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# St Patricks Plains Wind Farm

# **Environmental Impact Statement**

Final | 29 June 2023

**ERA Planning Pty Ltd trading as ERA Planning and Environment**

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# Glossary

| Abbreviation | Definition |
|---|---|
| **ABN** | Australian Business Number |
| **ACN** | Australian Company Number |
| **AFAC** | Australasian Fire and Emergency Services Authorities Council |
| **ARRB** | Australian Road Research Board |
| **AS** | Australian Standard |
| **ASS** | acid sulfate soil |
| **ATV** | all-terrain vehicle |
| **BACI** | before/after-control/impact |
| **BESS** | battery energy storage system |
| **CEMP** | Construction Environmental Management Plan |
| **CFEV** | Conservation of Freshwater Ecosystem Values |
| **CGE** | computable general equilibrium |
| **CRM** | collision risk model |
| **CT** | certificate of title |
| **DCCEEW** | (Australian Government) Department of Climate Change, Energy, the Environment and Water |
| **dB** | decibel |
| **dB LA90** | decibel A-weighted 90th percentile |
| **DGV** | default guideline value |
| **DNRE** | Department of Natural Resources and Environment Tasmania |
| **EIS** | Environmental Impact Statement |
| **EMPC Act** | *Environmental Management and Pollution Control Act 1994* |
| **EPA** | Tasmanian Environment Protection Authority |
| **EPBC Act** | *Environment Protection and Biodiversity Conservation Act 1999* |
| **EPP** | Environmental Protection Policy |
| **FPA** | Forest Practices Authority |

| Abbreviation | Definition |
|---|---|
| **FTE** | full-time equivalent |
| **GSP** | gross state product |
| **IDF** | IdentiFlight |
| **LGA** | local government area |
| **LIST** | Land Information System Tasmania |
| **LOS** | level of service |
| **ML** | megalitre |
| **MNES** | matters of national environmental significance |
| **MW** | megawatts |
| **NBES** | North Barker Ecosystem Services |
| **NC Act** | *Nature Conservation Act 2002* |
| **NGERS** | National Greenhouse and Energy Reporting Scheme |
| **NVA** | Natural Values Atlas |
| **PASS** | potential acid sulfate soil |
| **PEV** | protected environmental value |
| **PID** | property identification |
| **PSG** | project specific guideline |
| **RFA** | Regional Forest Agreement |
| **RTA** | Roads and Traffic Authority of NSW |
| **TFS** | Tasmania Fire Service |
| **TSP Act** | *Threatened Species Protection Act 1995* |
| **WBSE** | white-bellied sea eagle |
| **WTE** | wedge-tailed eagle |
| **WTG** | wind turbine generator |

# Executive summary

St Patricks Plains Wind Farm Pty Ltd, a wholly owned subsidiary of Ark Energy Projects Pty Ltd, is proposing the development of a wind farm in the St Patricks Plains area of the Central Highlands of Tasmania. The wind farm will comprise 47 wind turbine generators (WTGs) with a proposed maximum generating capacity of 300 megawatts, along with ancillary support infrastructure including a new access track network, electrical infrastructure, and an operations facility (the Project). Power generated will be exported via the existing TasNetworks Liapootah-Palmerston 220 kV transmission line onto the Tasmanian grid, significantly increasing Tasmania's renewable energy production.

The construction of the Project will result in a maximum disturbance footprint of up to 481.13 ha (construction footprint). However, once completed, rehabilitated and operational, the actual permanent infrastructure footprint will be approximately 193.88 ha (operational footprint), with 91.09 ha of that footprint subject only to vegetation management (not clearance) for the proposed turbine curtailment system and overhead power line.

The Project is considered a level 2 activity under the *Environmental Management and Pollution Control Act 1994* as it meets the definition of a Wind Energy Facility under that legislation and is also a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* for its potential impacts on matters of national environmental significance. The Project is being assessed as a class 2C project under the bilateral assessment agreement between the Tasmanian and Australian governments. The assessment requires the development of an Environmental Impact Statement (EIS) to address the project specific guidelines (PSGs) developed for the Project by the Tasmanian Environment Protection Authority (EPA) (available online at www.epa.tas.gov.au). A planning permit application will also be lodged with the Central Highlands Council.

This EIS has been developed based on the PSGs supplied by the EPA. For each environmental discipline, the EIS provides a summary of the existing environment, the potential impacts that may arise from the Project, and the management, mitigation and monitoring proposed to prevent the occurrence of unacceptable environmental impacts under state and Commonwealth legislation.

Extensive environmental management has been included for the Tasmanian wedge-tailed eagle, which is resident in the Project area. Significant effort has been made throughout the design phase of the Project to minimise collision risk to eagles from the blades of the WTGs, including the proposed installation of 24 turbine curtailment devices. This technology uses cameras to identify eagles at risk of mid-flight collision and then sends signals to the respective WTGs to curtail (slow or stop) their blade movement. All WTGs will be under the control of at least one curtailment device, with some devices monitoring multiple WTGs. The wind farm layout has also been adapted to avoid areas of known ecological values, particularly known eagle nest sites, which will be protected through the enforcement of a 1 km buffer from all WTGs.

