potential staging program is as follows:

- Phase 1:
  - Stage 1 – up to 42 wind turbines (c. 252MW)
  - Stage 2 – up to 29 additional wind turbines to bring the total wind farm capacity to 71 wind turbines (cumulative c. 426MW).
  - Stage 3 – up to 29 additional wind turbines to bring the total wind farm capacity to 100 wind turbines (cumulative c. 600MW), and
- Phase 2:
  - Stage 4 – up to 100 additional wind turbines to bring the total wind farm capacity to 200 wind turbines (cumulative c. 1200MW).

1.16 Is the proposed action related to other actions or proposals in the region?

Yes.

1.16.1 Identify the nature/scope and location of the related action (Including under the relevant legislation)

A High Voltage Transmission Line will be required to be designed and constructed within the OTC to transfer the generated electricity from Forest Wind to an existing Powerlink Queensland (**Powerlink**) substation located at Woolooga to the west of Gympie, which will be the transmission point of connection to the National Electricity Market. It is currently proposed that the High Voltage Transmission Line will run from a northern transmission substation via a primary transmission substation to the southwest corner of the Project Area (PLA) within the OTC and then on to Powerlink Corporation's Woolooga Substation. The High Voltage Transmission Line will be designed, installed and operated by a different entity to FWH, the details of which are currently being finalised and has not been included in this referral.

2. Matters of National Environmental Significance

Describe the affected area and the likely impacts of the proposal, emphasising the relevant matters protected by the EPBC Act. Refer to relevant maps as appropriate. The interactive map tool can help determine whether matters of national environmental significance or other matters protected by the EPBC Act are likely to occur in your area of interest. Consideration of likely impacts should include both direct and indirect impacts.

Your assessment of likely impacts should consider whether a bioregional plan is relevant to your proposal. The following resources can assist you in your assessment of likely impacts:

- Profiles of relevant species/communities (where available), that will assist in the identification of whether there is likely to be a significant impact on them if the proposal proceeds;
- Significant Impact Guidelines 1.1 – Matters of National Environmental Significance;
- Significant Impact Guideline 1.2 – Actions on, or impacting upon, Commonwealth land and Actions by Commonwealth Agencies.

2.1 Is the proposed action likely to have ANY direct or indirect impact on the values of any World Heritage properties?

A search of the Protected Matters Search database undertaken on 4th September 2019 did not identify any World Heritage properties within the Project Area (PLA). A copy of the EPBC Act Protected Matters Report is provided in Appendix E of the Ecological Assessment in Appendix A.3 of this Referral. The proposed action will not have any direct or indirect impact on the values of any World Heritage properties.

The Fraser Island World Heritage Site was assessed as part of the Landscape and Visual Impact Assessment (Viento, 2019) completed for the development application for the Project. Fraser Island National Park was inscribed on the World Heritage List in 1992; the boundary of the Park is 500m below high-water mark to include important areas of beaches, wetlands and mangroves, and part of the extensive seagrass beds in the Great Sandy Strait. It comprises a landscape of long beaches, dramatic coloured-sand cliffs, natural sandblows, rocky headlands, freshwater lakes and streams, and distinctive communities of native forest, saltmarsh and wallum. Notable features are the sandblows (created whenever the local vegetation disappears due to human or natural causes) and the freshwater lakes, generally formed in low elevation dune depressions that intersect the Island's regional water table. Diverse communities of vegetation; including closed forest (including rain forest and tall eucalypt forest dominated by Satinay and Brushwood), Blackbutt forest, Scribbly Gum and wallum banksia communities, communities of wet sites often dominated by Melaleuca species, Callitris forest and woodlands, mangroves and saltmarsh; evoking a strong sense of naturalness. Several towns, settlements and resorts, as well as camping areas, forestry camps, roads, jetties, and airstrips lie within Fraser Island e.g. Eurong, Happy Valley, Orchid Beach. 'Day-trippers' to the island are generally limited to southern parts of the Island (i.e. south of Indian Head and in close proximity to Kingfisher bay), due to limited access to and from the island (i.e. ferry to Kingfisher Bay, Wanggoolba Creek and Hook Point).

Fraser Island is located approximately 12km east of the nearest proposed wind turbine at its closest point. At 122km long, it is the longest sand island in the world and only a small part of Fraser Island is located within the 30km radius study area for the landscape assessment. Overarching protection of the world heritage values is provided by the legislation protecting national parks (*Nature Conservation Act 1992* (*Qld)*and *Recreation Areas Management Act 2006* (Qld)) as well as the *Marine Parks Act 2004* (Qld) and the *Planning Act 2016* (Qld). In addition, Australia's World Heritage Properties are also protected by the EPBC Act. Fraser Island was designated a World Heritage Site as it fulfilled the following three selection criteria:

- Superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance.

The island includes over 250km of sandy beaches with long uninterrupted sweeps of ocean beach, more than 40km of strikingly coloured sand cliffs, as well as spectacular dune blowouts, tall rainforests on sand, dune lakes and a mosaic of landscapes.

- Outstanding examples which represent major stages of earth's history, including the record of life, significant ongoing geological processes in the development of landforms, or significant geomorphic or physiographic features.

  Fraser Island has still evolving, complex coastal dune formations and an array of dunes and dune lakes, exceptional in number, diversity and age. These features provide evidence of dynamic and developmental stages in soil development, plant succession and retrogression.

- Outstanding examples representing significant ongoing ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals.

  This includes rainforest growing on tall sand dunes, species of flora and fauna adapted to nutrient poor acidic sands of the island, acid frogs and the diversity of plant and animal species.

The landscape assessment concluded that the above selection criteria refer to features intrinsic within Fraser Island itself, which would remain unaffected by the proposed wind farm at a distance of over 12km away (at its closest point) (Viento, 2019).

2.2 Is the proposed action likely to have ANY direct or indirect impact on the values of any National Heritage places?

A search of the Protected Matters Search database undertaken on 4 September 2019 did not identify any National Heritage places within the Project Area. A copy of the EPBC Act Protected Matters Report is provided in Appendix E of the Ecological Assessment in Appendix A.3 of this Referral. The proposed action will not have any direct or indirect impact on the values of any National Heritage places.

2.3 Is the proposed action likely to have ANY direct or indirect impact on the ecological character of a Ramsar wetland?

The Project is located 4km from the coastal foreshore of the Great Sandy Strait, a Ramsar wetland.

A number of waterways that drain into the Great Sandy Strait are located within the Project Area (PLA). Clearing of riparian vegetation will be limited to clearing to upgrade existing waterway crossings on existing forestry tracks only. There will be no direct impact to the Ramsar Wetland. Potential indirect impacts may result from the management of runoff from the construction areas. However, this will be actively managed by the Construction Contractor. An Erosion and Sediment Control Plan (**ESCP**) will be required to be developed for the Project and for each wind turbine and infrastructure site as relevant. A Stormwater and Erosion and Sediment Control Management Strategy has been developed for the Project which is to be used by the Construction Contractor to develop an Environment Management Plan and ESCP. A copy of the Strategy is provided in Appendix A.5 of this Referral. The Strategy was submitted to the Queensland State Assessment Referral Agency as part of the application for the Development Approval for the Project.

2.4 Is the proposed action likely to have ANY direct or indirect impact on the members of any listed species or any threatened ecological community, or their habitat?

Yes

2.4.1 Impact table

Table 5 Impact table

Species	Impact
Threatened ecological community	
Lowland Rainforest of Subtropical Australia (Critically Endangered)	The Lowland Rainforest of Subtropical Australia TEC primarily occurs from Maryborough in Queensland to the Clarence River (near Grafton) in New South Wales on basalt and alluvial soils, including sand and old or elevated alluvial soils as well as floodplain alluvia. It also occurs occasionally on enriched rhyolitic soils and basaltically enriched metasediment. The ecological community is generally a moderately tall (≥20 m) to tall (≥30 m) closed forest (canopy cover ≥70%). (EPBC Listing Advice). **Potential to occur at Tinana Creek and associated tributaries** Surveys undertaken in January 2020 confirmed that the area near Raintree Bridge on Tinana Creek is RE 12.3.16 (described as *Complex notophyll to microphyll vine forest on alluvial plains)*. The RE is analogous to the EPBC Act listed Lowland Rainforest of Subtropical Australia. The vegetation assessed at the existing Raintree Bridge crossing does not meet the species richness condition threshold for the listed community with only 11 native woody species from Appendix A of the listing advice recorded during the survey (Fox & Co, 2020) rather than the minimum 40 species required for remnant vegetation patches. The vegetation does not conform to the definition of a TEC. Nonetheless, this area is avoided by the Project due to the habitat values for potential EPBC Act listed species. **Low risk of impact** The Project will avoid Tinana Creek and its associated tributaries. Project infrastructure (other than existing roads and bridges) will not be located in the riparian vegetation.
Reptiles	
Delma torquata Collared Delma (Vulnerable)	Typically associated with western facing ridgelines supporting dry open eucalypt and acacia woodlands with an open midstorey and groundcover of native grasses, thick leaf litter and loose rocks. **Low potential to occur** No previous records **Low risk of impact** No previous records and lack of suitable habitat.
Elseya albagula Southern (white-throated) snapping turtle (Critically endangered)	Found only in Queensland in the Fitzroy, Mary and Burnett Rivers and associated smaller drainages in south eastern Queensland. White throated snapping turtles do occur in non-flowing waters, but typically at much reduced densities (conservation advice, white-throated snapping turtle, 2014) **High potential to occur** No previous records in the Project Area (PLA). Would not occur in pine plantations. Only potential habitat within Project Area (PLA) is Tinana Creek and associated tributaries. **Low risk of impact** The Project will avoid Tinana Creek and its associated tributaries. Project infrastructure will not be located in the riparian vegetation. There will not be any impact to riparian vegetation or hydrology.
Elseya albagula Mary River Turtle (Endangered)	Restricted to permanent flowing streams and large pool habitats of the Mary River catchment. **High potential to occur.** No previous records in Project Area (PLA). Would not occur in pine plantations. Only potential habitat within Project Area (PLA) is Tinana Creek and associated tributaries. **Low risk of impact** The Project will avoid Tinana Creek and its associated tributaries. Project infrastructure will not be located in the riparian vegetation. There will not be any impact to riparian vegetation or hydrology.
Egernia rugosa Yakka Skink (Vulnerable)	The Yakka Skink is known to occur in open dry sclerophyll forest, woodland and scrub. The core habitat of this species is within the Mulga Lands and Brigalow Belt South Bioregions (DoE, 2019). **Low potential to occur** No previous records

Species	Impact
	Low risk of impact No previous records and lack of suitable habitat.
Furina dunmalli Dunmall's snake (Vulnerable)	Dunmall's Snake occurs primarily in the Brigalow Belt region in the southeastern interior of Queensland. Records indicate sites at elevations between 200–500 m above sea level (DoE, 2019). **Low potential to occur** No previous records **Low risk of impact** No previous records and lack of suitable habitat.
Amphibians	
Litoria olongburensis Wallum Sedge Frog (Vulnerable)	Found in ephemeral, semi-permanent and permanent wetlands with emergent reeds, ferns and/or sedges, in undisturbed coastal wallum of South-East Queensland to northern NSW. Often not sympatric with *Litoria fallax* and generally found in fish free environments. Rarely occurs if gambusia is present. The call is a soft 'buzzing' (Curtis & Dennis, 2012) **Moderate potential to occur.** No previous records in the Project Area (PLA) although there are previous records in Toolara State Forest. Possible habitat in fragmented remnant areas. **Low risk of impact** Remnant areas are avoided and Project Infrastructure such as wind turbines and compounds (construction and operation) will be set back from wetlands and there are no likely impacts. Opportunities are available to microsite the wind turbines further from remnant vegetation.
Mixophyes fleayi Fleay's Frog (Endangered)	Fleay's Frog is narrowly and disjunctly distributed in wet forests from the Conondale Range in south-east Queensland, south to Yabbra Scrub in northeast New South Wales. While the majority of records for the species are from altitudes above 400 m, Fleay's Frog is also known from lowland rainforest; 200 m (DoE, 2019). In Queensland, populations are currently known from the Conondale Range, Lamington Plateau and the northern section of Main Range, Mt Barney area and Currumbin and Tallebudgera Creek below Springbrook Plateau (DoE, 2019). **Low potential to occur** No previous records. **Low risk of impact** Area outside of current known populations.
Mixophyes iteratus Giant Barred Frog (Endangered)	In south-eastern Queensland, the Giant Barred Frog is known from Doongul Creek in the Burrum River catchment, at scattered locations in the Mary River catchment downstream to Kenilworth, the Upper Stanley River, Caboolture River and Coomera River. Occurs along shallow rocky streams in rainforest, wet sclerophyll forest and farmland between 100 and 1000m or deep, slow moving streams with steep banks in lowland areas. Rainforests, Antarctic beech or wet sclerophyll forests with rainforest understorey. **High potential to occur** Previous records (1) in Project Area (PLA) Wildnet: 2014 Possible habitat in fragmented remnant areas. Suitable habitat occurs in Tinana Creek. **Low risk of impact** Remnant areas avoided and therefore no likely impacts. Tinana Creek and its associated tributaries are being avoided and there will be no impact.
Mammals	
Chalinolobus dwyeri Large-eared Pied Bat (Vulnerable)	In Queensland, records are known from sandstone escarpments in the Carnarvon, Expedition Ranges and Blackdown Tablelands. It is likely that these areas support a high proportion of the Queensland populations of the Large-eared Pied Bat, although estimates of the number of individuals present and their distribution in these areas has not been established. Additional records exist in the Scenic Rim near the NSW/Queensland border. The populations in this area appear to be reliant on the presence of roosts in volcanic rock types (DoE, 2018). **Low potential to occur**

Species	Impact
	No previous records **Low risk of impact** No previous records and lack of suitable habitat.
Dasyurus hallucatus Northern Quoll (Endangered)	The Northern Quoll occupies a diversity of habitats across its range which includes rocky areas, eucalypt forest and woodlands, rainforests, sandy lowlands and beaches, shrubland, grasslands and desert. Northern Quolls are also known to occupy non rocky lowland habitats such as beach scrub communities in central Queensland. Northern Quoll habitat generally encompasses some form of rocky area for denning purposes with surrounding vegetated habitats used for foraging and dispersal. Rocky habitats are usually of high relief, often rugged and dissected but can also include tor fields or caves in low lying areas such as in Western Australia. Eucalypt forest or woodland habitats usually have a high structural diversity containing large diameter trees, termite mounds or hollow logs for denning purposes. Dens are made in rock crevices, tree holes or occasionally termite mounds (Department of the Environment, 2014a). **Low potential to occur** No previous records. No suitable habitat in the Project Area (PLA). **Low risk of impact** Due to lack of previous records and suitable habitat.
Dasyurus maculatus maculatus Spotted-tail Quoll (Endangered)	Preference for mature wet forest habitat, especially in areas with rainfall 600 mm/year. Unlogged forest or forest that has been less disturbed by timber harvesting is also preferable. This subspecies has been recorded from a wide range of habitats. Prey-rich (small mammals (including possums), birds, reptiles, frogs) habitats are preferable (Department of the Environment, 2015f). **Low potential to occur** No previous records. No suitable habitat in the Project Area (PLA). **Low risk of impact** Due to lack of previous records and suitable habitat.
Petauroides volans Southern greater glider (Vulnerable)	The greater glider is an arboreal nocturnal marsupial, largely restricted to eucalypt forests and woodlands. It is primarily folivorous, with a diet mostly comprising eucalypt leaves, and occasionally flowers (DoEE, 2019). The greater glider is considered to be particularly sensitive to forest clearance and to intensive logging (DoEE, 2019). They have a low persistence in small forest fragments and disperse poorly across vegetation that is not native forest. The vegetation within the Project Area (PLA) is highly fragmented and is unlikely to support a population of greater gliders. **Low-moderate potential to occur** No previous records in the Project Area (PLA). **Low risk of impact** Wind turbines and ancillary infrastructure will be located in pine plantation. Remnant vegetation will be avoided for the construction of the wind turbines and ancillary infrastructure. There will not be any infrastructure within the NSF area as a part of this Project.
Phascolarctos cinereus Koala (Vulnerable)	Scattered populations throughout Qld, including moist forests in coastal areas, subhumid woodlands in southern and central regions, and along watercourses in semiarid eucalypt forested landscapes in the west. May also be found along non-riverine communities in semi-arid areas. Preferred habitat includes a range of temperate, sub-tropical and tropical forest, woodlands and semiarid vegetation types dominated by eucalyptus species. Also known to be limited to altitudes <800 m ASL and may be affected by temperature and leaf moisture in the western and northern parts of its range (Department of the Environment, 2014d). Koalas may occasionally take refuge in non-koala food trees such as pine trees. This would typically happen if it was disturbed whilst moving between food trees (eg. wild dog). **Known to occur (NSF area)** May occur in remnant patches along waterway corridors where suitable habitat occurs (provided suitable connectivity). May utilise creek lines for movement corridors within remnant vegetation in the scoping area. **Low risk of impact**

Species	Impact
	Wind turbines and ancillary infrastructure will be located in pine plantation. Remnant vegetation will be avoided for the construction of the wind turbines and ancillary infrastructure. Tinana Creek, its associated tributaries and other waterways will be avoided and there will be no impact to the riparian vegetation. There will not be any infrastructure within the NSF area as a part of this Project.
Potorous tridactylus tridactylus Long-nosed Potoroo (Vulnerable)	There is no consistent pattern to the habitat of the Long-nosed Potoroo (SE Mainland); it can be found in wet eucalypt forests to coastal heaths and scrubs. The main factors would appear to be access to some form of dense vegetation for shelter and the presence of an abundant supply of fungi for food (Curtis & Dennis, 2012). **Low-moderate potential to occur** No suitable habitat exists in Project Area (PLA). Potential habitat in remnant heath vegetation in northern portion of the scoping area. **Low risk of impact** Infrastructure sited in pine plantations, largely avoiding areas of remnant vegetation.
Pteropus poliocephalus Grey-headed Flying-fox (Vulnerable)	A canopy-feeding frugivore and nectarivore, which utilises vegetation communities including rainforests, open forests, closed and open woodlands, Melaleuca swamps and Banksia woodlands (DoEE, 2019). Roost sites are typically located near water, such as lakes, rivers or the coast. The Grey-headed Flying-fox is highly mobile and the national population is fluid, moving up and down the east coast in search of food (DoE, 2019). Grey-headed Flying-fox presence will be dependent on food resources. The time and location of flowering and fruiting of diet plants varies among seasons and years. In particular, drought years can have a strong influence on eucalypt flowering times. Sites noted as important in one year or period may not be visited again in the following year (DoE, 2019). Identified in June 2019 in the NSF portion of the Project Area (PLA). The Glenwood Varley Camp was active (category 3: 2,500 – 9,999 individuals) during the survey period. This camp is approximately 5km from the NSF portion and it's likely the GHFF observed were from this camp as it was the closest active camp. There are no turbines or infrastructure between the camp and where they were observed feeding. **Known to occur (NSF Area)** No camps within Project Area (PLA). Known camps within 50km of the Project Area (PLA). **Low risk of impact** The relatively small amount of native vegetation within the pine plantation is not considered core foraging habitat compared to the surrounding native state forests and National Parks, outside of the Project Area (PLA). Local populations dispersing at night are also likely to be below the rotor swept area height. Infrequent collision due to local dispersal flight height, absence of roosts within the Project Area (PLA) and the widespread distribution of preferred foraging habitat outside of the Project Area.
Xeromys myoides Water mouse (Vulnerable)	Found in habitats including mangroves and the associated saltmarsh, sedgelands, clay pans, heathlands and freshwater wetlands (Department of the Environment, 2015t). **Moderate potential to occur** Previous records within Tuan State Forest and 1 record (Wildnet 1999) in the Project Area (PLA) search area. **Low risk of impact** Suitable habitat is remnant freshwater wetlands areas. Remnant areas will be avoided and therefore no likely impacts.
Fish	
Maccullochella mariensis Mary River cod (Endangered)	The Mary River Cod occurs in three natural subpopulations (Lake Macdonald, Tinana Creek and Coondoo Creek upstream of Tinana Barrage, and upper Obi Obi Creek) in different tributary systems of the Mary River which are isolated from one another by impoundments and the main river channel. (Department of the Environment, 2016) The Mary River Cod occurs mainly in pools within relatively undisturbed tributaries, preferring relatively large and deep (0.8 to 3.2 m) shaded pools with abundant, slowly flowing water. Submerged logs and branches (snags) are used as cover from which to ambush prey, as resting sites, and as nesting sites. (Department of the Environment, 2016)

Species	Impact
	High potential to occur Previous records within Toolara and Tuan State Forests. Previous records (Wildnet 1995) in Project Area (PLA) search area. Suitable habitat exists in Tinana Creek. **Low risk of impact** Waterways avoided and therefore no likely impacts. Tinana Creek and its associated tributaries will be avoided and there will be no impact to the riparian vegetation. Wind turbines will be sited away from low-lying areas and waterbodies. Upgrade to waterway crossings may be required on existing forestry access tracks. Provided there are no impacts to water quality, flows, aquatic and riparian habitat within the Project Area, impacts on the species are not expected.
Nannoperca oxleyana Oxleyan Pygmy Perch (Endangered)	Occurs in coastal *Banksia*-dominated heath or wallum habitats. Usually inhabit waters with a high proportion of aquatic plant cover, i.e. between 60-80% (Department of the Environment, 2015k). **High potential to occur** Previous records within Toolara State Forests. Previous records (Wildnet 1994) in Project Area (PLA) search area. Potential to occur in smaller creeks and pools within the remnant waterways. Provided there are no impacts to water quality, flows, aquatic and riparian habitat within the Project Area (PLA), impacts on the species are not expected. **Low risk of impact** Waterways avoided and therefore no likely impacts. Turbine infrastructure will be sited away from low-lying areas and waterbodies. Upgrade to waterway crossings may be required on existing forestry access tracks. Provided there are no impacts to water quality, flows, aquatic and riparian habitat within the Project Area (PLA), impacts on the species are not expected.
Neoceratodus forsteri Australian lungfish (Vulnerable)	The Australian Lungfish's natural distribution is the Mary, Burnett and Brisbane River systems and (possibly) the Pine River system but translocated populations persist in the Coomera, Condamine, Albert and Logan Rivers. (Department of the Environment, 2015m) The species is restricted to areas of permanent water and cannot live in saline waters or migrate through sea water. Still or slow-flowing, shallow, vegetated pools with clear or turbid water are required to spawn and feed. Emergent or submerged vegetation are essential for successful deposition of eggs and for providing refuges for juveniles. (Department of the Environment, 2015m). **High potential to occur** Previous records (Wildnet 1992) in Project Area (PLA) search area. Suitable habitat exists within Tinana Creek. **Low risk of impact** Waterways avoided and therefore no likely impacts. Tinana Creek and its associated tributaries will be avoided and will not be impacted. Turbine infrastructure will be sited away from low-lying areas and waterbodies. Upgrade to waterway crossings may be required on existing forestry access tracks. Provided there are no impacts to water quality, flows, aquatic and riparian habitat within the Project Area (PLA), impacts on the species are not expected.
Pseudomugil mellis Honey Blue Eye (Vulnerable)	Inhabits slightly acidic (pH 4.4–6.8), clear and tannin-stained lakes, streams and wetlands with sandy or muddy bottoms in coastal heath (wallum) ecosystem. The species usually occurs where there is little or no flow, and the fish can find shelter in dense, aquatic vegetation (Department of the Environment, 2015r). **Moderate potential to occur** No previous records however potential to occur in remnant creeks and pools within the study area. No suitable habitat at Tinana Creek. **Low risk of impact** Waterways avoided and therefore no likely impacts. Turbine infrastructure will be sited away from low-lying areas and waterbodies. Upgrade to waterway crossings may be required on existing forestry access tracks. Provided there are no impacts to water quality, flows, aquatic and riparian habitat within the Project Area (PLA), impacts on the species are not expected.

Species	Impact
Birds	
Anthochaera Phrygia Regent Honeyeater (Critically Endangered)	Patchy distribution between south-east Queensland and central Victoria. It primarily occurs in box-ironbark woodland, but also occurs in other forest types. The species primarily feeds on nectar and, to a lesser extent, insects and their exudates (lerps and honeydew). It mainly feeds on nectar from eucalypts and mistletoes and it prefers taller and larger diameter trees for foraging. Movement through the landscape is governed by the flowering of select eucalypt species. Department of the Environment (2018). **Low potential to occur** No previous records. No suitable habitat in the Project Area (PLA). **Low risk of impact** Due to lack of previous records and suitable habitat.
Botaurus poiciloptilus Australian Bittern (Endangered)	Occurs predominantly in densely vegetated freshwater wetlands, reed beds, swamps, streams. Queensland population considered to be mostly confined to a few coastal swamps. (Simpson & Day, 2004). **Low potential to occur** No previous records. **Low risk of impact** Low potential to occur and turbine infrastructure sited away from low-lying areas and waterbodies.
Calidris canutus Red Knot, Knot (Migratory, Marine, Endangered) (also in Migratory Bird Table)	Found in flocks on large, sheltered intertidal sand and mudflats during the austral summer. Feed on bivalves, crustaceans and other invertebrates at the receding tide. Rarely encountered inland. Northern Arnhem Land coast is important land during the non-breeding season (Garnett, S.T., Szabo, J.K., and Dutson, 2011). **Low potential to occur** No previous records and no suitable habitat within the Project Area (PLA) search area. **Low risk of impact** Low risk of impact due to specific habitat requirements that restrict the species to intertidal areas. No records during bird surveys.
Calidris ferruginea Curlew Sandpiper (Listed Migratory, Listed Marine, Endangered) (also in Migratory bird table)	Mainly occur in both fresh and brackish waters on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms but are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand (Higgins & Davies, 1996). Curlew Sandpipers forage on mudflats and nearby shallow water and generally roost on bare dry shingle, shell or sand beaches, sandspits and islets in or around coastal or near-coastal lagoons and other wetlands, occasionally roosting in dunes during very high tides and sometimes in saltmarsh (Higgins & Davies, 1996). **Low potential to occur** No previous records and no suitable habitat within the Project Area (PLA) search area. Low potential to occur within Project Area (PLA) due to specific habitat requirements. **Low risk of impact** Low risk due to specific habitat requirements.
Calidris tenuirostris Great Knot (Migratory, Marine, Critically Endangered) (also in Migratory Bird Table)	Inhabit the same habitat as Red Knot, and are often found in flocks with, the Red Knot (see above) (Garnett, S.T., Szabo, J.K., and Dutson, 2011). **Low potential to occur** No previous records and no suitable habitat within the Project Area (PLA) search area. Low potential to occur within Project Area (PLA) due to specific habitat requirements. **Low risk of impact** Low risk of impact due to specific habitat requirements that restrict the species to intertidal areas. No records during bird surveys
Charadrius leschenaultii Greater Sand Plover (Migratory, Marine, Vulnerable)	Only seen in Australia from July-December, with an influx of individuals into the Top End of the NT during October. Inhabit littoral and estuarine habitats, mainly on sheltered beaches with large sand or mudflats, though observations have been made in estuary lagoons, inshore reefs, small rocky islands and sand cays on coral reefs. Occasionally

Species	Impact
(also in Migratory Bird Table)	sighted on near-coastal salt lakes and brackish swamps. Roosting generally takes place on sand-spits and banks on beaches or in tidal lagoons, higher up the beach than other waders (can be well above the high tide mark) (Department of the Environment, 2016a). **Low potential to occur** No previous records and no suitable habitat within the Project Area (PLA) search area. Low potential to occur within Project Area (PLA) due to specific habitat requirements. **Low risk of impact** Low risk of impact due to specific habitat requirements that restrict the species to intertidal areas. No records during bird surveys.
Charadrius mongolus Lesser Sand Plover (Migratory, Marine, Endangered)	Recorded along most of the coastline of the NT, in particular the North Arnhem coast, Mud Blue Bay, coast between Anson Bay and Murgenella creek and the Port McArthur area (Chatto, 2003). Inhabits mud and sandflats in sheltered bays, estuaries, harbours, and occasionally rocky outcrops, sandy beaches and coral reefs. Roosting occurs near foraging areas (Department of the Environment, 2016b). Migratory shorebird of the EAA. Seven important non-breeding sites in Australia; one being the Great Sandy Strait. **Low potential to occur** No previous records and no suitable habitat within the wind turbine search area. Low potential to occur within study area due to specific habitat requirements. **Low risk of impact** Low risk of impact due to specific habitat requirements that restrict the species to intertidal areas. No records during bird surveys.
Cyclopsitta diophthalma coxeni Coxen's Fig Parrot (Endangered)	Occurs in rainforest habitats including subtropical rainforest, dry rainforest, littoral and developing littoral rainforest, and vine forest. **Low potential to occur** No previous records. No suitable habitat in the Project Area (PLA). **Low risk of impact** Due to lack of previous records and suitable habitat.
Erythrotriorchis radiatus Red goshawk (Vulnerable)	Occurs in coastal and sub-coastal areas in riverine, wooded and forested lands of tropical and warm-temperate Australia. Known to prefer forest and woodland with a mosaic of vegetation types, large prey populations (birds), and permanent water. The vegetation types include eucalypt woodland, open forest, tall open forest, gallery rainforest, swamp sclerophyll forest, and rainforest margins. The Red Goshawk nests in large trees, frequently the tallest and most massive in a tall stand, and nest trees are invariably within one km of permanent water (DoEE, 2019). The Red Goshawk spends much of its time below the canopy, but it has been observed regularly flying just above the canopy. **Low potential to occur** No previous records and no suitable habitat in the Project Area (PLA). **Low risk of impact** No previous records and no suitable habitat in the Project Area (PLA).
Geophaps scripta scripta Squatter Pigeon (southern) (Vulnerable)	Open-forests to sparse, open-woodlands and scrub that are mostly dominated in the overstorey by *Eucalypts, Corymbia, Acoacia* or *Callitirs* species, remnant, regrowth or partly modified and within 3km of water bodies or courses, Department of the Environment (2018). **Low potential to occur** No previous records and no suitable habitat exists. Considered locally extinct. **Low risk of impact** No previous records and no suitable habitat in the Project Area (PLA).
Hirundapus caudacutus White-throated Needletail (Vulnerable)	Summer migrant (October – April). Occurs in high open spaces above wide range of habitats, such as oceans, ranges and headlands (Morcombe, 2003). The White-throated Needletail is widespread in eastern and south-eastern Australia (Barrett et al. 2003; Blakers et al. 1984; Higgins 1999). In eastern Australia, it is recorded in all coastal regions of Queensland and NSW, extending inland to the western slopes of the Great Divide and occasionally onto the adjacent inland plains (DoEE, 2019) There are

Species	Impact
	no published estimates of the extent of occurrence of the White-throated Needletail in Australia, although the species occurs at numerous and widespread sites in eastern Australia (DoEE, 2019). In Australia, the White-throated Needletail is almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground (DoEE, 2019). They often forage in areas of updraughts, such as ridges, cliffs or sand-dunes, or in the smoke of bushfires, or in whirlwinds. They often forage along the edges of low-pressure systems, which both lift their food sources and assist with their flight, and it is said that they follow these systems across Australia (DoEE, 2019). **Known to occur** Identified during bird utilisation surveys in Project Area (PLA). **Low risk of impact** Surveys demonstrated the occurrence and abundance of this species across the Project Area (PLA) is highly variable. Two (2) of the 139 bird utilisation surveys recorded numbers greater than 100 and five (5) of the 139 surveys recorded numbers greater than 10 (3 of those 5 were less than 20 individuals). The two survey occasions when they were recorded in flocks greater than 100 were on days associated with local bushfires or stormfronts. Potential collision with wind turbines is considered of low risk to the population. This is also consistent with the DoE Conservation advice regarding the assessment of threats to the White-throated Needletail (Table 1, item 2.1 of the Approved Conservation Advice, 4 July 2019). Given their widespread distribution (when in Australia during the Summer months), lack of resting habitat within the Project Area (PLA), turbine collision avoidance behaviour and highly variable occurrence and abundance across the Project Area (PLA), the Project is considered unlikely to have a Significant Impact on the White-throated Needletail.
Lathamus discolor Swift Parrot (Endangered, Listed Migratory)	Occurs in dry sclerophyll eucalypt forests and woodlands (occasionally wet sclerophyll forests). The Swift Parrot is endemic to south-eastern Australia. It breeds only in Tasmania and migrates to mainland Australia in autumn (to “overwinter”: returns to Tasmania in early August). Recent Queensland records are from the Gold Coast, Noosa, Toowoomba, Warwick and Lockyer Valley areas (Department of the Environment, 2014c). **Low potential to occur** No suitable habitat exists within the Project Area (PLA). **Low risk of impact** No previous records and no suitable habitat in the Project Area (PLA).
Limosa lapponica baueri Bar-tailed Godwit (Migratory, Marine, Vulnerable) (also in Migratory Bird Table)	Inhabits mainly in coastal areas such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays, around beds of seagrass, saltmarsh, coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats. Rarely found on inland wetlands or in areas of short grass, such as farmland, paddocks and airstrips (Department of the Environment, 2019; Morcombe, 2003). Breeds in eastern Russia and Alaska (Migratory Shorebirds of the East Asian – Australasian Flyway). Migratory shorebird of the EAA. Seven important non-breeding sites in Australia; one being the Great Sandy Strait. **Low potential to occur** No previous records and no suitable habitat within the Project Area (PLA) search area. Low potential to occur within study area due to specific habitat requirements. **Low risk of impact** Low risk of impact due to specific habitat preferences. No habitat west of Project Area (PLA) so short flights unlikely to occur.
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit (Migratory, Marine, Critically Endangered) (also in Migratory Birds)	As per *Limosa lapponica baueri,* although breeds in northern central Russia (Migratory Shorebirds of the East Asian – Australiasian Flyway). Migratory shorebird of the EAA. Seven important non-breeding sites in Australia; one being the Great Sandy Strait. **Low potential to occur** No previous records and no suitable habitat within the Project Area (PLA) search area. Low potential to occur within study area due to specific habitat requirements. **Low risk of impact**

Species	Impact
	Low risk of impact due to specific habitat preferences. No habitat west of Project Area (PLA) so short flights unlikely to occur.
Numenius madagascariensis Eastern Curlew (Listed Migratory, Listed Marine, Critically Endangered) (also in Migratory Birds)	Associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sand flats (Morcombe, 2003). Migratory shorebird of the EAA. Non-breeding period in Australia (Bamford et al, 2008). **Low potential to occur** No previous records and no suitable habitat within the Project Area (PLA) search area. Low potential to occur within study area due to specific habitat requirements. **Low risk of impact** Low risk of impact due to specific habitat preferences. No habitat west of Project Area (PLA)so short flights unlikely to occur.
Pachyptila turtur subantarctica Fairy prion (southern) (Vulnerable)	Breeding is currently known from only from two rock stacks off Macquarie Island (conservation advice, 2015). **Low potential to occur** Marine species **Low risk of impact** No previous records and no suitable habitat
Poephila cincta cincta Southern Black-throated Finch (Endangered)	Occurs mainly in grassy, open woodlands and forests, typically dominated by *Eucalyptus, Corymbia* and *Melaleuca,* and occasionally in tussock grasslands or other habitats (for example freshwater wetlands), often along or near watercourses, or in the vicinity of water. **Low potential to occur** No previous records and no suitable habitat exists. **Low risk of impact** No previous records and no suitable habitat in the Project Area (PLA).
Rostratula australis Australian painted snipe (Syn. *Rostratula benghalensis*) (Endangered, Listed Migratory, Migratory Wetlands)	Variety of habitats but generally requires presence of water. Inhabits shallow terrestrial freshwater wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains (Department of the Environment, 2019). **Moderate potential to occur.** Previous records (1) within Project Area (PLA) search area. Wildnet: 2007. Possible suitable habitat exists in the freshwater habitats within remnant vegetation. May occur in the adjacent Wide Bay Military Training Area Wetland. **Low risk of impact** Low risk of collision due to specific habitat preferences low numbers moving through Project Area (PLA).
Turnix melanogaster Black-breasted Button-quail (Vulnerable)	Prefer drier low closed forests, particularly semi-evergreen vine thickets restricted to coastal and near-coastal regions of south-eastern Queensland and north-eastern New South Wales. Deep leaf litter seems important (Department of the Environment, 2014g). **Low potential to occur.** No previous records and no suitable habitat. **Low risk of impact** No previous records and no suitable habitat in the Project Area (PLA)
Insects	
Argynnis hyperbius inconstans Australian fritillary (Critically Endangered)	Restricted to open, coastal, grassy sedgelands and wetlands where its larval food plant, *Viola betonicifolia*, is distributed. It is also sometimes found in disturbed areas (e.g. the drainage ditches of sugarcane farms) or in association with water course plant communities when its food plant *Viola betonicifolia* is present. The larval food plant, Viola betonicifolia, grows as a small, insignificant ground herb in association with *Lomandra longifolia* (long leaved matrush) and grasses, especially the grass *Imperata cylindrica* (bladey grass), in the Melaleuca wetland plant community. **Low potential to occur.** No previous records and no suitable habitat. **Low risk of impact** No previous records and no suitable habitat in the Project Area (PLA).

Species	Impact
Phyllodes imperialis smithersi Pink Underwing Moth	The Pink Underwing Moth is distributed from Kin Kin Creek south-east of Gympie in Queensland, to Bellingen in northern NSW (Sands 2012). The NSW Scientific Committee indicates that the species is known from five locations, of which Mary Cairncross Scenic Reserve, near Maleny (Queensland), contains the only confirmed breeding habitat (DoE, 2019). Found below the altitude of 600 m in undisturbed, subtropical rainforest on rich volcanic soils and fertile alluvium. **Low potential to occur.** No previous records and Project is north of current known distribution. **Low risk of impact** No previous records and no suitable habitat in the Project Area (PLA).
Flora	
Acacia attenuata (Vulnerable)	This species occurs on flat coastal lowland plains, at altitudes of lower than 30 m above sea level, typically occurring in seasonally waterlogged areas of wet heathland or heathland margins, open forest and woodland communities, and specifically on sandy poorly drained soils or peat swamps which are infertile. The species has been recorded growing in shrublands with *Leptospermum whitei* and *Baeckea frutescens*; in wallum with *Banksia aemula* and *Eucalyptus robusta*; in woodlands with *Corymbia trachyphloia*, *E. umbra* and *Banksia oblongifolia*; and in open forests of *E. umbra, E. racemosa* and *Melaleuca quinquenervia* and has been found in disturbed environments, such as roadsides subject to vegetation control. (Department of the Environment, 2019). **High potential to occur** Previous records within Toolara State Forest (Wildlife Online) and Project Area (PLA) search area (Wildnet: 2010). **Low risk of impact** Remnant areas avoided and therefore no likely impacts.
Arthraxon hispidus Hairy-joint grass (Vulnerable)	*A.hispidus* is found in or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps (Queensland CRA/RFA Steering Committee, 1998; DECC NSW, 2005), as well as woodland (Queensland Herbarium, 2011). In the South-East Queensland Bioregion, *A. hispidus* has also been recorded growing around freshwater springs on coastal foreshore dunes, in shaded small gullies, on creek banks, and on sandy alluvium in creek beds in open forests (Queensland CRA/RFA Steering Committee, 1998), and also with bog mosses in mound springs (Queensland Herbarium, 2011).(DES, 2018). **Low potential to occur** No previous records and no suitable habitat exists. **Low risk of impact** No previous records and no suitable habitat in the Project Area (PLA).
Baloghia marmorata Marbled Balogia (Vulnerable)	Found in subtropical rainforest/notophyll vine forest and wet sclerophyll forest (brush box woodland) with rainforest understorey between 150 and 550 m above sea level (Queensland Herbarium, 2008). Confined to the Lismore district, in north-east NSW, and the Tamborine Mountains and Springbrook, in southeast Queensland. *Baloghia marmorata Conservation Advice (2008)* **Low potential to occur** No previous records and no suitable habitat exists. **Low risk of impact** No previous records and no suitable habitat in the Project Area (PLA)
Bosistoa transversa (*Bosistoa selwynii*) Three-leaved Bosistoa, Yellow Satinheart (Vulnerable)	**T**hree-leaved Bosistoa grows in lowland subtropical rainforest up to 300 m above sea level. (Department of the Environment, 2019). **Low potential to occur** No previous records and no suitable habitat exists. **Low risk of impact** No previous records and no suitable habitat in the Project Area (PLA).
Cryptocarya foetida Stinking Cryptocarya, Stinking Laurel	The Stinking Cryptocarya is restricted to coastal sands, or if not, then close to the coast, occurring in littoral rainforest on old sand dunes and subtropical rainforests over slate and occasionally on basalt to an altitude of 150 m. Associated species include *Syzygium hemilamprum* (Broad-leaved Lilly Pilly), *Acronychia imperforata* (Beach

Species	Impact
(Vulnerable)	Acronychia), *Cryptocarya triplinervis* (Threeveined Laurel), *Cupaniopsis anacardioides* (Tuckeroo), *Flindersia bennettiana* (Bennet's Ash), *Lophostemon confertus* (Brush Box) and *Syzygium luehmannii* (Small-leaved Lilly Pilly). (Department of the Environment, 2019). **Low potential to occur** No previous records and no suitable habitat exists. **Low risk of impact** No previous records and no suitable habitat in the Project Area (PLA).
Cryptostylis hunteriana Leafless Tongue-orchid (Vulnerable)	The Leafless Tongue-orchid has been reported to occur in a wide variety of habitats including heathlands, heathy woodlands, sedgelands, *Xanthorrheoa* spp. plains, dry sclerophyll forests (shrub/grass subformation and shrubby sub-formation), forested wetlands, freshwater wetlands, grasslands, grassy woodlands, rainforests and wet sclerophyll forests (grassy sub-formation). Soils are generally considered to be moist and sandy, however, this species is also known to grow in dry or peaty soils. In south east Queensland, the associated plant community is *Banksia* spp./*Eucalyptus* spp. wallum heath. (Department of the Environment, 2019). Tin Can Bay is the northern most distribution of this species. **Low potential to occur** No previous records. Suitable habitat in the remnant vegetation patches although the study area is outside of the current known range. **Low risk of impact** Minimal disturbance of native vegetation for Project infrastructure.
Cupaniopsis shirleyana Wedge-leaf tuckeroo (Vulnerable)	Wedge-leaf Tuckeroo is known from south-eastern Queensland over a range of approximately 450 km, between Brisbane and Curtis Island (SHG, 2006). Wedge-leaf Tuckeroo occurs in a number of small populations throughout its range, in dry rainforest and scrubby urbanised areas on moderate to very steep slopes, screeslope gullies and rocky stream channels at elevations of 60–550 m above sea level (DoE, 2019)). **Low potential to occur** No previous records or suitable habitat exists. **Low risk of impact** No previous records and no suitable habitat in the Project Area (PLA).
Fontania rostrata (Vulnerable)	*Fontainea rostrata* is a tree or shrub growing 7–12 m high and is known from ten sites in the Gympie district, Teddington Weir and Mt Theebine near Glenwood, in Queensland, covering a distance of 100 km (BRI collection records, n.d.). This species occurs in notophyll vine forest on soil derived from metamorphic rock (DoE, 2019). The main potential threats to Fontainea rostrata include clearing of vegetation, fire, invasion by weeds, and potential impacts of stochastic events due to restricted distribution. **High potential to occur (Tinana Creek)** Suitable habitat along Tinana Creek. **Low risk of impact** Tinana Creek and its associated tributaries will be avoided and therefore no likely impacts.
Macadamia integrifolia Macadamia nut (Vulnerable)	The Macadamia Nut is a medium-sized tree which can grow to approximately 20 m in height with a similar crown width, giving the tree a rounded shape. The Macadamia Nut grows in remnant rainforest, preferring partially open areas such as rainforest edges. **Moderate potential to occur** No previous records. Only suitable habitat is associated with Tinana Creek in areas with transitional rainforest. No suitable habitat exists in the eastern portion of the Project Area (PLA). **Low risk of impact** Tinana Creek and its associated tributaries will be avoided and therefore no likely impacts.
Macadamia ternifolia Small-fruited Queensland Nut (Vulnerable)	Habitat is fragmented and found within lowland warm complex notophyll vine forest and Araucarian notophyll vine forest Historically, the species was recorded east of the Main Divide from Kin Kin, near Gympie; and south to the Pine River, north of Brisbane. Following extensive habitat clearing, the species is now considered extremely rare in

Species	Impact
	the wild and is restricted to an area between Mount (Mt) Pinbarren (northern extent) and Mary Cairncross Park near Maleny (southern extent) (a distance of almost 50 km) (Barry & Thomas 1994). (DoE, 2018) **Low potential to occur** No previous records or suitable habitat exists. **Low risk of impact** Considered outside of known range.
Macrozamia pauli-guilielmi Pineapple Zamia (Endangered)	Macrozamia pauli-guilielmi occurs in lowland (5–230 m altitude) open forest or woodland (wallum) dominated by banksias or eucalypts, or in shrub land or heath land, generally on stabilised sand dunes. ((DoEE, 2019) **Known to occur** Identified during surveys in the Project Area (PLA). **Low risk of impact** Individuals of pineapple zamia are known to occur within the Project Area (PLA). They occur in remnant and non-remnant areas. They are likely part of a highly fragmented metapopulation known to occur within Tuan State Forest (both within the pine plantations and remnant areas). The population of this larger population is estimated at 6,774 individuals within Tuan State Forest (Forest 915). Given the avoidance measures proposed, the project is unlikely to have a significant impact on pineapple zamia and is more likely to introduce further protection measures for the individuals within the pine plantations than they currently have (National Multi-species Recovery Plan for the cycads, 2007). Infrastructure is not proposed for this Project in the NSF area and there will be no impact to macrozamias in this area.
Macrozamia parcifolia (Vulnerable)	*Macrozamia parcifolia* occurs in tall open forest communities with a sparse to dense shrubby understorey, at altitudes between 120-220m above sea level. It grows on stony ridges and slopes, on well-drained, hard, red-brown clay loam soils of basaltic origin. **Low potential to occur** No suitable habitat exists and no previous records. **Low risk of impact** No previous records and no suitable habitat in the Project Area (PLA).
Phaius australis Lesser Swamp-orchid (Endangered)	The Lesser Swamp-orchid is commonly associated with coastal wet heath/sedgeland wetlands, swampy grassland or swampy forest and often where Broadleaved Paperbark or Swamp Mahogany are found. Typically, the Lesser Swamp-orchid is restricted to the swamp-forest margins, where it occurs in swamp sclerophyll forest (Broad-leaved Paperbark/Swamp Mahogany/Swamp Box (Lophostemon suaveolens)), swampy rainforest (often with sclerophyll emergents), or fringing open forest. It is often associated with rainforest elements such as Bangalow Palm (Archontophoenix cunninghamiana) or Cabbage Tree Palm (Livistona australis). This orchid species is relatively adaptable in its requirements for light and soil type. Soils range from acidic waterlogged peat, with a pH of 4.2 to peaty-sand, with a pH of 7.0. Soil parent materials include marine aeolian sand, the most common substrate, alluvium, granite, metasediments, hailstone gravel and sandstone. Soil types on sand range from shallow peat to humus/groundwater podzol. (Department of the Environment, 2015p). **Moderate potential to occur** Suitable habitat exists in low lying remnant area however no previous records. **Low risk of impact** No previous records and remnant vegetation avoided in the Project Area (PLA).
Samadera bidwillii Quassia (Vulnerable)	Endemic to Queensland and occurs in lowland rainforest most commonly but can also be found in other forest types. Commonly found in areas adjacent to watercourses. Found on a range of soil types including lithosols, skeletal soils, loam soils, sands, silts and sands with clay subsoils. (DoE, 2019) Quassia is a small shrub or tree that grows to about 6 m in height, with red flowers and red fruit occurring from November to March. Branchlets are ribbed, with fine, pale-brown hairs. Its leaves are 4.5–9 cm long, 6–12 mm wide, glabrous (hairless) or sometimes silky to pubescent only on the lower surface, with secondary veins numerous and regularly arranged. Leaves are stiff and leathery, narrow-elliptic or lanceolate, blunt or bluntly pointed, the margins bent under. They are green, glossy and hairless above, and sparsely hairy below. Quassia flowers occur in

Species	Impact
	clusters of 1–4, and each flower has 8–10 stamens, with filaments densely villous (covered in small hairs) on the outer surface, the sepals are 0.75 to 1 mm long and the red petals are approximately 2.5 mm in length. The fruit are ovidellipsoid, 1 cm long, hairy and sometimes appear winged Quassia is endemic to Queensland and is currently known to occur in several localities between Scawfell Island, near Mackay, and Goomboorian, north of Gympie. Quassia has been confirmed as occurring in at least 40 sites. Included within this range are a number of populations along the Mary River; Tinana Creek, Tallegalla Weir, Teddington Weir pondage, and from Teddington Weir to Tiana Barrage (DoEE, 2019). **High potential to occur** Previous records within Tuan State Forest (Wildlife Online). Known to occur along Tinana Creek. **Low risk of impact** Tinana Creek and its associated tributaries will be avoided and there will be no impact.
Sophora fraseri (Vulnerable)	*Sophora fraseri* is a subtropical shrub, that normally grows in wet sclerophyll forest and a range of rainforest types. It has been reported growing in hilly terrain on hillslopes at altitudes at altitudes from 60 to 660m, mostly shallow stony to shaly soils, of loam to clay texture derived from sandstone or basalt rocks. Associated species include: *Corymbia citriodora, Eucalyptus carnea, E. microcorys, E. acmenoides, E. propinqua* and *Lophostemon confertus*. The shrub appears to prefer growing along rainforest margins, in eucalypt forests in the vicinity of rainforests or in large canopy gaps in closed forest communities (DES, 2019). **Low potential to occur** No suitable habitat exists and no previous records. **Low risk of impact** No previous records and no suitable habitat in the Project Area (PLA).
Thesium australe Austral Toadflax, Toadflax (Vulnerable)	Austral Toadflax is semi-parasitic on roots of Kangaroo Grass (*Themeda triandra*) and a range of other grass species. The species occurs in subtropical, temperate and subalpine climates over a wide range of altitudes on soils derived from sedimentary, igneous and metamorphic geology including black clay loams to yellow podzolics and peaty loams.(DoE, 2019) Austral Toadflax occurs in shrubland, grassland or woodland, often on damp sites. Vegetation types include open grassy heath dominated by Swamp Myrtle (*Leptospermum myrtifolium*), Small-fruit Hakea (*Hakea microcarpa*), Alpine Bottlebrush (*Callistemon sieberi*), Woolly Grevillea (*Grevillea lanigera*), Coral Heath (*Epacris microphylla*) and Poa spp. (Griffith 1991); Kangaroo Grass grassland surrounded by Eucalyptus woodland; and grassland dominated by Barbed-wire Grass (*Cymbopogon refractus*). (DoE, 2019) The species flowers and fruits throughout the year on the coast and during summer at higher altitudes. In subalpine and tableland climates, the species dies back to rootstock during winter and resprouts in spring. In coastal areas the species persists all year round and may live for longer than two years (DoE, 2019). **Low potential to occur** No suitable habitat exists and no previous records. **Low risk of impact** No previous records and no suitable habitat in the Project Area (PLA).
Triunia robusta Glossy Spice Bush (Endangered)	*Triunia robusta* is restricted to a small area on Queensland's Sunshine Coast, between Pomona and Woombye, mainly in the Maroochy River catchment area. The main habitat is notophyll vine forest, or mixed tall open forest developing a rainforest understorey in the absence of fire. Triunia robusta Conservation Advice (2008). **Low Potential to Occur** Although vine forest occurs along Tinana Creek, the Project Area (PLA) is well outside of the known area of distribution. **Low risk of impact** No previous records and outside of known distribution.
Xanthostemon oppositifolius Southern Penda (Vulnerable)	It is known from Kin Kin-Boreen Point–Cooroy District, near Noosa; Teddington Weir, south of Maryborough; and Granite Creek and Broken Creek, south-west of Miriam Vale (DoE, 2019).

Species	Impact
	In southern locations, southern penda occurs predominantly in riparian communities on slightly acid clayey sands to sandy clays derived from sedimentary and metasedimentary rocks. Associated vegetation includes notophyll vine forest, simple notophyll mixed tall closed forest with *Araucaria cunninghamii* var. c*unninghamii* (hoop pine) emergents or in transitional rainforest where the upper stratum is composed mostly of tall sclerophyll elements with rainforest species restricted to a developing understorey or mid-storey (DoE, 2019). At Granite Creek sites, it occurs on hillside on metasediments or old volcanic rocks in *araucarian notophyll* vine forest (DoE, 2019). **High potential to occur** Previous records within Toolara State Forest (Wildlife Online). Only suitable habitat is along creeks in Western portion of Project Area (PLA) such as Tinana Creek. **Low risk of impact** Remnant areas and Tinana Creek and its associated tributaries will be avoided and therefore no likely impacts. No suitable habitat in eastern portion of the Project Area (PLA).

2.4.2 Do you consider this impact to be significant?

Species that have been identified as having a moderate or high potential to occur or are known to occur in the Project Area (PLA) are listed in the table below. The significance of the impact to each of the species has been assessed in a Significant Impact Assessment Report provided in Appendix A.6 of this referral and summarised below.

Table 6 Significance of impact

Species	Likelihood of occurrence	Risk of impact	Significance of impact
Threatened ecological community			
Lowland Rainforest of Subtropical Australia (Critically Endangered)	Moderate potential to occur	**Low risk of impact** The vegetation assessed at the existing Raintree Bridge crossing does not meet the species richness condition threshold for the listed community with only 11 native woody species from Appendix A of the listing advice recorded during the survey (Fox & Co, 2020) rather than the minimum 40 species required for remnant vegetation patches and is therefore not a TEC. Tinana Creek and its associated tributaries will be avoided as part of the Project and there will be no impact to riparian vegetation.	**Unlikely to have a significant impact** The vegetation is not a TEC. Tinana Creek and its associated tributaries will be avoided as part of the Project and there will be no impact.
Reptiles			
Elseya albagula Southern (white-throated) snapping turtle (Critically endangered)	High potential to occur	**Low risk of impact** Tinana Creek and its associated tributaries will be avoided as part of the Project. There will be no impact to riparian vegetation or hydrology.	**Unlikely to have a significant impact** There will not be any impacts on water quality, flows, aquatic and riparian habitat within the Project Area (PLA), impacts on the Southern (white-throated)

			snapping turtle are not expected, should the turtles occur.
Elseya albagula Mary River Turtle (Endangered)	High potential to occur	**Low risk of impact** Tinana Creek and its associated tributaries will be avoided as part of the Project. There will be no impact to riparian vegetation or hydrology.	**Unlikely to have a significant impact** There will not be any impacts on water quality, flows, aquatic and riparian habitat within the Project Area (PLA), impacts on the Mary River turtle are not expected, should the turtles occur.
Amphibians			
Litoria olongburensis Wallum Sedge Frog (Vulnerable)	Moderate potential to occur	**Low risk of impact** Possible habitat in fragmented remnant areas. Remnant areas avoided and therefore no likely impacts.	**Unlikely to have a significant impact** A conservative approach has been taken with the SIA as there are no previous records of Wallum Sedge Frog (WSF) and within the Project Area (PLA). Nonetheless, potential habitat exists for WSF within the mosaic of remnant wetlands and waterways remaining within the pine plantations within the Project Area (PLA). The Project has been designed to avoid remnant areas which offer the most suitable habitat for flora and fauna within the pine plantation. Should populations of WSF remain within remnant pockets within the current landscape of actively managed silviculture operations, the Project is unlikely to have a Significant Impact on these populations.
Mixophyes iteratus Giant Barred Frog (Endangered)	High potential to occur	**Low risk of impact** Remnant areas avoided and therefore no likely impacts. Tinana Creek and its associated tributaries will be avoided and there will be no impact.	**Unlikely to have a significant impact** A conservative approach has been taken with the SIA as there is one (1) record for GBF within the Project Area (PLA). Nonetheless, potential habitat exists for GBF within the mosaic of remnant wetlands and waterways remaining within the pine plantations within the Project Area (PLA). The Project has been designed to avoid remnant areas which offer the most suitable habitat for flora and fauna within the pine plantation. Should populations of GBF remain within remnant pockets within the current landscape of actively managed silviculture operations, the Project is unlikely to have a Significant Impact on these populations.
Mammals			

Phascolarctos cinereus Koala (Vulnerable)	Known to occur	**Low risk of impact** Wind turbines and ancillary infrastructure will be located in pine plantation. Remnant vegetation will be avoided for the construction of the wind turbines and ancillary infrastructure. Tinana Creek, its associated tributaries and other waterways will be avoided and there will be no impact to the riparian vegetation. There will not be any infrastructure within the NSF area as a part of this Project.	**Unlikely to have a significant impact** Koala habitat within the NSF portion of the Project Area (PLA) is not proposed to be impacted by the Project. Should koalas occur within the mosaic of remnant vegetation amongst the pine plantation within the Project Area (PLA), these will not be impacted by the Project as remnant vegetation is specifically avoided for project infrastructure. The project infrastructure has specifically been sited within the operational exotic pine plantations to avoid areas of remnant vegetation. Given the avoidance measures proposed, the Project is not considered to have a significant impact on koalas.
Pteropus poliocephalus Grey-headed Flying-fox (Vulnerable)	Known to occur	**Low risk of impact** The relatively small amount of native vegetation within the pine plantation is not considered core foraging habitat compared to the surrounding native state forests and National Parks, outside of the Project Area (PLA). Local populations dispersing at night are also likely to be below the rotor swept area height. Infrequent collision due to local dispersal flight height, absence of roosts within the Project Area (PLA) and the widespread distribution of preferred foraging habitat outside of the Project Area.	**Unlikely to have a significant impact** There is limited foraging habitat within the Project Area (PLA) compared to foraging habitat available outside of the Project Area (PLA). There are no known Grey-headed flying fox camps within the Project Area (PLA). The Project is considered unlikely to have a Significant Impact on Grey-headed flying fox.
Xeromys myoides Water mouse (Vulnerable)	Moderate potential to occur	**Low risk of impact** Suitable habitat in remnant freshwater wetlands areas. Remnant areas will be avoided and therefore no likely impacts.	**Unlikely to have a significant impact** Marginal habitat exists within the Project Area (PLA) for water mouse and these areas (low-lying wetland areas in remnant freshwater melaleuca forests) are avoided by the Project. No important populations are known to occur within the Project Area (PLA). Important populations are associated with the inter-tidal areas of the Great Sandy Strait rather than within the Project Area (PLA). Nonetheless, should water mouse occur in small pockets of remnant low-lying habitat, these areas are avoided by the Project, management measures are also proposed to mitigate indirect impacts to low-lying areas and waterways; and therefore, the

			Project is unlikely to have a significant impact.
Petauroides volans volans Southern greater glider (Vulnerable)	Low - Moderate potential to occur	**Low risk of impact** Wind turbines and ancillary infrastructure will be located in pine plantation. Remnant vegetation will be avoided for the construction of the wind turbines and ancillary infrastructure. There will not be any infrastructure within the NSF area as a part of this Project.	**Unlikely to have a significant impact** Southern greater gliders are considered to have a low potential to occur however have been included in the SIA as a precautionary measure. Given the lack of previous records and sensitivity to forest clearance and intensive logging (the Project Area (PLA) is within an actively managed forestry) and avoidance of remnant vegetation, impacts to southern greater gliders are considered unlikely.
Potorous tridactylus tridactylus Long-nosed Potoroo (Vulnerable)	Low-moderate potential to occur No suitable habitat exists in Project Area (PLA). Potential habitat in remnant heath vegetation in northern portion of the scoping area.	**Low risk of impact** Infrastructure sited predominantly in pine plantations, largely avoiding areas of remnant vegetation	**Unlikely to have a significant impact** Marginal habitat exists within the Project Area (PLA) for LNP and these remnant areas are avoided by the Project. No important populations are known to occur within the Project Area (PLA). Nonetheless, should LNP occur in small pockets of dense remnant vegetation, these areas are avoided by the Project, and therefore the Project is unlikely to have a significant impact.
Fish			
Maccullochella mariensis Mary River cod (Endangered)	High potential to occur	**Low risk of impact** Waterways avoided and therefore no likely impacts. Tinana Creek and its associated tributaries will be avoided and there will be no impact to the riparian vegetation. Wind turbines will be sited away from low-lying areas and waterbodies. Upgrade to waterway crossings may be required on existing forestry access tracks. Provided there are no impacts to water quality, flows, aquatic and riparian habitat within the Project Area, impacts on the species are not expected.	**Unlikely to have a significant impact** The Project has been designed to avoid waterways and remnant riparian areas. The Project will not create waterway barriers or impoundments. Indirect impacts such as degradation in water quality will be mitigated by a project specific ESCP. The Project is unlikely to have a Significant Impact on Mary River Cod.
Nannoperca oxleyana Oxleyan Pygmy Perch (Endangered)	High potential to occur	**Low risk of impact** Waterways avoided and therefore no likely impacts. Turbine infrastructure will be sited away from low-lying areas and waterbodies. Upgrade to waterway crossings may be required on existing forestry access tracks. Provided there	**Unlikely to have a significant impact** The Project has been designed to avoid low-lying remnant pockets of wallum heath by siting infrastructure within the operational exotic pine plantations. Existing access tracks will be utilised within the Project Area (PLA). Any

		are no impacts to water quality, flows, aquatic and riparian habitat within the Project Area (PLA), impacts on the species are not expected.	upgrades to existing tracks or culverts in low-lying areas will be undertaken in accordance with approved EMPs to ensure impacts to water quality and potential habitat are mitigated. The Project will not change the hydrology of the existing waterways. Indirect impacts such as degradation in water quality will be mitigated by a project specific ESCP. The Project is unlikely to have a Significant Impact on Oxleyan pygmy perch.
Neoceratodus forsteri Australian lungfish (Vulnerable)	High potential to occur	**Low risk of impact** Waterways avoided and therefore no likely impacts. Tinana Creek and its tributaries will be a**v**oided and will not be impacted. Turbine infrastructure will be sited away from low-lying areas and waterbodies. Upgrade to waterway crossings may be required on existing forestry access tracks. Provided there are no impacts to water quality, flows, aquatic and riparian habitat within the Project Area (PLA), impacts on the species are not expected.	**Unlikely to have a significant impact** The Project has been designed to avoid waterways and remnant riparian areas. The Project will not create waterway barriers or impoundments. Indirect impacts such as degradation in water quality will be mitigated by project specific ESCP. The Project is unlikely to have a Significant Impact on Australian lungfish.
Pseudomugil mellis Honey Blue Eye (Vulnerable)	Moderate potential to occur	**Low risk of impact** Waterways avoided and therefore no likely impacts. Turbine infrastructure will be sited away from low-lying areas and waterbodies. Upgrade to waterway crossings may be required on existing forestry access tracks. Provided there are no impacts to water quality, flows, aquatic and riparian habitat within the Project Area (PLA), impacts on the species are not expected.	**Unlikely to have a significant impact** The Project has been designed to avoid low-lying remnant pockets of wallum heath by siting infrastructure within the operational exotic pine plantations. Existing access tracks will be utilised within the Project Area (PLA). Any upgrades to existing tracks or culverts in low-lying areas will be undertaken in accordance with approved EMPs to ensure impacts to water quality and potential habitat are mitigated. The Project will not change the hydrology of the existing waterways and low-lying remnant areas. Indirect impacts such as degradation in water quality will be mitigated by the project specific ESCP. The Project is unlikely to have a Significant Impact on honey blue-eye.
Birds			
Hirundapus caudacutus White-throated Needletail (Vulnerable, Migratory Terrestrial	Known to occur	**Low risk of impact** Surveys demonstrated the occurrence and abundance of this species across the Project Area (PLA) is highly variable. The two survey	**Unlikely to have a significant impact** Given their widespread distribution (when in Australia during the Summer months), lack of resting habitat within the Project Area (PLA), turbine

Species, Listed Marine Species)		occasions when they were recorded in flocks greater than 100 were on days associated with local bushfires or stormfronts.	collision avoidance behaviour and highly variable occurrence and abundance across the Project Area (PLA), the Project is considered unlikely to have a Significant Impact on the White-throated Needletail.
Rostratula australis Australian painted snipe (Endangered, Listed Marine Species, Migratory Wetland Species)	Moderate potential to occur	**Low risk of impact** Low risk of collision due to specific habitat preferences low numbers moving through Project Area (PLA).	**Unlikely to have a significant impact** Given one (1) previous record 13 years ago and avoidance of potential low-lying habitat, the Project is unlikely to have a Significant Impact on Australian painted snipe.
Flora			
Acacia attenuate (Vulnerable)	High potential to occur	**Low risk of impact** Remnant areas avoided and therefore no likely impacts.	**Unlikely to have a significant impact** The Project has been designed to avoid low-lying remnant pockets of wet heathland or heathland margins, open forest and woodland communities by siting infrastructure within the operational exotic pine plantations. Existing access tracks will be utilised within the Project Area (PLA). Any upgrades to existing tracks or culverts in low-lying areas will be undertaken in accordance with approved EMPs to ensure impacts to these areas are mitigated. Pre-clearance surveys will be undertaken prior to any track widening or clearing along roadsides or within pine plantation areas to determine if *Acacia attenuata* are present and if further avoidance measures are required. The Project is unlikely to have a Significant Impact on *Acacia attenuata*.
Macrozamia pauli-guilielmi Pineapple Zamia (Endangered)	Known to occur	**Low risk of impact** Individuals of pineapple zamia are known to occur within the Project Area (PLA). They occur in remnant and non-remnant areas. They are likely part of a highly fragmented metapopulation known to occur within Tuan State Forest (both within the pine plantations and remnant areas). The population of this larger population is estimated at 6,774 individuals within Tuan State Forest (Forest 915). Given the avoidance measures proposed, the Project is unlikely to have a significant impact on pineapple zamia and is more likely to introduce further protection measures for the	**Unlikely to have a significant impact** The Project has been designed to avoid known populations of pineapple zamia in the Project Area (PLA). Additional individual pineapple zamia are known to occur within the Project Area (PLA). They occur in remnant and non-remnant areas. They are likely part of a highly fragmented metapopulation known to occur within Tuan State Forest (both within the pine plantations and remnant areas). The population of this larger population is estimated at 6,774 individuals within Tuan State Forest (Forest 915). Given the avoidance measures proposed, the Project is unlikely

		individuals within the pine plantations than they currently have (National Mulit-species Recovery Plan for the cycads, 2007).	to have a significant impact on pineapple zamia and is more likely to introduce further protection measures for the individuals within the pine plantations which are considered more at threat due to land tenure.
Phaius australis Lesser swamp orchid (Endangered)	Moderate potential to occur	**Low risk of impact** No previous records. Remnant areas avoided and therefore no likely impacts	**Unlikely to have a significant impact** The Project has been designed to avoid low-lying remnant pockets of wet heathland or heathland margins by siting infrastructure within the operational exotic pine plantations. Existing access tracks will be utilised within the Project Area (PLA). Any upgrades to existing tracks or culverts in low-lying areas will be undertaken in accordance with approved EMPs to ensure impacts to these areas are mitigated. Pre-clearance surveys will be undertaken prior to any culvert upgrades to determine if *Phaius australis* are present and if further avoidance measures are required. The Project is unlikely to have a Significant Impact on *Phaius australis.*

2.5 Is the proposed action likely to have ANY direct or indirect impact on the members of any listed migratory species, or their habitat?

Yes

2.5.1 Impact table

Table 7 Impact table

Species	Impact
Migratory Marine	
Anous stolidus Common Noddy (Migratory Marine, Listed Marine)	In Australia, the Common Noddy occurs mainly in ocean off the Queensland coast, but the species also occurs off the north-west and central Western Australia coast. During the breeding season, the Common Noddy usually occurs on or near islands, on rocky islets and stacks with precipitous cliffs, or on shoals or cays of coral or sand (DoE, 2019). **Low potential to occur** Low potential to occur within study area due to specific habitat requirements. **Low risk of impact** No previous records and no suitable habitat in the Project Area (PLA).
Apus pacificus Fork-tailed swift (Listed Marine, Migratory Marine)	Summer migrant (October – April). Occurs in low to very high airspace over variety of habitats including rainforest and semi-arid areas. Known to be most active in front of summer storm fronts (Morcombe, 2003). **Known to occur** Identified during bird utilisation surveys. **Low risk of impact** Surveys demonstrated the occurrence and abundance of this species across the Project Area (PLA) is highly variable. FTS were recorded in their highest numbers (up to 51 individuals) on 29 November 2018 which was associated with severe local bushfires. Although the risk assessment identified this species as at high risk of

Species	Impact
	collision (due to being aerial insectivores and flying within rotor swept area (RSA), FTS were observed in numbers less than the ecologically significant proportion of the population and are considered at low risk of impact.
Migratory Terrestrial	
Cuculus optatus Oriental cuckoo (Migratory Terrestrial)	Vegetated habitats such as monsoon rainforest, wet sclerophyll forest, open woodlands and appears quite often along edges of forests, or ecotones between forest types. This cuckoo feeds arboreally, foraging for invertebrates on loose bark on the trunks and branches of trees, and among the foliage, including in mistletoes. It will forage from the ground but requires shrubs or trees from which it sallies and returns to consume prey items. Appendix A: Supporting information for each of the 14 migratory listed birds (draft guidelines). **Moderate potential to occur** No previous records although suitable habitat exists in the adjacent National Park and remnant vegetation patches. **Low risk of impact** No previous records. Potential suitable habitat in the Project Area (PLA) is along Tinana Creek where there is lowland rainforest and the ecotones between the rainforest and adjacent remnant woodlands. These areas are avoided and therefore there are no likely impacts.
Hirundapus caudacutus White-throated Needletail (Vulnerable, Migratory Terrestrial)	Summer migrant (October – April). Occurs in high open spaces above wide range of habitats, such as oceans, ranges and headlands (Morcombe, 2003). The White-throated Needletail is widespread in eastern and south-eastern Australia. In eastern Australia, it is recorded in all coastal regions of Queensland and NSW, extending inland to the western slopes of the Great Divide and occasionally onto the adjacent inland plains (DoE, 2019) There are no published estimates of the extent of occurrence of the White-throated Needletail in Australia, although the species occurs at numerous and widespread sites in eastern Australia (DoE, 2019) In Australia, the White-throated Needletail is almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground (DoE, 2019). They often forage in areas of updraughts, such as ridges, cliffs or sand-dunes, or in the smoke of bushfires, or in whirlwinds. They often forage along the edges of low-pressure systems, which both lift their food sources and assist with their flight, and it is said that they follow these systems across Australia (DoE, 2019). **Known to occur** Identified during bird utilisation surveys in Project Area (PLA). **Low risk of impact** Surveys demonstrated the occurrence and abundance of this species across the Project Area (PLA) is highly variable. An ecologically significant proportion of the WTN population is 100 individuals (international proportion) or 10 individuals (national proportion). The two survey occasions when they were recorded in flocks greater than 100 were on days associated with local bushfires or stormfronts. On **five** survey occasions they were recorded in flocks greater than 10 (and less than 100). WTN are aerial insectivores (aerial pursuit of prey) and are known to fly within the RSA. The risk assessment would therefore put this species in the high risk of collision category. However, a study by Hull (2013) reported WTN are not classified as having a high risk of collision due to their avoidance behaviour. Given their widespread distribution (when in Australia during the Summer months), lack of resting habitat within the Project Area (PLA), turbine collision avoidance behaviour and highly variable occurrence and abundance across the Project Area (PLA), the project is considered unlikely to have a Significant Impact.
Monarcha melanopsis Black-faced monarch (Listed Marine, Migratory Terrestrial)	Found in rainforests, eucalypt woodlands, coastal scrub and damp gullies. It may be found in more open woodland when migrating into the south-east during summer (Morcombe, 2003). **High potential to occur** Previous records (1) in Wind Turbine Search Area. Wildnet, 2005. Suitable habitat exists in remnant vegetation patches. **Low risk of impact**

Species	Impact
	Infrequent collision based on low numbers moving through the study area and low flight behaviour**,** therefore low risk of impact.
Monarcha trivirgatus (syn. Symposiachrus trivirgatus) Spectacled Monarch (Listed Marine, Migratory Terrestrial)	Resident of NE Queensland and migrates to SE Queensland. Found mainly in rainforests but also can be found in mangroves, swamps and watercourse thickets. (Morcombe, 2003). **Known to occur** Previous records (7) in Wind Turbine Search Area. Wildnet, 2007. Suitable habitat exists in remnant vegetation patches. wo (2) individuals observed within the lowland rainforest along Tinana Creek (below the canopy). Suitable habitat exists in remnant vegetation patches. **Low risk of impact** Infrequent collision based on low numbers moving through the Project Area (PLA) and low flight behaviour, therefore low risk of impact.
Myiagra cyanoleuca Satin Flycatcher (Migratory Terrestrial)	Satin Flycatchers are eucalypt forest and woodland inhabitants. They are particularly common in tall wet sclerophyll forest, often in gullies or along water courses. In woodlands they prefer open, grassy woodland. The diversity of occupied habitats expands during migration, with the species recorded in most wooded habitats. *Appendix A: Supporting information for each of the 14 migratory listed birds (draft guidelines).* **High potential to occur** Previous records (1) in Wind Turbine Search Area. Wildnet, 1974. Suitable habitat exists in remnant vegetation patches. **Low risk of impact** Infrequent collision based on low numbers moving through the study area and low flight behaviour, therefore low risk of impact.
Rhipidura rufifrons Rufous Fantail (Listed Marine, Migratory Terrestrial)	Found in rainforest, dense wet eucalypt and monsoon forest, swamps, riverside vegetation. Found in open country on migration (Morcombe, 2003). **High potential to occur** Previous records (8) in Wind Turbine Search Area. Wildnet, 2007. Suitable habitat exists in remnant vegetation patches. **Low risk of impact** Infrequent collision based on low numbers moving through the study area and low flight behaviour, therefore low risk of impact.
Actitis hypoleucos Common Sandpiper (Migratory Wetland)	The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. The Common Sandpiper has been recorded in estuaries and deltas of streams, as well as on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties. The muddy margins utilised by the species are often narrow and may be steep. The species is often associated with mangroves, and sometimes found in areas of mud littered with rocks or snags (DoE, 2019). **Low potential to occur** Possible habitat exists in Great Sandy Strait although it is not considered an internationally important site for this species. **Low risk of impact** No suitable habitat within the Project Area.
Arenaria interpres Ruddy Turnstone (Listed Migratory, Listed Marine)	The Ruddy Turnstone is widespread within Australia during its non-breeding period of the year. It strongly prefers rocky shores or beaches where there are large deposits of rotting seaweed (DoE, 2019). **Low potential to occur** Possible habitat exists in Great Sandy Strait although it is not considered an internationally important site for this species. **Low risk of impact** No suitable habitat within the Project Area.
Calidris acuminata Sharp-tailed Sandpiper	In Queensland, they are recorded in most regions, being widespread along much of the coast and are very sparsely scattered inland. prefers muddy edges of shallow

Species	Impact
(Migratory Wetland, Listed Marine)	fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation (DoE, 2019). **Low potential to occur** Possible habitat exists in Great Sandy Strait although it is not considered an internationally important site for this species. **Low risk of impact** No suitable habitat within the Project Area.
Calidris alba Sanderling (Migratory Wetland, Listed Marine)	Almost always found on the coast, mostly on open sandy beaches exposed to open sea-swell, and also on exposed sandbars and spits, and shingle banks, where they forage in the wave-wash zone and amongst rotting seaweed. They are occasional in the Gulf of Carpentaria and Torres Strait. Scattered records occur in mid-east and south-east Queensland from Townsville and Alva Beach, south to Fraser Island, and around Moreton Bay and Point Danger, including on offshore islands. (DoE, 2019). **Low potential to occur** Possible habitat exists in Great Sandy Strait although it is not considered an internationally important site for this species. **Low risk of impact** No suitable habitat within the Project Area.
Calidris canutus Red Knot, Knot (Migratory, Listed Marine, Endangered, Migratory Wetland)	Found in flocks on large, sheltered intertidal sand and mudflats during the austral summer. Feed on bivalves, crustaceans and other invertebrates at the receding tide. Rarely encountered inland. Northern Arnhem Land coast is important land during the non-breeding season (Garnett, S.T., Szabo, J.K., and Dutson, 2011). **Low potential to occur** One (1) previous record from the Great Sandy National Park (Wildlife Online). Low potential to occur within study area due to specific habitat requirements. **Low risk of impact** No suitable habitat within the Project Area.
Calidris ferruginea Curlew sandpiper (Critically Endangered, Listed Migratory, Listed Marine)	Mainly occur in both fresh and brackish waters on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms but are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand (Higgins & Davies, 1996). Curlew Sandpipers forage on mudflats and nearby shallow water and generally roost on bare dry shingle, shell or sand beaches, sandspits and islets in or around coastal or near-coastal lagoons and other wetlands, occasionally roosting in dunes during very high tides and sometimes in saltmarsh (Higgins & Davies, 1996). **Low potential to occur.** No previous records and no suitable habitat within the wind turbine search area. **Low risk of impact** No suitable habitat within the Project Area.
Calidris melanotos Pectoral sandpiper (Migratory Wetland, Listed Marine)	In Queensland, most records for the Pectoral Sandpiper occur around Cairns. prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands (DoE, 2019). **Low potential to occur** Possible habitat exists in Great Sandy Strait although it is not considered an internationally important site for this species. **Low risk of impact** No suitable habitat within the Project Area.
Calidris ruficollis Red-necked Stint (Listed Migratory, Listed Marine)	Mostly found in coastal areas, including in sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks and, sometimes, on protected sandy or coralline shores. Occasionally they have been recorded on exposed or ocean beaches, and sometimes on stony or rocky shores, reefs or shoals (DoE). **Low potential to occur**

Species	Impact
	Possible habitat exists in Great Sandy Strait although it is not considered an internationally important site for this species. **Low risk of impact** No suitable habitat within the Project Area.
Calidris subminuta Long-toed Stint (Listed Migratory, Listed Marine)	Regular summer visitor to Australia, but uncommon in the east. In Queensland the Long-toed Stint has been recorded at Mount Isa, Lytton, Cairns, Dynevor Downs. Prefer shallow freshwater or brackish wetlands including lakes, swamps, river floodplains, streams, lagoons and sewage ponds (DoE, 2019). **Low potential to occur** No suitable habitat within the Project Area. **Low risk of impact** No suitable habitat within the Project Area.
Calidris tenuirostris Great Knot (Migratory, Listed Marine, Critically Endangered)	Inhabit the same habitat as Red Knot, and are often found in flocks with, the Red Knot (see above) (Garnett, S.T., Szabo, J.K., and Dutson, 2011). **Low potential to occur** Low potential to occur within study area due to specific habitat requirements. 1 previous record in Great Sandy National Park (Wildlife Online). **Low risk of impact** No suitable habitat within the Project Area.
Charadrius bicinctus Double-banded Plover (Migratory Wetland, Listed Marine)	Found on littoral, estuarine and fresh or saline terrestrial wetlands and also saltmarsh, grasslands and pasture. It occurs on muddy, sandy, shingled or sometimes rocky beaches, bays and inlets, harbours and margins of fresh or saline terrestrial wetlands such as lakes, lagoons and swamps, shallow estuaries and rivers. (DoE, 2019). **Low potential to occur** Possible habitat exists in Great Sandy Strait although it is not considered an internationally important site for this species. **Low risk of impact** No suitable habitat within the Project Area.
Charadrius leschenaultii Greater Sand Plover (Migratory, Listed Marine, Vulnerable)	Only seen in Australia from July-December, with an influx of individuals into the Top End of the NT during October. Inhabit littoral and estuarine habitats, mainly on sheltered beaches with large sand or mudflats, though observations have been made in estuary lagoons, inshore reefs, small rocky islands and sand cays on coral reefs. Occasionally sighted on near-coastal salt lakes and brackish swamps. Roosting generally takes place on sand-spits and banks on beaches or in tidal lagoons, higher up the beach than other waders (can be well above the high tide mark) (Department of the Environment, 2016a). **Low potential to occur** No previous records and no suitable habitat within the Project Area (PLA). Low potential to occur within the Project Area (PLA) due to specific habitat requirements. **Low risk of impact** No suitable habitat within the Project Area.
Charadrius mongolus Lesser Sand Plover (Migratory, Listed Marine)	Recorded along most of the coastline of the NT, in particular the North Arnhem coast, Mud Blue Bay, coast between Anson Bay and Murgenella creek and the Port McArthur area (Chatto, 2003). Inhabits mud and sandflats in sheltered bays, estuaries, harbours, and occasionally rocky outcrops, sandy beaches and coral reefs. Roosting occurs near foraging areas (Department of the Environment, 2019). Migratory shorebird of the EAA. Seven important non-breeding sites in Australia; one being the Great Sandy Strait. **Low potential to occur** No previous records and no suitable habitat within the Project Area (PLA). **Low risk of impact** No suitable habitat within the Project Area.
Gallinago hardwickii Latham's Snipe	In Australia, Latham's Snipe occurs in permanent and ephemeral wetlands up to 2000 m above sea-level. They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies) (DoE, 2019).

Species	Impact
(Migratory Wetland, Listed Marine)	**Low potential to occur.** No previous records and no suitable habitat within the search area. **Low risk of impact** No suitable habitat within the Project Area.
Limosa lapponica Bar-tailed Godwit (Migratory Wetland, Listed Marine)	Found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh (DoE, 2019). The Great Sandy Strait is Site of International Importance (DoE, 2019). **Low potential to occur in Project Area (PLA)** **Known to occur in the Great Sandy Strait** as a summer migrant (nonbreeding). **Low risk of impact** Unlikely to be at risk of rotor strike due to specific habitat requirements that restrict the species distribution to intertidal areas.
Limosa limosa Black-tailed Godwit (Migratory Wetland, Listed Marine)	Found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh. The Great Sandy Strait is Site of International Importance (DoE, 2019) **Low potential to occur in Project Area (PLA)** **Known to occur in the Great Sandy Strait** as a summer migrant (nonbreeding). **Low risk of impact** Unlikely to be at risk of rotor strike due to specific habitat requirements that restrict the species distribution to intertidal areas.
Numenius madagascariensis Eastern Curlew (Critically Endangered, Listed Migratory, Listed Marine)	Associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sand flats (Morcombe, 2003). Migratory shorebird of the EAA. Non-breeding period in Australia (Bamford et al, 2008). **Known to occur in the Great Sandy Strait** as a summer migrant (nonbreeding). **Low risk of impact** Unlikely to be at risk of rotor strike due to specific habitat requirements that restrict the species distribution to intertidal areas.
Numenius phaeopus Whimbrel (Listed Migratory, Listed Marine)	Often found in mudflats of estuaries, particularly those with mangroves. Occasionally found on sandy or rocky beaches, on coral or rocky islets, or on intertidal reefs and platforms (Department of the Environment, 2015n). Migratory shorebird of the EAA. Non-breeding period in Australia (Bamford et al, 2008). **Low potential to occur in Project Area (PLA)** **Known to occur in the Great Sandy Strait** as a summer migrant (nonbreeding). **Low risk of impact** Unlikely to be at risk of rotor strike due to specific habitat requirements that restrict the species distribution to intertidal areas.
Pandion haliaetus (Syn. P. cristatus) Eastern osprey (Listed Migratory, Listed Marine)	Eastern ospreys occur in littoral and coastal habitats and terrestrial wetlands, and occasionally travel inland along major rivers. They require extensive areas of open fresh, brackish or saline water for foraging. (Department of the Environment, 2019) **Low potential to occur** No previous records and no suitable breeding or foraging habitat exists within the study area. **Low risk of impact** No suitable habitat within the Project Area.
Pluvialis fulva Pacific Golden Plover (Migratory Wetland, Listed Marine)	Usually inhabits coastal habitats, though it occasionally occurs around inland wetlands. Pacific Golden Plovers usually occur on beaches, mudflats and sandflats (sometimes in vegetation such as mangroves, low saltmarsh such as *Sarcocornia*, or beds of seagrass) in sheltered areas including harbours, estuaries and lagoons, and also in evaporation ponds in saltworks. Moreton Bay is a Site of International Importance for this species. **Low potential to occur** Possible habitat exists in Great Sandy Strait although it is not considered an internationally important site for this species.

Species	Impact
	Low risk of impact No suitable habitat within the Project Area.
Pluvialis squatarola Grey Plover (Migratory Wetland, Listed Marine)	Usually forage on large areas of exposed mudflats and beaches of sheltered coastal shores such as inlets, estuaries and lagoons. They also occasionally feed in pasture and at the muddy margins of inland wetlands such as lakes, swamps and bores. Great Sandy Strait is Site of International Importance (DoE, 2019) **Low potential to occur in Project Area (PLA)** **Known to occur in the Great Sandy Strait** as a summer migrant (nonbreeding). **Low risk of impact** Unlikely to be at risk of rotor strike due to specific habitat requirements that restrict the species distribution to intertidal areas
Tringa brevipes Grey-tailed tattler (also named *Heteroscelus brevipes* in the PMST) (Migratory, Marine)	Within Australia, the Grey-tailed Tattler has a primarily northern coastal distribution and is found in most coastal regions. In Queensland it is found along the entire coast, with small numbers located in the Gulf of Carpentaria. The Grey-tailed Tattler is often found on sheltered coasts with reefs and rock platforms or with intertidal mudflats. It can also be found at intertidal rocky, coral or stony reefs as well as platforms and islets that are exposed at low tide. It has been found around shores of rock, shingle, gravel or shells and also on intertidal mudflats in embayments, estuaries and coastal lagoons, especially fringed with mangroves (Department of the Environment, 2016d). Migratory shorebird of the EAA. The Great Sandy Strait is an important nonbreeding site in Australia (Bamford et al., 2008). **Low potential to occur in Project Area (PLA)** **Known to occur in the Great Sandy Strait** as a summer migrant (nonbreeding). **Low risk of impact** Unlikely to be at risk of rotor strike due to specific habitat requirements that restrict the species distribution to intertidal areas.
Tringa nebularia Common greenshank (Migratory Wetland, Listed Marine)	It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. Habitats include embayments, harbours, river estuaries, deltas and lagoons and are recorded less often in round tidal pools, rock-flats and rock platforms (Department of the Environment, 2015s). Migratory shorebird of the EAA. The Great Sandy Strait is an important nonbreeding site in Australia (Bamford et al., 2008). **Low potential to occur in Project Area (PLA)** **Known to occur in the Great Sandy Strait** as a summer migrant (nonbreeding). **Low risk of impact** Unlikely to be at risk of rotor strike due to specific habitat requirements that restrict the species distribution to intertidal areas.
Tringa stagnatilis Marsh Sandpiper (Migratory Wetland, Listed Marine)	Lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, saltpans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks (DoE, 2019). **Low potential to occur** Possible habitat exists in Great Sandy Strait although it is not considered an internationally important site for this species. **Low risk of impact** No suitable habitat within the Project Area.
Xenus cinereus Terek Sandpiper (Listed Migratory, Listed Marine)	Forages mostly in the open, on soft wet intertidal mudflats or in sheltered estuaries, embayments, harbours or lagoons. The species has also been recorded on islets, mudbanks, sandbanks and spits, and near mangroves and occasionally in samphire (*Halosarcia* spp.). Birds are seldom near the edge of water, however, birds may wade into the water (Department of the Environment, 2019). There appears to be two waves of migration down the eastern coast: one in August or September and one in November (Department of the Environment, 2019). Widespread in coastal Queensland, from south-east of the Gulf of Carpentaria, north to Torres Strait and along the eastern coast to south-east Australia. Migratory shorebird of the EAA. The Great Sandy Strait is an important nonbreeding site in Australia (Bamford et al., 2008).

Species	Impact
	Low potential to occur in Project Area (PLA) **Known to occur in the Great Sandy Strait** as a summer migrant (nonbreeding). **Low risk of impact** Unlikely to be at risk of rotor strike due to specific habitat requirements that restrict the species distribution to intertidal areas.
Listed Marine (if not listed above)	
Anseranas semipalmata Magpie Goose (Listed Marine)	Wetland Species. More common north of Rockhampton. **Moderate potential to occur.** Possible flyover although unlikely due to lack of suitable freshwater wetland habitat. None observed during surveys. **Low risk of impact** Infrequent collision based on low numbers moving through the study area and therefore low risk of impact.
Ardea alba (Syn. A. modesta) Great Egret, White Egret (Listed Marine, Migratory Wetland)	Widespread in Australia. Recorded in a wide range of wetland habitats including flooded pastures, dams, estuarine mudflats, mangroves and reefs and usually frequents shallow water. (Department of the Environment, 2015b; Morcombe, 2003). **Moderate potential to occur.** No previous records. None observed during surveys. **Low risk of impact** Infrequent collision based on low numbers moving through the study area and therefore low risk of impact.
Ardea ibis Cattle egret (Syn. Bubulcus ibis) (Listed Marine, Migratory Wetland)	Occurs in moist pastures with tall grass, shallow open wetlands and margins and also mudflats (Morcombe, 2003). **Moderate potential to occur.** No previous records. None observed during surveys. **Low risk of impact** Infrequent collision based on low numbers moving through the study area and therefore low risk of impact.
Charadrius ruficapillus Red-capped Plover (Listed Marine)	Most common and widespread of Australia's beach-nesting shorebirds. Usually inhabit wide, bare sandflats or mudflats at the margins of saline, brackish or freshwater wetlands where they forage by using their characteristic 'stop-run-peck' method, taking small invertebrates from the surface (Birdlife Australia, 2019). **Low potential to occur in Project Area (PLA), known to occur in the Great Sandy Strait** **Low risk of impact** Unlikely to be at risk of rotor strike due to specific habitat requirements that restrict the species distribution to intertidal areas.
Haliaeetus leucogaster White-bellied sea-eagle (Listed Marine)	White-bellied sea-eagle (WBSE) occur in predominantly coastal areas although also occurs far inland on large pools of rivers. Mostly over islands, reefs, headlands, beaches and estuaries. Known to occur on seasonally inundated swamps, lagoons and floodplains (Morcombe, 2003). **Moderate potential to occur** No roosting habitat observed in the study area although would roost in the adjacent National Park. Possible fly-over species due to large home ranges although bird utilisation data collected by Biosis Research at a variety of wind farms and observations made during numerous assessments for other purposes, indicates that WBSE residing in coastal locations are almost entirely confined to a narrow zone and are rarely sighted more than 500 metres inland (Cumulative Impacts to White-bellied Sea-eagles, Biosis, 2005). Avoidance rates of WBSE have been observed and also modelled on other wind farms in Australia. White-bellied sea-eagle (WBSE) display 99% avoidance rates (Smales, 2005). Cumulative impact assessments of the impact of wind farms within Australia on WBSE (within the Australian WBSE range) have modelled a mortality rate of 0.9 individuals/year across approximately 50 wind farms (built and proposed) (Cumulative Impacts to White-bellied Sea-eagles, Biosis, 2005). **Low risk of impact**

Species	Impact
	Infrequent collision due to low numbers moving through Project Area (PLA), avoidance behaviour and preferred foraging habitat along the coastline, therefore low risk of impact.
Himantopus himantopus Black-winged Stilt (Listed Marine)	Usually forage by wading in water up to belly deep, but also feed along the muddy margins of wetlands, regularly forming large, noisy feeding flocks, often in association with Banded Stilts and Red-necked Avocets (Birdlife Australia, 2019). **Low potential to occur in Project Area (PLA), known to occur in the Great Sandy Strait** **Low risk of impact** Unlikely to be at risk of rotor strike due to specific habitat requirements that restrict the species distribution to intertidal areas. Observed at Poona during bird utilisation surveys (Oct 2018).
Merops ornatus Rainbow bee-eater (Listed Marine)	Summer migrant (September – April) although in northern Australia they remain and breed. Occurs in open woodlands, semi-arid scrub, grasslands, clearing in heavier forests, farmlands and coastal areas. Avoids heavy forests due to hindrance to feeding (i.e. Catching insects) (Morcombe, 2003). **Known to occur** Observed during bird utilisation surveys. **Low risk of impact** Considered at moderate risk of collision due to being aerial insectivores, although all observations during BUS were below RSA height. Widespread and occur in a wide variety of habitats and considered at low risk of impact.
Recurvirostra novaehollandiae Red-necked Avocet (Listed Marine)	Feeds on aquatic insects and their larvae, crustaceans and seeds. It wades in shallow water, sweeping its bill back and forth just below the surface to catch prey. Found throughout mainland Australia but breeds mainly in the southwestern interior. Out of breeding season, it visits most of the rest of Australia (Birdlife Australia, 2019). **Low potential to occur in Project Area (PLA), likely to occur in the Great Sandy Strait** **Low risk of impact** Unlikely to be at risk of rotor strike due to specific habitat requirements that restrict the species distribution to intertidal areas.
Coracina tenuiostris Cicadabird (Listed Marine)	Occurs in the foliage canopy of diverse forests and woodlands as well as mangroves and paperbark swamps. A migratory visitor to south eastern Australia (Morcombe, 2003). **Known to occur** Observed on one occasion during bird utilisation surveys. **Low risk of impact** Infrequent collision based on low numbers moving through the study area and low flight behaviour, therefore considered at low risk of impact.
Reptiles	
Crocodylus porosus Estuarine Crocodile	Crocodile known to occur in the Great Sandy Straits. **Low potential to occur** No suitable habitat within Study Area. **Low risk of impact** Not in Project Area.

2.5.2 Do you consider this impact to be significant?

Shorebirds (waders) inhabit intertidal areas and/or freshwater wetlands. Thirty-four (34) shorebirds are migratory and breed in northern China, Mongolia, Siberia and Alaska birds and Russia and migrate to non-breeding grounds in Australia along the East Asian – Australasian (EAA) flyway. Migratory shorebirds were assessed for their susceptibility to collision-based impacts considering their arrival and departure from the Great Sandy Straits over the Summer months. The risk of impact is low or unlikely and is provided in Section 2.3.1 of the Significant Impact Assessment Report in Appendix A.6.

The Great Sandy Strait is considered an internationally important site for seven (7) migratory species (terek sandpiper (*Xenus cinereus*), grey-tailed tattler (*Tringa brevipes*), common greenshank (*Tringa nebularia*), bar-tailed godwit (*Limosa lapponica baueri* and *Limosa lapponica menzbieri*), lesser sand plover (*Charadrius mongolus*), whimbrel (*Numenius phaeopus*), far eastern curlew (*Numenius madagascariensis*)) (Bamford M, Watkins D, Bancroft W, 2008). The table below provides an assessment of those seven (7) species and other migratory birds with a moderate or high potential to occur or are known to occur in the Project Area (PLA).

Table 8 Significance of impact

Species	Likelihood of occurrence	Risk of impact	Significance of impact
Internationally recognised Migratory Shorebirds			
Xenus cinereus Terek sandpiper (Listed Migratory, Listed Marine)	**Unlikely in the Project Area (PLA).** Known to occur in the Great Sandy Strait as a Summer migrant.	**Low risk of impact** Unlikely to be at risk of rotor strike due to specific habitat requirements that restrict the species distribution to intertidal areas.	**Unlikely to have a Significant Impact.** No migratory shorebirds have been observed during the Summer migratory periods. The Project is set-back a minimum 4km from the Great Sandy Strait. The Project is considered unlikely to substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species. The Project Area (PLA) is not considered an area of important habitat for migratory shorebirds as it is within a highly fragmented and actively managed pine plantation. The Project is not expected to result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species. There are no ecologically significant proportions of a migratory species population within the Project Area (PLA). The Project is considered unlikely to seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.
Tringa brevipes Grey-tailed tattler (also named *Heteroscelus brevipes* in the PMST) (Migratory, Marine)	**Unlikely in the Project Area (PLA).** Known to occur in the Great Sandy Strait as a Summer migrant.	**Low risk of impact** Unlikely to be at risk of rotor strike due to specific habitat requirements that restrict the species distribution to intertidal areas	
Tringa nebularia Common greenshank (Migratory Wetland, Listed Marine)	**Unlikely in the Project Area (PLA).** Known to occur in the Great Sandy Strait as a Summer migrant.	**Low risk of impact** Unlikely to be at risk of rotor strike due to specific habitat requirements that restrict the species distribution to intertidal areas	
Limosa lapponica baueri and *Limosa lapponica menzbieri* Bar-tailed godwit (Migratory, Marine, Vulnerable)	**Unlikely in the Project Area (PLA).** Known to occur in the Great Sandy Strait as a Summer migrant.	**Low risk of impact** Low risk of impact due to specific habitat preferences. No habitat west of Project Area (PLA) so short flights unlikely to occur.	
Charadrius mongolus Lesser sand plover (Migratory, Listed Marine)	**Unlikely in the Project Area (PLA).** Known to occur in the Great Sandy Strait as a Summer migrant.	**Low risk of impact** Low risk of impact due to specific habitat requirements that restrict the species to intertidal areas. No records during bird surveys.	
Numenius phaeopus Whimbrel (Listed Migratory, Listed Marine)	**Unlikely in the Project Area (PLA).**	**Low risk of impact** Unlikely to be at risk of rotor strike due to specific habitat requirements that	

	Known to occur in the Great Sandy Strait as a Summer migrant.	restrict the species distribution to intertidal areas	
Numenius madagascariensis Eastern curlew (Listed Migratory, Listed Marine, Critically Endangered)	**Unlikely in the Project Area (PLA).** Known to occur in the Great Sandy Strait as a Summer migrant.	**Low risk of impact** Unlikely to be at risk of rotor strike due to specific habitat requirements that restrict the species distribution to intertidal areas	
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift (FTS) (Migratory Marine, Listed Marine)	**Known to occur**	**Low risk of impact** Surveys demonstrated the occurrence and abundance of this species across the Project Area (PLA) is highly variable. FTS were recorded in their highest numbers (up to 51 individuals) on 29 November 2018 which was associated with severe local bushfires. Although the risk assessment identified this species as at high risk of collision (due to being aerial insectivores and flying within rotor swept area (RSA), FTS were observed in numbers less than the ecologically significant proportion of the population and are considered at low risk of impact.	**Unlikely to have a Significant Impact.** Most of the Project Area (PLA) is a highly modified environment consisting of pine plantations and is not considered important habitat for the migratory species known to occur or with a moderate potential to occur. The Project will not substantially modify, destroy or isolate an area of important habitat for a migratory species. The Project will not result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species. The Project will not seriously disrupt the lifecycle of an ecologically significant proportion of the population of a migratory species. The Project is considered unlikely to have a Significant Impact on FTS.
Migratory Terrestrial Species			
Hirundapus caudacutus White-throated Needletail (Vulnerable, Migratory Terrestrial)	**Known to occur** Identified during BUS in Project Area (PLA).	**Low risk of impact** Surveys demonstrated the occurrence and abundance of this species across the Project Area (PLA) is highly variable. The two survey occasions when they were recorded in flocks greater than 100 were on days associated with local bushfires or stormfronts.	**Unlikely to have a significant impact** Given their widespread distribution (when in Australia during the Summer months), lack of resting habitat within the Project Area (PLA), turbine collision avoidance behaviour and highly variable occurrence and abundance across the Project Area (PLA), the project is considered unlikely to have a Significant Impact on the White-throated Needletail.
Monarcha trivirgatus (syn. Symposiachrus trivirgatus Spectacled Monarch	**Known to occu**r Observed at Tinana Creek	**Low risk of impact** Infrequent collision based on low numbers moving through the study area and low flight	**Unlikely to have a significant impact** The Project is not expected to substantially modify (including

(Listed Marine, Migratory Terrestrial)		behaviour, therefore low risk of impact.	by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species. The Project is avoiding areas of remnant vegetation. Most of the Project Area (PLA) is a highly modified environment consisting of pine plantations. There are large tracks of remnant vegetation outside of the Project Area in contrast to the mosaic of remnant vegetation remaining within the Project Area. Remaining vegetation which might be utilised for resting, breeding or feeding habitat is avoided by siting most project infrastructure within the pine plantations.
Cuculus optatus Oriental cuckoo (Migratory Terrestrial)	**Moderate potential to occur** No previous records although suitable habitat exists in the adjacent National Park and remnant vegetation patches.	**Low risk of impact** **No previous records and n**o suitable habitat in the Project Area (PLA).	**Unlikely to have a Significant Impact** Most of the Project Area (PLA) is a highly modified environment consisting of pine plantations and is not considered important habitat for the migratory species known to occur or with a moderate potential to occur. The Project will not substantially modify, destroy or isolate an area of important habitat for a migratory species. The Project will not result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species. The Project will not seriously disrupt the lifecycle of an ecologically significant proportion of the population of a migratory species.
Monarcha melanopsis Black-faced monarch (Listed Marine, Migratory Terrestrial)	**High potential to occur** Previous records (1) in Project Area (PLA) Wildnet, 2005. Suitable habitat exists in remnant vegetation patches.	**Low risk of impact** Infrequent collision based on low numbers moving through the study area and low flight behaviour, therefore low risk of impact.	
Myiagra cyanoleuca Satin Flycatcher (Migratory Terrestrial)	**High potential to occur** Previous records (1) in Project Area (PLA) Wildnet, 1974. Suitable habitat exists in remnant vegetation patches. Refer risk assessment.	**Low risk of impact** Infrequent collision based on low numbers moving through the study area and low flight behaviour, therefore low risk of impact.	
Rhipidura rufifrons Rufous Fantail (Listed Marine, Migratory Terrestrial)	**High potential to occur** Previous records (8) in Project Area (PLA) Wildnet, 2007.	**Low risk of impact** Infrequent collision based on low numbers moving through the study area and low flight behaviour, therefore low risk of impact.	
Listed Marine			
Coracina tenuriostris Cicadabird	**Known to occur** Two (2) cicadabirds were observed at one	**Low risk of impact** Infrequent collision based on low numbers moving through the study area and low flight	**Unlikely to have a Significant Impact**

(Listed Marine)	location in 2016.	behaviour, therefore considered at low risk of impact.	Most of the Project Area (PLA) is a highly modified environment consisting of pine plantations and is not considered important habitat for the migratory species known to occur or with a moderate potential to occur. The Project will not substantially modify, destroy or isolate an area of important habitat for a migratory species. The Project will not result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species. The Project will not seriously disrupt the lifecycle of an ecologically significant proportion of the population of a migratory species.
Merops ornatus Rainbow bee-eater (Listed Marine)	**Known to occur** Observed during bird utilisation surveys.	**Low risk of impact** Considered at moderate risk of collision due to being aerial insectivores, although all observations during BUS were below RSA height. Widespread and occur in a wide variety of habitats and considered at low risk of impact.	**Unlikely to have a Significant Impact** Most of the Project Area (PLA) is a highly modified environment consisting of pine plantations and is not considered important habitat for the migratory species known to occur or with a moderate potential to occur. The Project will not substantially modify, destroy or isolate an area of important habitat for a migratory species. The Project will not result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species. The Project will not seriously disrupt the lifecycle of an ecologically significant proportion of the population of a migratory species.
Anseranas semipalmata Magpie Goose (Listed Marine)	**Moderate potential to occur.** Possible flyover although unlikely due to lack of suitable freshwater wetland habitat. None observed during surveys.	**Low risk of impact** Infrequent collision based on low numbers moving through the study area and therefore low risk of impact.	**Unlikely to have a Significant Impact** Most of the Project Area (PLA) is a highly modified environment consisting of pine plantations. There are large tracts of remnant vegetation outside of the Project Area in contrast to the mosaic of remnant vegetation remaining within the Project Area. Remaining vegetation which might be utilised for resting,

			breeding or feeding habitat is avoided by siting most project infrastructure within the pine plantations.
Ardea alba (Syn. A. modesta) Great Egret, White Egret (Listed Marine, Migratory Wetland)	**Moderate potential to occur.** No previous records. None observed during surveys.	**Low risk of impact** Infrequent collision based on low numbers moving through the study area and therefore low risk of impact.	**Unlikely to have a Significant Impact** Most of the Project Area (PLA) is a highly modified environment consisting of pine plantations. There are large tracts of remnant vegetation outside of the Project Area in contrast to the mosaic of remnant vegetation remaining within the Project Area. Remaining vegetation which might be utilised for resting, breeding or feeding habitat is avoided by siting most project infrastructure within the pine plantations.
Ardea ibis Cattle egret (Syn. Bubulcus ibis) (Listed Marine, Migratory Wetland)	**Moderate potential to occur.** No previous records. None observed during surveys.	**Low risk of impact** Infrequent collision based on low numbers moving through the study area and therefore low risk of impact.	**Unlikely to have a Significant Impact** Most of the Project Area (PLA) is a highly modified environment consisting of pine plantations. There are large tracks of remnant vegetation outside of the Project Area in contrast to the mosaic of remnant vegetation remaining within the Project Area. Remaining vegetation which might be utilised for resting, breeding or feeding habitat is avoided by siting most project infrastructure within the pine plantations.
Haliaeetus leucogaster White-bellied sea-eagle (Listed Marine)	**Moderate potential to occur** No roosting habitat observed in the study area although would roost in the adjacent National Park. Possible fly-over species due to large home ranges although bird utilisation data collected by Biosis.	**Low risk of impact** Infrequent collision due to low numbers moving through Project Area (PLA), avoidance behaviour and preferred foraging habitat along the coastline, therefore low risk of impact.	**Unlikely to have a Significant Impact** White-bellied sea-eagle occur along the Great Sandy Strait. No White-bellied sea-eagle have been recorded previously and recently within the Project Area (PLA). The White-bellied sea-eagle were subject to the Collision Risk Assessment and were considered at low risk of impact due to low numbers moving through the Project Area (PLA) and preferred foraging habitat along the coastline outside of the Project Area (PLA).

			The Project is considered unlikely to have a significant impact on White-bellied sea-eagle populations.

2.6 Is the proposed action to be undertaken in a marine environment (outside Commonwealth marine areas)?

No

2.7 Is the proposed action to be taken on or near Commonwealth land?

Yes, the Project lot boundary is located adjacent to the Wide Bay Training Area.

2.7.1 Is the proposed action likely to have any direct or indirect impact on the Commonwealth land?

The Project will not have a direct or indirect impact on Commonwealth land:

- There are dedicated site entrance points that are not within Commonwealth land
- Access within the Project Area (PLA) will be on existing forestry access tracks
- Vegetation clearing is limited to clearing pine for the construction and operations compounds, wind turbines, substations and other relevant infrastructure
- There will not be any impact to the NSF portion of the Project Area (PLA) as part of this Project.
- All stormwater will be treated on site. A Stormwater and Erosion and Sediment Control Management Strategy has been developed that outlines the proposed control and management measures and is provided in Appendix A.7.

2.8 Is the proposed action taking place in the Great Barrier Reef Marine Park?

No

2.9 Is the proposed action likely to have ANY direct or indirect impact on a water resource related to coal/gas/mining?

No

2.10 Is the proposed action a nuclear action?

No

2.11 Is the proposed action to be taken by the Commonwealth agency?

No

2.12 Is the proposed action to be undertaken in a Commonwealth Heritage Place Overseas?

No

2.13 Is the proposed action likely to have ANY direct or indirect impact on a water resource related to coal/gas/mining?

No

3. Description of the project area

Provide a description of the project area and the affected area, including information about the following features (where relevant to the project area and/or affected area, and to the extent not otherwise addressed in Section 2).

3.1 Describe the flora and fauna relevant to the project area

Flora

The Project is located within the Tuan, Toolara and Neerdie State Forests, which are highly modified landscapes of operational exotic pine plantations, mostly comprising a hybrid of *Pinus elliottii* (slash pine) and *Pinus caribaea* (caribbean pine). Remnant Eucalypt woodland and Melaleuca forest occurs throughout the plantation as a mosaic of small remnant patches. Often these are associated with waterways and drainage lines. Within these areas there are twenty-seven Regional Ecosystems (RE) as described in Section 3.5 of this Referral. There will be no clearing of REs for construction of the wind turbines or hardstand areas as they are all located within pine plantation areas. Clearing in riparian areas is expected to be negligible and limited to upgrades of existing waterway crossings.

An ecological assessment has been completed for the Project and is provided in Appendix A.3.

Flora and vegetation surveys were undertaken on:

- Project Area (PLA)
  - 2-3 April 2019 (in the NSF area)
  - 17-19 June 2019 (inclusive)
  - Opportunistic during fauna surveys

The surveys were undertaken to ground-truth mapped RE, identify flora species, including threatened flora. Surveys undertaken in Neerdie State Forest 2 involved meander surveys and 20 quaternary vegetation assessments. This involves collecting information on structure, canopy height, dominant and codominant canopy species, subdominant, associated species and additional notes such as presence of hollow bearing trees.

Forty-four quaternary sites were undertaken across the Project Area (PLA) in remnant RE patches. Refer to Figure 2 in the Ecological Assessment Report in Appendix A.3 for flora survey locations.

One flora species of conservation significance was identified in the Project Area (PLA), Pineapple Zamia (*Macrozamia pauli-guilielmi*) which is endangered under the EPBC Act. Plants were identified growing in remnant RE patches, while some were also recorded in the pine plantations.

Pineapple zamia was recorded in the Project Area (PLA) during surveys, mostly within remnant vegetation however they were also identified within the pine plantation.

- Area 1 - Remnant vegetation (2 adults) – area avoided by the Project
- Area 2 - Remnant vegetation (7 adults, 1 juvenile (10cm high)) – area avoided by the Project
- Area 3 - Remnant vegetation (2 adults) – area avoided by the Project
- Area 4 - Pine plantation (2 adults) – area avoided by the Project
- Area 5 - Native State Forest (up to 50 adults) – area avoided by the Project

The Plantation Licensee has also identified and delineated 34 populations of pineapple zamia within the Project Area (PLA) as part of their environmental stewardship. They have also mapped and identified areas of pineapple zamia outside of the Project Area (PLA) within the State Forests. These locations have been provided to FWH so project infrastructure can be sited to avoid impacts to known populations of pineapple zamia within the Project Area (PLA).

Fauna

Up to 82.6% of the site comprises exotic pine plantation and cleared tracks with the remaining 17.4% comprising a mosaic of native remnant vegetation which provides habitat for native species. These areas of native vegetation, which include riparian areas along waterways, will be largely avoided with all infrastructure sited within existing exotic pine plantations.

Not all the threatened species indicated through desktop information are expected to occur within the Project Area (PLA) due to the absence of suitable habitat for some species. Seven fauna species of conservation significance listed under the EPBC Act were identified during the surveys undertaken within the Project Area (PLA) as follows:

- White-throated needletail (*Hirundapus caudacutus*) – Vulnerable (V), Migratory Terrestrial (MT) and Listed Marine (LM) (EPBC Act)
- Fork-tailed swift (*Apus pacificus*) – MT (EPBC Act)
- Rainbow Bee Eater (*Merops ornatus*) **–** LM (EPBC Act)
- Cicadabird (*Coracina tenuirostris*) – LM (EPBC Act)
- Spectacled Monarch (*Monarcha trivirgatus (syn. Symposiachrus trivirgatus*) LM, MT (EPBC Act)
    - Observed at Tinana Creek
- Grey-headed Flying-fox (*Pteropus poliocephalus*) – Vulnerable (V) (EPBC Act)
    - Observed in the NSF portion of the Project Area (PLA)
- Koala (*Phascolarctos cinereus*) - V (EPBC Act)
    - Observed in the NSF portion of the Project Area (PLA)

Details of the surveys and the results are provided below.

<u>Birds</u>

Twenty-five bird survey locations were established, of which seven (7) are considered reference sites. 139 fixed-point BUS have been undertaken between 2016 and 2019. The surveys were undertaken by a suitably qualified ecologist, Mr Paul Fox with over 18 years' experience and Mr Robert Clemens, an expert ornithologist with over 25 years' experience and 12 years in undertaking migratory shorebird surveys. Robert has been employed by Birds Australia since 2005 in a number of roles including Technical Manager and Branch Support Officer whilst also undertaking other research and technical roles for other organisations.

Survey locations were selected based on clear vantage points across the entire Project Area (PLA). This was generally in elevated positions or where the pine plantation had been harvested allowing a clear view shed. The BUS were designed with reference to the Queensland State Code 23: Wind Farm Development, Planning Guidelines (Queensland Government, June 2018). A copy of the Planning Guidelines are provided for reference in Appendix A.9. The survey was undertaken with consideration of relevant seasons (migratory period) and also a Before and After Control Impact (BACI) design. The BACI design includes reference sites placed at a sufficient distance from the proposed turbine locations to obtain data outside of the zone of influence of the turbines (State Code 23, June 2018). The BUS are fixed-time point counts undertaken over a 20-minute period using a methodology adapted from Reynolds et al. (1980) and Biosis (2016). Point count locations were selected to provide sufficient representation of turbine locations across the entire wind farm. The following was recorded:

- Species
- Number of birds
- Height of bird above the ground
- Horizontal distance from observer to bird
- Weather conditions (cloud cover, wind direction, wind speed)

Bird surveys recorded 66 bird species across the Project Area (PLA). The following four species of conservation significance were recorded:

- White-throated needletail (*Hirundapus caudacutus*) – V, MT, LM (EPBC Act)
    - White-throated needletails were observed in the highest numbers. This species was recorded on 9 of the 16 survey days (22 of the 139 fixed-point BUS). On seven of the 22 BUS they were reported in numbers greater than 10 (on 4 days of the 16 survey days). The first initial BUS undertaken in December 2016 identified the greatest number of individuals, with a flock of 327 reported at 50m –

100m above ground level. One other survey (18 December 2018) reported flocks greater than 100 individuals with 165 being recorded between 30m – 200m above ground level.

- Fork-tailed swift (*Apus pacificus*) – MT (EPBC Act)
  - Fork-tailed swifts were recorded on 4 of the 16 survey days (15 of the 139 fixed-point BUS). One survey (29 November 2018) recorded up to 51 individuals at 1 site (they were recorded at most sites surveyed during that survey). Bushfires in the Wide Bay area on the 29 November 2018 (the small township of Tinnanbar was cut off by bushfires) correlated with the highest number of Fork-tailed swifts recorded. This is consistent with their known flight behaviour. White-throated needletails were also recorded during the same survey.
- Spectacled monarch (*Monarcha trivirgatus* (syn. *Symposiachrus trivirgatus*) – MT, LM (EPBC Act)
  - Two individuals were observed within the riparian vine forest along Tinana Creek in the vicinity of Raintree Bridge. Both individuals were observed foraging below the canopy, amongst the shrub layer.
- Rainbow bee-eater (*Merops ornatus*) – LM (EPBC Act)
  - Rainbow bee-eaters were recorded on 7 of the 16 survey days (10 of the 139 fixed-point BUS)
- Cicadabird (*Coracina tenuirostris*) – LM (EPBC Act)
  - Two cicadabirds were observed at one location in 2016.

No migratory shorebirds were observed within the Project Area (PLA) or flying over the Project Area (PLA) on any of the bird surveys. Seven raptor species were recorded on site. None of the raptors are listed species under the EPBC Act. One large water bird (white-necked heron (*Ardea pacifica*) was observed flying over the site. White-necked herons are not listed under the EPBC Act.

Refer to the Ecological Assessment Report in Appendix A.3 for further details of the surveys and results.

Bats

Bat utilisation surveys were undertaken across the Project Area (PLA) between 14 February 2019 and 26 March 2019 using ultrasonic detectors. The detectors were moved on a weekly basis over the 6-week period, which equates to 114 nights of recording. Targeted nocturnal surveys were undertaken within the Project Area (PLA) and Neerdie State Forest 2, the NSF portion of the PLA.

Up to 14 microbat species were recorded during the bat surveys. No threatened microbat species were recorded.

Grey-headed Flying Fox

There are seven GHFF camps within 50km of the Project Area (PLA) that have been occupied by GHFF within the past two years.

- Glenwood Varley Road (53)
- Maaroom, Esplanade (209)
- Goomboorian, Anderleigh Rd Ginger Creek (55)
- Maryborough, Kent Street (88)
- Maryborough, Albion Rd Wetlands (Island Plantation) (87)
- Gympie (53)
- Woocoo (171)

The definition of a Nationally Important GHFF Camp is defined for the management of GHFF and Spectacled Flying-fox camps, specifically relating to in-situ camp management. Camps that have contained ≥ 10,000 GHFF in more than one year in the last 10 years or have been occupied by more than 2,500 GHFF permanently or seasonally every year for the last 10 years (EPBC Policy Statement, September 2015).

As such, the closest Nationally Important GHFF camps are Maaroom, Glenwood Varley Road, Gympie and Woocoo, which are 4km, 14km, 30km and 40km away from the nearest turbine location, respectively.

GHFF were observed feeding in the flowering eucalypts within the NSF section of the Project Area (PLA) during nocturnal surveys in June 2019. The NSF portion of the Project Area (PLA) does provide foraging habitat as GHFF were observed in the eucalypts in this part of the project area. This is located in the south-west portion of the Project Area (PLA) away from wind turbines and no infrastructure is currently proposed

for this portion of the Project Area. They have not been observed within the pine plantation portion of the Project Area (PLA).

Further details are provided in the Ecological Assessment Report in Appendix A.3.

Koala

Koala surveys were undertaken in the NSF area using a trained koala scat detector dog from the University of the Sunshine Coast. A total of 20 surveys were undertaken over two days in.

Koala scats were recorded within the NSF portion of the Project Area (PLA) (refer to report in Appendix I of the Ecological Assessment Report in Appendix A.3 of this referral). Habitat utilization, determined from systematic surveys, is considered to be low at approximately between 0-6%. From the age of scats found, ranging from Category 2, a couple of days old, to Category 5, more than a few months old (refer to Table 1 in the Koala Survey Report in Appendix I of the Ecological Assessment Report in Appendix A.3 of this referral), this suggests variability in the time frames that koalas were present. Numerous scats approximately one (1) month old were found near Mt Eaton Creek (USC, 2019).

Aquatic species

Aquatic surveys were undertaken during some BUS whilst traversing the site between BUS location. These rapid assessments included brief habitat assessments and dip-netting if considered possible habitat for threatened aquatic fauna. Additional aquatic assessments were undertaken on 17-19 June 2019. Aquatic assessments involved dip-netting and habitat assessments for threatened aquatic species. A targeted survey of Tinana Creek was undertaken on 9 January 2020.

No EPBC Act listed threatened species were recorded during the surveys.

3.2 Describe the hydrology relevant to the project area (including water flows)

The Project is located within the Mary River Catchment (Drainage Basin 138) and the Great Sandy Strait Catchment (Part of Noosa Drainage Basin 140). The Project Area includes a number of waterways that are mapped under the *Water Act (2000)* and the *Fisheries Act (1994).* Impact to waterways will be minimised as part of the Project.

The Project Area (PLA) is characterised by flat to undulating terrain with elevations of 10m to 140m AHD (Australian Height Datum) with elevations ranging between approximately 60m and 140m in the southern half of the Project Area (PLA) decreasing to around 20m at the northern end of the Site. A ridgeline runs roughly northwest-southeast through the Site, with high points located along this ridge. This ridge acts as a catchment divide, with creeks to the west of this draining towards the west and northwest into Tinana Creek and eventually into the Mary River. Creeks to the east, generally drain east and northeast to the coast. Coondoo Creek and a number of other waterways are tributaries to Tinana Creek.

Except for some major streams such as Tinana Creek, watercourses within the Project Area are ephemeral with a seasonal summer wet season flow and a winter dry season where streams reduce to a series of pools. Much of the lowland plantations such as the Boonooroo Plains become seasonally wet and remain so for months due to suspended water tables.

Infrequent flood events are the major generators of turbidity, sediment and nutrient movement. Over a six-year monitoring period *Bubb et al (2002)* found that 12.6% of incident rainfall converted to stream flow and 85% of total sediment movement from the Kelly Logging Area paired catchment study occurred in one year where above average rainfall resulted in stream rises to 3.2 metres above base flow.

The paired catchment study indicates a positive stream flow probability of 26.4% and a flood flow (>2m stream rise above nil flow) probability of 13.9% per year.

3.3 Describe the soil and vegetation characteristics relevant to the project area

Soil

The Tuan Toolara forest is a flat to undulating coastal lowland landscape with occasional low hills (Mt Eaton, Kelly Range).

The site lies within the Maryborough Basin, a sequence of thick (50m to 500m) fluvial quartzose sandstones (Myrtle Creek Sandstone) overlain by the Tiaro Coal Measures deposits (up to 850m thick) during the later Triassic and Early Jurassic. This sequence of deposition was halted by a period of volcanic activity (Grahams Creek Formation) in the latest Jurassic and Early Cretaceous. The basin then underwent a major folding and faulting event in the Late Cretaceous, with the formation of tight isoclinal folds with a general northwest axis trend to the south of Maryborough and thrust faults and steep dips in coastal areas. This period also involved substantial erosion.

The Elliot Formation was deposited unconformably over the basin in the Eocene – Oligocene, comprising predominantly siliceous freshwater sandstone and siltstone. This has subsequently been iron cemented to form a ferricrete during the Miocene. Coastal plain deposits and alluvium has subsequently been deposited from the Tertiary period up to the present day.

Soils are generally coarse textured low phosphorous-nitrogen and consequent low fertility. Prolonged water logging is a common feature of many areas within the Project Area primarily because of low slope and a clay aquitard at depths of between 0.5m and 10m.

Bubb et al 2002 using Great Soil Group nomenclature described the soils as Siliceous sands, Lithosols, Grey and Gleyed podzolics, Yellow earths, Yellow podzolics and Humic podzols. Comparable Australian Soil Orders are, Dermosols, Hydrosols, Kandosols, Podosols and Sodosols.

Vegetation

The Project is located within the Tuan, Toolara and Neerdie State Forests, which are highly modified landscapes of exotic pine plantations. Remnant Eucalypt woodland and Melaleuca forest occurs throughout the plantation as a mosaic of small remnant patches. Often these are associated with waterways and drainage lines. Within these areas there are twenty-seven RES as described in Section 3.5 of this Referral.

3.4 Describe any outstanding natural features and/or any other important or unique values relevant to the project area

None present.

3.5 Describe the status of native vegetation relevant to the project area

The Project will be sited on an area that comprises highly modified vegetation with the majority of the site located within an existing exotic pine plantation. There is a network of remnant regional ecosystems (REs) throughout the Project area primarily associated with creek and drainage lines which historical and ongoing pine plantation practices have avoided. This has created a network of often disconnected remnant vegetation patches throughout the pine plantation. Within these areas twenty-seven (27) REs are mapped within the area on the Queensland Department of Environment and Science RE mapping as outlined in the table below:

Table 9 Mapped RE within the Project Area (PLA)

RE	Description	VM Act Status	Biodiversity Status
12.2.11	*Corymbia tessellaris +/- Eucalyptus tereticornis, C. intermedia* and *Livistona decora* woodland on beach ridges in northern half of bioregion	LC	NC
12.3.4	*Melaleuca quinquenervia, Eucalyptus robusta* woodland on coastal alluvium	OC	OC
12.3.5	*Melaleuca quinquenervia* open forest on coastal alluvium	LC	NC
12.3.6	*Melaleuca quinquenervia +/- Eucalyptus tereticornis, Lophostemon suaveolens, Corymbia intermedia* open forest on coastal alluvial plains	LC	NC
12.3.7	*Eucalyptus tereticornis, Casuarina cunninghamiana* subsp. *cunninghamiana +/-* Melaleuca spp. fringing woodland	LC	OC

RE	Description	VM Act Status	Biodiversity Status
12.3.11	*Eucalyptus tereticornis +/- Eucalyptus siderophloia, Corymbia intermedia* open forest on alluvial plains usually near coast	OC	OC
12.3.12	*Eucalyptus latisinensis* or *E. exserta, Melaleuca viridiflora var. viridiflora* woodland on alluvial plains	LC	NC
12.3.13	Closed or wet heathland. Characteristic species include *Melaleuca thymifolia, Banksia robur, Xanthorrhoea fulva, Hakea actites, Leptospermum spp.* and *Baeckea frutescens.* Occurs on seasonally waterlogged Quaternary alluvial plains along coastal lowlands.	LC	NC
12.3.14	*Banksia aemula* low woodland on alluvial plains usually near coast	OC	OC
12.3.16	Complex notophyll to microphyll vine forest on alluvial plains	E	E
12.3.17	Simple notophyll fringing forest usually dominated by Waterhousea floribunda	OC	E
12.5.1	Open forest complex with *Corymbia citriodora subsp. variegata* on subcoastal remnant Tertiary surfaces. Usually deep red soils	LC	NC
12.5.4	*Eucalyptus latisinensis +/- Corymbia intermedia, C. trachyphloia* subsp. *trachyphloia, Angophora leiocarpa, Eucalyptus exserta* woodland on complex of remnant Tertiary surfaces and Cainozoic and Mesozoic sediments	LC	NC
12.5.6c	*Eucalyptus pilularis open forest +/- E. siderophloia, E. propinqua, Corymbia intermedia, E. microcorys, E. acmenoides, E. tereticornis, E. biturbinata, Lophostemon confertus* with *E. saligna, E. montivaga* at higher altitudes. Occurs on remnant Tertiary surfaces. Usually deep red soils	E	E
12.5.7	*Corymbia citriodora* subsp. *variegata +/- Eucalyptus portuensis* or *E. acmenoides, E. fibrosa subsp. fibrosa* open forest on remnant Tertiary surfaces. Usually deep red soils	LC	NC
12.5.9	Sedgeland to heathland in low lying areas on complex of remnant Tertiary surface and Tertiary sedimentary rocks	OC	OC
12.5.10	*Eucalyptus latisinensis* and/or *Banksia aemula* low open woodland on complex of remnant Tertiary surface and Tertiary sedimentary rocks	LC	NC
12.5.12	*Eucalyptus racemosa* subsp. *racemosa, E. latisinensis +/- Corymbia gummifera, C. intermedia, E. bancroftii* woodland with heathy understorey on remnant Tertiary surfaces	OC	OC
12.9-10.4	*Eucalyptus racemosa subsp. racemosa* woodland on sedimentary rocks	LC	OC
12.9-10.3	*Eucalyptus moluccana* open forest on sedimentary rocks	OC	OC
12.9-10.17b	*Eucalyptus acmenoides, E. major, E. siderophloia +/- Corymbia citriodora* subsp. *variegata* open fores on sedimentary rocks. (b) C*orymbia citriodora subsp. variegata* mixed open forest to woodland. Other commonly occurring canopy trees include *Eucalyptus acmenoides, Angophora leiocarpa, E. siderophloia, E. carnea, E. longirostrata and C. intermedia*. Other species that may be present locally include *Eucalyptus tereticornis, E. crebra, E. fibrosa subsp. fibrosa and*	LC	NC

RE	Description	VM Act Status	Biodiversity Status
	E. exserta. Lophostemon confertus (tree form and whipstick form) often present in gullies and as a sub-canopy or understorey tree. Mixed understorey of grasses and shrubs. Hills and ranges of Cainozoic and Mesozoic sediments usually with > 1000mm rainfall per annum		
12.11.5	*Corymbia citriodora* subsp. *variegata* woodland to open forest +/- *Eucalyptus siderophloia/E. crebra, E. carnea, E. acmenoides, E. propinqua* on metamorphics +/- interbedded volcanics	LC	NC
12.12.5	*Corymbia citriodora* subsp. *variegata, Eucalyptus crebra* woodland on Mesozoic to Proterozoic igneous rocks	LC	NC
12.12.7	*Eucalyptus crebra* woodland on Mesozoic to Proterozoic igneous rocks	LC	NC
12.12.12	*Eucalyptus tereticornis, Corymbia intermedia, E. crebra +/- Lophostemon suaveolens* woodland on Mesozoic to Proterozoic igneous rocks	OC	OC
12.12.15b	*Lophostemon confertus* open forest +/- *Eucalyptus microcorys, E. siderophloia, E. carnea, E. propinqua* and vine forest species often present in understorey. Occurs in gullies and exposed ridges on Mesozoic to Proterozoic igneous rocks often amongst vine forest	LC	NC
12.12.16	Notophyll vine forest on Mesozoic to Proterozoic igneous rocks	LC	NC
non-rem	Non-remnant areas such as pine plantations	n/a	n/a

OC = Of Concern, LC = Least Concern, NC = No Concern at Present, E = Endangered

Most REs will be avoided by the Project due to specific site selection of the wind turbines and associated infrastructure within pine plantation. There will be no clearing of RE for construction of the wind turbines or hardstand areas. Clearing in riparian areas is expected to be negligible and limited to the upgrade of existing waterway crossings to enable oversized components to be delivered to the site.

Vegetation along Tinana Creek has been identified as the one location within the Project Area with potential Lowland Rainforest of Subtropical Australia TEC i
dentified as 'likely to occur' by the DoEE mapping (Ecological communities of National environmental significance TEC, Nov.2016), DoE). A site survey undertaken on 9 January 2020 has identified that the vegetation does not conform to the diagnostic criteria provided in the *Advice to the Minister for Sustainability, Environment, Water, Population and Communities from the Threatened Species Scientific Committee (the Committee) on an Amendment to the List of Threatened Ecological Communities under the EPBC Act*.

Areas of essential habitat for Wallum froglet (*Crinia tinnula*) and Wallum rocketfrog (*Litoria freycineti*) which are listed as vulnerable under the Queensland *Nature Conservation Act* (NC Act), are mapped within remnant vegetation in the Project Area (PLA). Areas of essential habitat for koala (*Phascolarctos cinereus*) which is listed as vulnerable under the EPBC Act and NC Act, are mapped within remnant vegetation, including riparian areas in the NSF area. Essential habitat for Pineapple Zamia (*Macrozamia pauli-guilielmi*) is also mapped in the NSF area associated with the remnant eucalypt forests. No wind turbines or operations/construction compounds will be located within mapped essential habitat.

3.6 Describe the gradient (or depth range if action is to be taken in a marine area) relevant to the project area

Not relevant.

3.7 Describe the current condition of the environment relevant to the project area

The wind farm site is located within highly modified pine plantations. The pine trees in the plantations are harvested 27 – 35 years after planting. The Project area consists of a mosaic of pine in various ages of the plant rotation. Many waterways and drainage lines within the pine plantations have historically been cleared of most of their riparian vegetation; in most cases, there remains a sparse single row of regrowth eucalypt or melaleuca delineating the creek line from surrounding landforms.

3.8 Describe any Commonwealth Heritage Places or other places recognised as having heritage values relevant to the project area

There are no Commonwealth Heritage Places or other places recognised as having heritage values within the Project area. The Wide Bay Military Reserve on Tin Can Bay Road (Place ID: 105285) is a listed Commonwealth Heritage Place located adjacent to the Project Area lot boundary. It has been listed under the class of 'natural' as it "*supports a diverse range of plant communities from estuarine, strand (including coastal marshes and pockets of rainforest), wetlands, heath, tall shrublands and woodlands, to the open forests of the subcoastal hills and ranges"* (Australian Heritage Database, accessed 23/10/19).

The Wide Bay Military Reserve will not be impacted by the Project.

3.9 Describe any Indigenous heritage values relevant to the project area

Butchulla First Nations people are the traditional custodians and have Native Title determination over land in the northern section. Kabi Kabi First Nations people are the traditional custodians and have an active native title claim in the southern section of the Project Area (PLA).

A desktop cultural heritage study for the Project was completed by David Cameron Consulting in April 2019. The report noted that the absence of recorded Aboriginal cultural heritage within or near the Project Area does not mean that there is no probability that cultural heritage might exist. The lack of records would simply be the result of there not having been any previous studies undertaken in the area. The desktop assessment did not identify any records of Aboriginal cultural heritage specifically associated with the Project Area. The report concluded that over areas of exotic pine plantation it is "moderately" likely that residual Aboriginal cultural heritage will be present both in areas of previous significant ground disturbance and areas of remnant vegetation and landforms where little or no significant ground disturbance has occurred.

Furthermore, in areas where particular combinations of key environmental and cultural attributes are present, the probability of encountering cultural heritage will tend toward being a "high" likelihood.

Cultural Heritage Management Plans are being developed in close consultation with Kabi Kabi First Nation and Butchulla in accordance with the *Aboriginal Cultural Heritage Act Qld 2003*. The development of the Cultural Heritage Management Plans has included the documentation of cultural values and cultural stories over the Project Area. These cultural values and cultural stories and related documents remain confidential to the respective Aboriginal party.

3.10 Describe the tenure of the action area (e.g. freehold, leasehold) relevant to the project area

The wind farm will be located within State Forest leased to a Plantation Licensee. The main site access track will be located within State Forest.

3.11 Describe any existing or any proposed uses relevant to the project area

The Project is located within existing actively managed and operational exotic pine plantations in the Toolara, Tuan and Neerdie State Forests which are used for the primary purpose of growing and extracting exotic pine from a major forestry plantation. This use will continue.

4. Measures to avoid or reduce impacts

Provide a description of measures that will be implemented to avoid, reduce, manage or offset any relevant impacts of the action. Include, if appropriate, any relevant reports or technical advice relating to the feasibility and effectiveness of the proposed measures. Examples of relevant measures to avoid or reduce impacts may include the timing of works, avoidance of important habitat, specific design measures, or adoption of specific work practices.

4.1 Describe the measures you will undertake to avoid or reduce impact from your proposed action

The Project has been designed with the following key environmental objectives:

- Minimise clearing of native vegetation and habitat for threatened species
- Minimise impact to waterways
- Minimise impacts to birds and bats

These have been achieved by implementing a number of avoidance and reduction measures as outlined in the table below.

Table 10 Environmental management objectives

Objectives	Management measures	
Minimise clearing of native vegetation and habitat for threatened species	Project design and layout	— Wind turbines and associated permanent and temporary infrastructure have been designed to be located within areas of pine planation and avoid native vegetation and waterways and therefore avoid damage to remnant areas of natural habitat. — Only marginal clearing of remnant vegetation may occur for upgrades to existing waterway crossings. — Existing forestry tracks will be used to provide access within the Project Area (PLA) and therefore avoids disturbance to native vegetation and habitat. Some of the tracks may be required to be widened to enable the delivery of the wind turbine blades, towers and other components. — Electrical cabling will mostly be underground along existing access tracks to reduce the amount of vegetation clearing required. — All overhead distribution and transmission lines will be co-located within the OTC
	Construction control measures	— Pre-clearance/pre-construction surveys will be undertaken to determine if site -specific micro-siting of turbines is required to further minimise impacts.
Minimise impact to waterways	Project design and layout	— All wind turbines and Project infrastructure are not located in riparian vegetation of a major mapped waterway
	Erosion and sediment control	— Controls will be implemented during construction to prevent erosion from construction areas and sedimentation of waterways, management of fuel and chemical storage and designating no-go zones. — The Project is to adopt best practice erosion and sediment control management measures.

Minimise impacts to birds and bats	Project design and layout	— The Project is set back a minimum of 4km from the Great Sandy Strait which is a known significant non-breeding area for EPBC listed migratory shorebirds. — The Project is set back from known GHFF camps. — Electrical cabling will mostly be underground along existing access tracks, or in track drains, which will further reduce the likelihood of collision and/ or electrocution of birds and bats.
	Bird and bat monitoring and mitigation measures	— Post-construction bird and bat utilisation surveys are to be undertaken in accordance with the Bird and Bat Management Plan prepared for the Project provided in Appendix A.10 of this referral.

Details of the management measures are discussed below.

Project design and layout

The Project has been deliberately designed to avoid areas of native vegetation by including the following specific constraints:

- areas of mapped regional ecosystems, essential habitat
- location of significant waterways

As a result, all Project infrastructure, including wind turbines, meteorological masts, sub-stations and operation compounds will all be situated in the pine plantation and will not be located in areas of native vegetation. Likewise, temporary infrastructure such as construction compounds will not be located in areas of native vegetation. FWH has identified nominal locations for 226 wind turbines within the Project Area (PLA) and alternative wind turbine locations every 100-200m as shown in **Figures 2A and 2B** in Appendix A.1. A final site selection will be undertaken prior to construction commencing to confirm the location of each wind turbine. Once on site, prior to construction, a final on-ground assessment shall be undertaken to ground truth and micro-site each wind turbine taking into consideration each of the following constraints applicable to MNES:

— ecology - presence of protected flora (in particular, *Macrozamia pauli-guilielmi*), or individual habitat features such as hollow bearing trees
— cultural heritage - avoidance of high-risk areas or features
— drainage lines - presence of the Plantation Licensee's specific drainage infrastructure or other erosion and sediment control measures

The wind turbines will not be micro-sited more than 100m from a nominal or alternative wind turbine location as required by Condition 1 of the Development Permit under the Queensland *Planning Act* 2016.

Site access

Access within the Project Area (PLA) will be provided using existing operational forestry tracks, some of which will be required to be widened to enable the delivery of the wind turbine blades, towers and other components. Some minor clearing may be required for these upgrades.

An access track is required from the Bruce Highway for the delivery of components from Brisbane and materials from the region as well as to provide access to the site for employees and contractors. It is proposed that existing road reserves will be used to provide access to the PLA. Once in the plantation, existing forestry access tracks will be used.

The following control measures will be implemented to avoid and reduce impacts to MNES:

- Use existing forestry tracks
- Clearing of native vegetation for the upgrade of existing waterway crossings will be limited to the minimum area required
- Preconstruction flora and fauna assessment to be undertaken no less than four weeks prior to clearing commencing
- No-go zones to be clearly demarcated prior to construction commencing
- Weed management to be undertaken no less than two weeks prior to clearing commencing.

Construction control measures

A Preliminary Construction Management Plan has been prepared to provide a conceptual framework for the management of construction related impacts during the construction phase of the Project and has been included in Appendix A.5 of this Referral. The Plan includes a preliminary Construction Environment Management Plan (CEMP) that provides control measures for the soil and water, flora, fauna, waste, air, noise, weeds and pests, cultural heritage and fuels and chemicals. The CEMP includes management monitoring, reporting, incident management requirements and corrective actions for each aspect. The Construction Contractor will be required to prepare a CEMP prior to construction commencing in accordance with Condition 11 of the Development Permit provided in Appendix A.4. The CEMP will be required to ensure all activities comply with all relevant environmental approvals and legislative requirements and will be reviewed regularly. The CEMP shall include the following:

- approvals and legislative requirements
- control measures for all identified environmental aspects and impacts
- reporting requirements
- monitoring, inspection and audit requirements
- incident management
- roles and responsibilities

Management measures to be adopted during construction to minimise impact on MNES include the following:

- Soil and water
    - The construction contractor will be required to prepare an overarching or standard ESCP for the Project, as well as specific ESCPs for the wind turbine sites and associated hardstand areas and access tracks as necessary. The ESCPs are to be prepared by a suitably qualified person in accordance with IECAs Best Practice Erosion and Sediment Control prior to works commencing
- Flora
    - Vegetation clearing will be minimised as far as reasonably practical. Notwithstanding, some clearing will be required for the upgrade of the access tracks, construction of the turbine hardstand areas, construction of towers for the transmission line and operational and temporary construction compounds. Clearing will not be permitted in no-go zone areas to ensure the protection of remnant vegetation. A procedure for vegetation clearing including preclearing inspections will be included within the CEMP.
    - No clearing of remnant vegetation, will be undertaken in the Project Area (PLA) without authorisations.
    - The vegetation clearing area will be clearly identified and marked on all construction plans.
    - Prior to any clearing or disturbance works being undertaken, all necessary permits for clearing of any native vegetation will be received from relevant regulatory authorities.
    - Trees containing stags or hollows to be retained wherever possible
    - All vegetation to be removed will be clearly identified as such.
    - Highly visible barriers (i.e. hi-viz tape or temporary fencing) will be used to establish ‘no-go zones’ in which essential habitat and/or areas containing conservation significant species to be retained is located.
    - If minor clearing/ trimming is required to upgrade existing waterway crossings, trees / vegetation shall be cut near or at ground level and the root mass shall be retained in the ground, where possible, to ensure bank stability.
    - Ensure vehicles stay on designated tracks and roads where possible
    - Ensure vehicles are washed down at appropriate wash down areas prior to moving into an area and after travelling through known weed infestations before entering any new area
    - Ensure all personnel are trained in weed management procedures
    - Ensure Project specific fire management plans are implemented in accordance with the systems developed by the Plantation Licensee.
    - Disturbed areas shall be stabilised progressively.

- Fauna
    - Prior to the commencement of works, the construction zone must be clearly delineated with flagging tape to identify areas to be cleared and “no-go” zones.
    - Trees and stags containing hollows to be retained wherever possible
    - Any herbicides shall be used in accordance with manufacturers and Australian Pesticides and Veterinary Management Authority (APVMA) standards.
    - A fauna spotter will be on site during any clearing of native vegetation required for the upgrade of existing forestry access tracks
    - Herbicides used near waterways shall be registered for aquatic use.
    - Disturbed areas shall be stabilised progressively
    - Any permanent fencing required on site shall be fauna friendly design.
    - Measures to comply with Bird and Bat Management Plan (BBMP) during construction
    - Report any injured fauna to wildlife career and DES as relevant
    - Comply with the requirements of all relevant approvals including Species Management Plan if in place
- Weed and pest management
    - The construction contractor, in consultation with the Plantation Licensee, will develop a protocol for the management of vehicles entering and exiting the site.
    - All invasive weed species will be controlled or removed from the construction areas at initial clearing stages and also at the end of construction works.
    - Herbicides shall be used in accordance with manufacturers and APVMA standards.
    - Herbicides used near waterways shall be registered for aquatic use
    - Pest vectors such as Fire Ants (*Solenopsis invicta)* present a significant risk to agriculture and community. While the risk is low, engineered, materials leaving Port of Brisbane will be checked for any insect presence.
    - The Construction Contractor will engage a skilled weed management team for periodic maintenance of invasive and environmental weeds within the Wind farm development area
    - Where prohibited invasive plants are found on the wind farm they will be reported to the Department of Agriculture and Fisheries and the Plantation Licensee and controlled immediately.

Erosion and sediment control

A Stormwater and Erosion and Sediment Control Management Strategy (the Strategy) has been prepared to outline FWH’s approach to stormwater and erosion and sediment control management during the construction and operation of Forest Wind within the Project Area (PLA) to ensure:

- the potential for soil loss from construction and maintenance works is mitigated
- stormwater flows from site works do not result in a deterioration of the quality or quantity of water within water courses
- there is “no-harm” to catchment values.

A copy of the Strategy is provided in Appendix A.7 of this referral.

As noted above, a CEMP will be required to be prepared by the Construction Contractor prior to construction commencing. In accordance with Condition 11 of the Development Permit, the CEMP will include a Stormwater Management Plan that details management and mitigation measures for the protection of soil and water quality through the implementation of stormwater management and erosion and sediment controls (ESC) in accordance with the *Best Practice Erosion and Sediment Control Guidelines for Australia (International Erosion Control Association)*. The Strategy provides supporting information to assist with the preparation of the CEMP, Stormwater Management Plan and ESCPs including the following:

- identifies the soil types within the Project footprint
- establishes an erosion risk rating for each soil type
- identifies the tasks that may result in an erosion hazard
- identifies controls to minimise erosion soil loss.

It will be the responsibility of the Construction Contractor to confirm the relevance and suitability of this data prior to preparation of the CEMP, Stormwater Management Plan and ESCP. The Stormwater Management Plan and ESCPs will be prepared by a suitably qualified person prior to construction commencing on site. A suitably qualified person may be either a Registered Professional Engineer of Queensland (RPEQ) or a Certified Professional in Erosion and Sediment Control (CPESC). The Strategy includes a summary of catchment erosion research previously completed in the Project Area (PLA) and provides preliminary data to support the development of an ESCP.

Construction areas for the wind turbines and other infrastructure will drain to plantation compartments. Research by *Bubbla et al 2000* demonstrated that 7%-12% of incident rainfall over the plantation generates overland flow. The dispersed nature of individual turbine pads and drainage into plantation compartments will allow the maximum infiltration and sediment capture, however the collective effect of overland flows as level 1 streams aggregate to higher order streams may result in a net increase in turbidity if controls are not applied.

The main impact to MNES is as a result of changes to water quality. The following potential impacts to water quality during the construction of the Project have been identified:

- clearing of exotic pine plantation for the following uses:
    - permanent wind farm infrastructure including the wind turbines, crane hardstands and laydown areas and all related and or ancillary uses such as substations and battery storage facilities, above-ground Distribution Lines.
    - temporary construction facilities such as construction compounds, concrete batching plants, and manufacturing and assembly plants.
    - minor re-alignments of existing forestry access tracks.
- civil earthworks will create site disturbance and potential erosion hazards.

There are no anticipated clearing works during the operational phase of the Wind Farm. Occasional minor works will be required to maintain access and manage vegetation around facilities and corridors. The use of machinery and herbicide, if not controlled, can result in exposed soils and an erosion hazard.

The following principles will be adopted to mitigate the erosive impact of increased rainfall intensity and overland flows:

- minimising extent of exposed soil
- minimising infrastructure design footprint
- minimising drain grades and slope batters
- maximising vegetative cover and soil permeability
- avoiding the concentration of water and reducing overland flow rates
- maintaining the integrity of riparian vegetation filter strips
- using existing vegetation and enhanced vegetation cover to maintain permeability and filter fine sediments.

The following standards and designs guides will be applied to the techniques adopted by FWH and its contractors:

- Queensland Urban Drainage Manual 4th ed. Institute of Public Works Engineering Australasia
- IECA Best practice erosion and sediment control – for construction and building sites
- Plantation Licensee environmental standards for road and plantation drainage design.

The Strategy has identified stormwater risks and erosion hazards as a result of the Project and determined control and management measures to be adopted during the design, construction and operational phases as relevant.

Bird and bat monitoring

Pre-construction bird and bat surveys have been undertaken over a three-year period between 2016 and 2019 in order to establish a baseline data set. A Bird and Bat Monitoring Plan (BBMP) has been prepared to document the results of the baseline survey and outline the requirements for monitoring the impacts on birds and bats and from the Project and an overall strategy for managing and mitigating any significant impacts on birds and bats from the operation of the wind farm (refer Appendix A.10). The BBMP uses an adaptive management approach and will be further developed prior to the commencement of construction of stage of

the wind farm in accordance with Condition 8 of the Development Permit. Monitoring indicates compliance and any noncompliance with approval conditions and management plans. This in turn informs where management measures are effective and where management measures need to be reviewed and altered to achieve their goals. Should the monitoring program's results demonstrate that further mitigation is required, further assessment will be undertaken to determine appropriate mitigation or management measures. Additional measures may include deploying a radar detection and deterrent technology system.

The BBMP is provided in Appendix H of the Ecological Assessment Report provided as Appendix A.3 of this referral. Monitoring measures outlined in the BBMP include the following:

- Post construction bird/ bat utilisation surveys
    - Monthly from August – November (4 events) and monthly from February – April (3 events) for the first 2 years
    - Same survey points and BUS methods as pre-construction monitoring
- Monitoring storm fronts, low pressure systems and bushfire alerts which may be precursors to White-throated Needletail and Fork-tailed Swift presence.
- Spatially and temporarily replicated carcass monitoring undertaken by suitably qualified ecologists and/or trained detector dogs.
    - Monthly surveys to be undertaken at a stratified random representative selection of turbines (10%), so that annually each turbine is inspected at least once, for a period of two years. Or, a greater frequency, subject to observations, or
    - monthly stratified random locations with each strata having a minimum of 3 turbines. Strata may be north, south, east and west within the Project Area.
    - If carcasses are identified repeatedly for a period of 3 months a strategy will be developed to manage the risk of collision.

The BBMP also outlines impact triggers and adaptive management measures to be adopted. Mitigation measures that can be adopted include the following:

- Trial acoustic and/or sonar to deter bats/birds
- Slow rotor speeds or temporary shutdown of turbines. Bird and bat utilisation surveys determine isolation period.
- Slow rotor speeds or temporary shutdown of subject turbines during Summer period of known migratory aerial insectivores when birds may be on site. Repeat carcass surveys following extreme weather events to determine if events are linked to unacceptable impacts. Bird and bat utilisation surveys determine isolation period.
- Repeat carcass surveys to determine if correlation is related to low visibility. Temporary shutdown on subject turbines identified as causing the impact.

4.2 For matters protected by the EPBC Act that may be affected by the proposed action, describe the proposed environmental outcomes to be achieved

MNES that may be impacted by the Project include the white-throated needletail, fork-tailed swift, spectacled monarch, the grey-headed flying fox, and the pineapple zamia. The proposed environmental outcomes to be achieved for each MNES are outlined in the table below.

Table 11 Proposed environmental outcomes

MNES	Proposed environmental outcome
White-throated needletail	— Important habitat will not be impacted by ensuring that the wind turbines are located within the existing pine plantation areas. — The Project will not result in mortality of White-throated Needletail such that an ecologically significant proportion of the population of the species is affected. — The Project does not increase weed and pest species that may impact the species directly or indirectly.

Fork-tailed swift	— Important habitat for migratory bird species will continue to be present in the Great Sandy Strait and the Project will not affect the migratory pathways of these species. — The Project will not result in significant mortalities of Fork-tailed Swift. — The Project does not increase weed and pest species that may impact the species directly or indirectly.
Spectacled monarch	— Important habitat will not be impacted by ensuring that the wind turbines are located within the existing pine plantation areas and away from remnant vegetation including rainforests and watercourses. — The Project will not result in significant mortalities of Spectacled monarch. — The Project does not increase weed and pest species that may impact the species directly or indirectly.
Grey-headed flying fox	— The Project will not result in significant mortalities of GHFF during foraging — The Project does not increase weed and pest species that may impact the species directly or indirectly.
Pineapple zamia	— No impact to a population of pineapple zamia by ensuring the avoidance of the species. Removal and translocation will be considered as a management measure once all avoidance options have been exhausted. — The Project does not increase weed and pest species that may impact the species directly or indirectly.

5. Conclusion on the likelihood of significant impacts

Note – numbering is as per online referral form

5.1.1 World Heritage Properties

No

5.1.2 National Heritage Places

No

5.1.3 Wetlands of International Importance (declared Ramsar Wetlands)

There are no Wetlands of International Importance within the Project Area (PLA). The Great Sandy Strait Ramsar area is approximately 4km from the eastern boundary of the Project Area (PLA) (other than where it extends up Poona Creek which is within 1km of the eastern boundary of the Project Area (PLA).

5.1.4 Listed threatened species or any threatened ecological community

A Significant Impact Assessment has been prepared for the Project and is provided in Appendix A.6. It has been determined that the project will not have a significant impact on MNES as outlined below.

Table 12 Significance of impact

Species	Significance of impact
Vine forest **RE 12.3.16** (described as *Complex notophyll to microphyll vine forest on alluvial plains)* is present along Tinana Creek in the area of a proposed crossing at Raintree Bridge. The RE is analgous to the EPBC Act listed Lowland Rainforest of Subtropical Australia. The vegetation assessed at the existing Raintree Bridge crossing does not meet the species richness condition threshold for the listed community with only 11 native woody species from Appendix A of the listing advice recorded during the survey (Fox & Co, 2020) rather than the minimum 40 species required for remnant vegetation patches. This vegetation is not a TEC. Nonetheless, this area is avoided by the Project due to the habitat values for potential EPBC Act listed species.	**On that basis, the Project will not have a Significant Impact on RE 12.3.16.**
***Macrozamia pauli-guilielmi* (Pineapple Zamia)** Threatened flora species known to occur are *Macrozamia pauli-guilielmi* (Pineapple Zamia). All existing areas of known pineapple zamia within the Project Area (PLA) have been delineated and used to inform the siting of project infrastructure such as wind turbines, construction and operation compounds and distribution lines. Project infrastructure will not be sited in areas of known populations of pineapple zamia.	**On this basis the Project will not have a Significant Impact on Pineapple Zamia.**
Fontania rostrata, Macadamia integrifolia, Samadera bidwillii* (Quassia)** and ***Xanthostemon oppositifolius (southern penda) if present, would be restricted to the riparian notophyll forest (lowland rainforest) along Tinana Creek which is avoided by the Project and therefore not impacted by the Project. S*amadera bidwillii* (Quassia) whilst more commonly found in lowland rainforest has the potential to	**On this basis the Project will not have a Significant Impact on these species.**

occur in other forest types such as open forest and woodland, which are also avoided by the Project.	
Phaius australis (lesser swamp orchid) are associated with coastal wet heath/sedgeland wetlands, swampy grassland or swampy forest and often where Broad-leaved Paperbark (*Melaleuca leucadendra*) or Swamp Mahogany (*Eucalyptus robusta*) are found. There are no previous or current records and low-lying areas are avoided by Project.	**On this basis the Project will not have a Significant Impact on *Phaius australis*.**
Acacia attenuata Potential habitat exists for *Acacia attenuata* within the small low-lying pockets of remnant vegetation remaining within the Project Area (PLA). As they are able to tolerant some level of disturbance they have the potential to occur within the non-remnant areas in low-lying areas (previous wallum habitat – pre-clear extent). The Project has been designed to avoid these low-lying remnant pockets of wet heathland or heathland margins, open forest and woodland communities by siting infrastructure within the operational exotic pine plantations. Existing access tracks will be utilised within the Project Area (PLA). Any upgrades to existing tracks or culverts in low-lying areas will be undertaken in accordance with approved EMPs to ensure impacts to these areas are mitigated. Pre-clearance surveys will be undertaken prior to any track widening or clearing along roadsides or within pine plantation areas to determine if *Acacia attenuata* are present and if further avoidance measures are required.	**The Project will not have a Significant Impact on *Acacia attenuata.***
White-throated Needletail (*Hirundapus caudacutus*) White-throated Needletail (*Hirundapus caudacutus*) has been observed foraging over the Project Area (PLA). Surveys demonstrated that the occurrence and abundance of this species across the Project Area (PLA) is highly variable. An ecologically significant proportion of the population was identified on 7 of the 139 Bird Utilisation Surveys. Considering the widespread distribution, highly variable occurrence across the Project Area, known avoidance behaviour, limited available roosting habitat and lack of clearing of remnant vegetation required for Project infrastructure, the Project will not have a Significant Impact on this species.	**The Project will not have a Significant Impact on this species.**
Australian Painted Snipe (*Rostratula australis (Syn. Rostratula benghalensis)* Australian Painted Snipe (*Rostratula australis (Syn. Rostratula benghalensis)* has been recorded once in 2007 within the Project Area (PLA). There are no recent records of this species although it is acknowledged they are very secretive, mainly crepuscular (active at dawn and dusk) and generally remain in dense cover while feeding, making detection difficult.	**Given the avoidance of low-lying habitat, the Project is will not have a Significant Impact on this species.**
Grey-headed Flying-Fox (*Pteropus poliocephalus)* There are seven (7) known Grey-headed Flying-Fox (*Pteropus poliocephalus*) camps within 50km of the Project Area (PLA). Four (4) of the seven (7) camps are Nationally Important Flying-fox Colonies (Maaroom, Glenwood Varley Road, Gympie and Woocoo) which are a minimum 4km, 14km, 30km and 40km from the nearest turbine, respectively. There are no known camps within the Project Area (PLA). Calculations of foraging zones (15km and 50km from each camp) has	**The Project is considered will not have a Significant Impact on Grey-headed Flying-Fox.**

been undertaken. Given the extensive amount of remnant vegetation cleared for the pine planations, most of the available foraging habitat (96% - 100%) is outside of the Project Area (PLA). Calculations are also considered conservative as they exclude non-remnant vegetation outside of the Project Area (PLA) which would also contain foraging resources for GHFF such as orchids, regrowth and street trees.	
Koalas (*Phascolarctos cinereus*) Koalas (*Phascolarctos cinereus*) are present within the NSF portion of the Project Area (PLA). They may be present within the mosaic of remnant areas remaining within the broaded landscape of pine plantations with the Project Area (PLA). No works are proposed within the NSF portion of the Project Area (PLA). The Project avoids remnant vegetation.	**The Project will not have a Significant Impact on Koalas.**
Southern greater glider (*Petauroides volans Volans)* and water mouse (*Xeromys myoides*). Potential marginal habitat exists within remnant vegetation for Southern greater glider (*Petauroides volans Volans)* and water mouse (*Xeromys myoides*). No works are proposed within the NSF portion of the Project Area (PLA). The Project avoids remnant vegetation.	**The Project will not have a Significant Impact on Southern greater glider (*Petauroides volans Volans)* and water mouse (*Xeromys myoides*) should they occur.**
Southern (white-throated) snapping turtle (*Elseya albagula*) and Mary River Turtle (*Elusor macrurus)* Two (2) threatened turtles (Southern (white-throated) snapping turtles (*Elseya albagula*) and Mary River Turtle (*Elusor macrurus))* potentially occur within Tinana Creek and its associated tributaries which runs through the Project Area (PLA). There will be no impacts on water quality, flows, aquatic and riparian habitat within the Project Area (PLA).	**The Project will not have a Significant Impact on these turtles.**
Wallum sedge frog (Litoria olongburensis) and giant barred frog (Mixophyes iteratus) Two (2) threatened amphibians (wallum sedge frog (Litoria olongburensis) and giant barred frog (Mixophyes iteratus)) potentially occur within remnant areas of the Project Area (PLA) such as riparian habitats of Tinana Creek and its associated tributaries and low-lying coastal wallum. There will be no impacts on water quality, flows, aquatic, riparian and wetland habitat within the Project Area (PLA).	**The Project will not have a significant Impact on these two amphibians.**
Four (4) fish species (**Mary River Cod (*Maccullochella mariensis),* Oxleyan pygmy perch (*Nannoperca oxleyana*), Australian lungfish (*Neoceratodus forsteri)* and honey blue eye (*Pseudomugil mellis*)**. The Project has been designed to avoid waterways, wetlands and remnant riparian areas. The Project will not create waterway barriers or impoundments. Indirect impacts such as degradation in water quality will be mitigated by project specific ESCP.	**The Project will not have a Significant Impact on these fish species.**

5.1.5 Listed migratory species

A Significant Impact Assessment has been prepared for the Project and is provided in Appendix A.6. It has been determined that the project will not have a significant impact on listed migratory species as outlined below.

Table 13 Significance of impact – listed migratory species

Species	Significance of impact
White-throated Needletail (*Hirundapus caudacutus*) White-throated Needletail (*Hirundapus caudacutus*) has been observed foraging over the Project Area (PLA). Surveys demonstrated that the occurrence and abundance of this species across the Project Area (PLA) is highly variable. An ecologically significant proportion of the population was identified on 7 of the 139 Bird Utilisation Surveys. Considering the widespread distribution, highly variable occurrence across the Project Area, known avoidance behaviour, limited available roosting habitat and lack of clearing of remnant vegetation required for Project infrastructure, the Project will not have a Significant Impact on this species.	**The Project will not have a Significant Impact on this species.**
Fork-tailed swifts (*Apus pacificus)* Fork-tailed swifts (*Apus pacificus)* were recorded on 15 of the 139 fixed-point BUS. The greatest number of individuals observed was 51which is less than the ecologically significant proportion of the population (1,000 individuals (for an Internationally important proportion) or 100 individuals (for a Nationally important proportion).	**The Project will not have a Significant Impact on this species.**
Spectacled monarch (*Monarcha trivirgatus)* Spectacled monarch (*Monarcha trivirgatus)* were observed on one occasion (2 individuals) within the vine forest along Tinana Creek. No habitat for spectacled monarch is proposed to be cleared for the Project. Due to their low flight behaviour and avoidance of habitat, the Project will not have a Significant Impact on this species.	**The Project will not have a Significant Impact on this species.**

Other migratory birds which have the potential to occur include;

- Oriental cuckoo *Cuculus optatus*
- Black-faced monarch *Monarcha melanopsis*
- Satin Flycatcher *Myiagra cyanoleuca*
- Rufous Fantail *Rhipidura rufifrons*

The Project will not have a Significant Impact on these species due to low flight behaviour, low numbers moving through the site and avoidance of remnant potential habitat.

Listed Marine species known to occur include Rainbow bee-eater (*Merops ornatus)* and cicadabird (*Coracina tenuriostris).* **The Project will not have a Significant Impact on these species due to low numbers moving through the site and avoidance of remnant potential habitat.**

Other listed marine species which have the potential to occur include:

- Magpie Goose *Anseranas semipalmata*
- Great Egret *Ardea alba (Syn. A. modesta)*
- Cattle Egret *Ardea ibis* (Syn. *Bubulcus ibis*)
- White-bellied Sea-eagle *Haliaeetus leucogaster*

The Project will not have a Significant Impact on these species due to habitat preferences outside of Project Area (PLA) and low numbers moving through the site.

5.1.6 Commonwealth marine environment

No

5.1.7 Protection of the environment from actions involving Commonwealth land

No

5.1.8 Great Barrier Reef Marine Park

No

5.1.9 A water resource, in relation to coal/gas/mining

No

5.1.10 Protection of the environment from nuclear actions

No

5.1.11 Protection of the environment from Commonwealth actions

No

5.1.12 Commonwealth Heritage places overseas

No

5.2 If no significant matters are identified, provide the key reasons why you think the proposed action is not likely to have a significant impact on a matter protected under the EPBC Act and therefore not a controlled action

The referral and significant impact assessment have identified EPBC MNES that have a potential or are known to occur within the Project Area (PLA). Due to the avoidance and mitigation measures proposed, in particular the location of the wind farm in an existing and operational pine plantation as well as the avoidance of remnant vegetation, the Project is not considered to have a significant impact on the MNES and therefore is not a controlled action.

6. Environmental record of the person proposing to take the action

Provide details of any proceedings under Commonwealth, State or Territory law against the person proposing to take the action that pertain to the protection of the environment or the conservation and sustainable use of natural resources.

6.1 Does the party taking the action have a satisfactory record of responsible environmental management? Please explain in further detail.

Forest Wind Holdings Pty Limited is an entity established for the purposes of the Project in 2018. FWH's shareholders and directors, have extensive experience developing and delivering energy projects with more than satisfactory record of responsible environmental management. FWH has developed the Project in accordance with State code 23 and aims to use best practice control measures where possible. Surveys of the Project Area have been undertaken over a three -year period which clearly demonstrates FWH's commitment to understanding the environment, site constraints and delivering an environmentally responsible project.

6.2 Provide details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against (a) the person proposing to take the action, or (b) if a permit has been applied for in relation to the action - the person making the application.

a) There are no proceedings against the person proposing to take the action.

b) FWH has submitted an application for a development approval for a material change of use for a wind farm which was approved in February 2020. There were no proceedings against FWH for the application.

6.3 If it is a corporation undertaking the action will the action be taken in accordance with the corporation's environmental policy and framework?

Yes

6.3.1 If the person taking the action is a corporation, please provide details of the corporation's environmental policy and planning framework.

FWH is part owned by Siemens and operates under their environment policy. Details of Siemens' environment policy can be found at the website below and is also provided as Appendix A.11 of this referral.

https://assets.new.siemens.com/siemens/assets/public.1541967148.539e1a49e416eab0b3e7507b4a986a8fc38139cf.ehs-policy.pdf

6.4 Has the person taking the action previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act?

6.4.1 EPBC Act No and/or Name of Proposal.

FWH has not previously referred an action under the EPBC Act.

7. Information sources

You are required to provide the references used in preparing the referral including the reliability of the source.

7.1 List references used in preparing the referral (please provide the reference source reliability and any uncertainties of source)

Reference source	Reliability	Uncertainties
Advice to the Minister for Sustainability, Environment, Water, Population and Communities from the Threatened Species Scientific Committee (the Committee) on an Amendment to the List of Threatened Ecological Communities under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	Federal government approved report	Nil
Bamford M, Watkins D, Bancroft W, T. G. and J. W. (2008). *Migratory Shorebirds of the East Asian - Australasian Flyway; Population Estimates and Internationally Important Sites*.	Peer reviewed, published	Nil
K. A. Bubb , P. F. Frayne & T. R. Wittmer (2002) Impacts on stream and groundwater quality during the inter-rotation phase of a Pinus plantation in the coastal lowlands of south-east Queensland, Australian Forestry, 65:1, 38-46, DOI: 10.1080/00049158.2002.10674851	Peer reviewed, published paper	Nil
Commonwealth of Australia, Department of the Environment (2015). *Draft referral guideline for 14 birds listed as migratory species under the EPBC Act*.	Federal government guideline	Nil
Curtis, L. K., & Dennis, A. J. (Eds.). (2012). *Queensland's Threatened Animals*. Collingwood, VIC, Australia: CSIRO Publishing.	Peer reviewed, published	Nil
Department of the Environment (2019). *Acacia attenuata* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Tue, 27 Aug 2019 12:08:45 +1000	Federal government database	Nil
Department of the Environment (2018). *Anthochaera phrygia* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Thu, 15 Nov 2018 14:49:35 +1100	Federal government database	Nil
Department of the Environment (2019). *Cryptocarya foetida* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Tue, 27 Aug 2019 12:12:20 +1000.	Federal government database	Nil
Department of the Environment (2019). *Egernia rugosa* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Fri, 9 Aug 2019 11:56:06 +1000.	Federal government database	Nil

Reference source	Reliability	Uncertainties
Department of the Environment (2018). *Chalinolobus dwyeri* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Thu, 15 Nov 2018 14:44:17 +1100	Federal government database	Nil
Department of the Environment. (2016a). *Charadrius leschenaultii* in Species Profile and Threats Database	Federal government database	Nil
Department of the Environment (2019). *Charadrius mongolus* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Wed, 7 Aug 2019 11:43:37 +1000.	Federal government database	Nil
Department of the Environment (2019). *Cryptocarya foetida* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Tue, 27 Aug 2019 12:12:20 +1000.	Federal government database	Nil
Department of the Environment (2019). *Cryptostylis hunteriana* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Tue, 27 Aug 2019 12:53:16 +1000.	Federal government database	Nil
Department of the Environment (2019). *Cupaniopsis shirleyana* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Tue, 27 Aug 2019 12:14:36 +1000.	Federal government database	Nil
Department of the Environment. (2014a). *Dasyurus hallucatus*. Retrieved from http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=331	Federal government database	Nil
Department of the Environment. (2015f). *Dasyurus maculatus maculatus* (SE mainland population). Retrieved from http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=75184	Federal government database	Nil
Department of the Environment (2019). *Erythrotriorchis radiatus* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Tue, 27 Aug 2019 12:01:46 +1000	Federal government database	Nil
Department of the Environment (2019). *Fontainea rostrata* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Tue, 27 Aug 2019 12:16:53 +1000.	Federal government database	Nil
Department of the Environment (2018). *Geophaps scripta scripta* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Thu, 15 Nov 2018 15:05:14 +1100	Federal government database	Nil
Department of the Environment (2019). *Hirundapus caudacutus* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Wed, 7 Aug 2019 09:37:22 +1000.	Federal government database	Nil

Reference source	Reliability	Uncertainties
Department of the Environment (2019). *Limosa lapponica* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Tue, 13 Aug 2019 22:23:44 +1000.	Federal government database	Nil
Department of the Environment (2018). *Macadamia ternifolia* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Thu, 15 Nov 2018 15:34:03 +1100	Federal government database	Nil
Department of the Environment (2016). Threatened Species Scientific Committee. Conservation Advice, *Maccullochella mariensis (2016)*	Federal government database	Nil
Department of the Environment (2019). *Macrozamia pauli-guilielmi* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Tue, 27 Aug 2019 12:18:42 +1000.	Federal government database	Nil
Department of the Environment (2019). *Mixophyes fleayi* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Fri, 9 Aug 2019 12:01:05 +1000.	Federal government database	Nil
Department of the Environment. (2015m). *Neoceratodus forsteri*. Retrieved January 20, 2015, from http://www.environment.gov.au/sprat	Federal government database	Nil
Department of the Environment (2019). *Petauroides volans* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Tue, 27 Aug 2019 11:47:41 +1000.	Federal government database	Nil
Department of the Environment. (2015p). *Phaius australis* in Species Profile and Threats Database. Retrieved July 16, 2015, from http://www.environment.gov.au/sprat	Federal government database	Nil
Department of the Environment. (2014d). *Phascolarctos cinereus* (combined populations of Qld, NSW and the ACT). Retrieved from http://www.environment.gov.au/sprat	Federal government database	Nil
Department of the Environment (2019). *Phyllodes imperialis smithersi* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Fri, 9 Aug 2019 11:29:00 +1000.	Federal government database	Nil
Department of the Environment. (2015r). *Pseudomugil mellis.* Retrieved January 20, 2015, from http://www.environment.gov.au/sprat	Federal government database	Nil
Department of the Environment (2019). *Pteropus poliocephalus* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Tue, 6 Aug 2019 16:53:52 +1000.	Federal government database	Nil
Department of the Environment (2019). *Rostratula australis* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from:	Federal government database	Nil

Reference source	Reliability	Uncertainties
http://www.environment.gov.au/sprat. Accessed Tue, 27 Aug 2019 12:06:17 +1000.		
Department of the Environment (2019). *Samadera bidwillii* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Tue, 27 Aug 2019 12:21:06 +1000.	Federal government database	Nil
Department of the Environment (2019). *Thesium australe* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Tue, 27 Aug 2019 12:24:28 +1000.	Federal government database	Nil
Department of the Environment. (2014g). *Turnix melanogaster*. Retrieved from http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=923	Federal government database	Nil
Department of the Environment (2019). *Xanthostemon oppositifolius* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Tue, 27 Aug 2019 13:01:59 +1000.	Federal government database	Nil
Department of the Environment. (2015t). *Xeromys myoides*. Retrieved January 20, 2015, from http://www.environment.gov.au/sprat	Federal government database	Nil
Garnett, S.T., Szabo, J.K., and Dutson, G. (2011). The action plan for Australian Birds 2010. Melbourne, Victoria.	Peer reviewed, published	Nil
Higgins, P.J., (1999). Handbook of Australian, New Zealand and Antarctic birds Volume 4., Melbourne, Victoria: Oxford University Press.	Peer reviewed, published	Nil
Higgins, P. J., & Davies, S. J. J. F. (Eds.). (1996). Handbook of Australian, New Zealand and Antarctic Birds. Volume Three - Snipe to Pigeons. Melbourne, Victoria: Oxford University Press.	Peer reviewed, published	Nil
Morcombe, M. (2003). *Field Guide to Australian Birds.* Archerfield: Steve Parish Publishing Pty Ltd.	Peer reviewed, published	Nil
Simpson, K., & Day, N. (2004). *A Field Guide to the Birds of Australia (7th ed.)*. Camberwell: Penguin Group.	Peer reviewed, published	Nil
Queensland Government, Species Technical Committee (STC). Species nomination form and guidelines for adding or changing the category of a native species listing under the Queensland Nature Conservation Act 1992 (NCA) (*Boronia rivularis*)	State government document	Nil
Threatened Species Scientific Committee (December 2008), Conservation Advice, *Baloghia marmorata* (Marbled Balogia)	Federal government listing advice	Nil
Threatened Species Scientific Committee (December 2014), Conservation Advice, *Elseya albagula* (White-throated snapping turtle)	Federal government listing advice	Nil
Threatened Species Scientific Committee (July 2008), Conservation Advice, *Triunia robusta*	Federal government listing advice	Nil
Viento Environmental Limited (August 2019) *Landscape and Visual Impact Assessment*	Independent consultant report	Nil

8. Proposed alternatives

You are required to complete this section if you have any feasible alternatives to taking the proposed action (including not taking the action) that were considered but not proposed.

8.1 Provide a description of the feasible alternative?

After numerous technical, environmental, planning, regulatory, legal, commercial and financial feasibility assessments, the proposed layout was derived as a basis to identify potential staging layouts. From this assessment, detailed assessments were undertaken to identify if each location based on current information is likely to be suitable from an individual infrastructure location perspective, as well as a whole of wind farm system design perspective.

Within the current turbine footprint, turbines may be sited within the selected corridors to avoid constraints forming known alternatives that are suitable. However, to relocate an infrastructure corridor to an alternative location would require specific detailed assessment across many factors including noise, landscape, electromagnetic interference, ecology, land use, stakeholder engagement, access, geotechnical, wind resources and many other factors determine if any other alternative is viable.

The currently proposed development infrastructure is suitably sited for a wind farm in accordance with State code 23.

8.2 Select the relevant alternatives related to your proposed action.

The locations of the wind turbines will be within any of the nominal or alternative locations but shall not exceed a maximum of 226 wind turbines, as required by the Development Permit. Wind turbines will not be located any less than 3km from the nearest private dwelling.

8.3 Do you have another alternative?

There are no other alternative locations for the Project. The locations of the wind turbines will be within any of the nominal or alternative locations but shall not exceed a maximum of 226 wind turbines, as required by the Development Permit. Wind turbines will not be located any less than 3km from the nearest sensitive receiver.

Appendices