Other environmental considerations for the Project include minimising noise and visual impacts through careful WTG placement; reducing impacts on areas identified as important flora and fauna habitat through the layout of the wind farm; and managing the construction process in an environmentally responsible manner in alignment with all relevant state and Commonwealth legislation.

Traffic generated has been reviewed and impacts addressed. Materials for civil works will be sourced from within Tasmania, and large WTG and electrical infrastructure components will be imported via the Port of Bell Bay near Launceston and delivered by road to the Project Site by specialty vehicles suitable for hauling over-dimensional parts.

Most of the workforce for the Project is expected to be sourced from within Tasmania, with approximately 200 full-time equivalent workers required for the construction period. During operation up to 20 workers will be required to run the wind farm.

The construction of the Project is expected to take approximately 24 months, with an expected commencement date of late 2024.

With the management, mitigation and monitoring measures committed to throughout this document in place, the potential environmental impacts as a result of the Project, in ERA's professional opinion, are manageable and acceptable under state and Commonwealth law.

Overall the Project is considered, in ERA's opinion, to present a net environmental benefit to Tasmania. It does this by significantly increasing the state's production of renewable energy, contributing to Tasmania's renewable energy targets, serving latent load growth and contributing to the state's increased demand for green energy to service existing domestic and commercial demand as well as new industries, such as hydrogen production. This Project would help to lower electricity costs by increasing supply and assist more broadly by contributing to a reduction in carbon emissions from energy production on a nationwide basis.

# Contents

## Figures

## Tables

# 1 Introduction

## 1.1 Title of proposal

This Environmental Impact Statement (EIS) has been prepared to seek approval for the proposed **St Patricks Plains Wind Farm.**

## 1.2 Proposal overview

St Patricks Plains Wind Farm Pty Ltd, a wholly owned subsidiary of Ark Energy Projects Pty Ltd (the Proponent), is proposing the development of a wind farm in the St Patricks Plains area of the Central Highlands of Tasmania. The wind farm will comprise 47 wind turbine generators (WTGs) with a proposed maximum generating capacity of 300 megawatts (MW), with the power generated to be exported via TasNetworks transmission lines (the Project).

Ancillary features of the Project include electrical equipment and facilities, distribution infrastructure, a network of all-weather roads and tracks, a battery energy storage system (BESS), permanent met masts, turbine curtailment technology, and an operations facility.

The construction of the Project will result in a maximum disturbance footprint of 481.13 ha (construction footprint) (shown in Figure 2-2); however, once completed, rehabilitated and operational, the actual permanent infrastructure footprint will be 193.88 ha (operational footprint) (shown in Figure 2-1); a summary table of the operational footprint is provided in Table 2-4.

The proposed Project will involve a capital expenditure of approximately $540 million and will look to employ approximately 200 workers during peak construction and up to 20 full-time equivalent (FTE) workers during the operational phase. The workforce will preferentially be sourced regionally or more broadly from within Tasmania where possible.

WTG components will be imported to TasPorts' Bell Bay facility in northern Tasmania and trucked to site. All remaining construction materials will be sourced regionally or from within Tasmania.

Construction of the Project is planned to commence in late 2024 and is expected to take approximately 24 months to complete. The completed Project will have an operational life of 30 years but is expected to continue past this timeframe with ongoing refurbishment of the infrastructure as required.

## 1.3 Proposal location

The proposed Project will occur within the St Patricks Plains area of the Central Highlands of Tasmania. The nearest town to the Project is Miena, which is approximately 10 km to the north-west, adjacent to the Great Lake; the town includes tourist accommodation, restaurants and a hotel. The highland lakes area is a popular holiday and fishing destination, which results in a fluctuating population density, with many holiday shacks spread throughout the region, including in areas adjacent to the proposed Project Site.

The closest population centres are Bothwell ~35 km to the south and Miena ~10 km to the north. The Project Site is isolated from the larger Tasmanian cities of Burnie, Devonport, Launceston and Hobart.

The Project occurs on approximately 10,000 ha of land over 15 titles:

- 'Wihareja' – 4244a Waddamana Road, Steppes, Tas 7030 (Titles 100672/1 and 156999/1)
- 'St Patricks Plains' – 6011 Highland Lakes Road, Steppes, TAS 7030 (Titles 182190/1 and 182189/1)
- 'The Ripple (North)' – 6300 Highland Lakes Road, Steppes, TAS 7030 (Title 126982/1)
- 'The Ripple (South)' – Highland Lakes Road, Steppes, TAS 7030 (Title 126983/1)

- ‘Ripple Lodge’ – 6212 Highland Lakes Road, Steppes, TAS 7030 (Title 124603/1)
- ‘Allwrights Lagoons’ – Penstock Road, Shannon, TAS 7030 (Titles 205991/1, 100081/65, 100080/2 and 100080/3)
- ‘Christian Marsh’ – 5057 Highland Lakes Road, Steppes, TAS 7030 (Titles 241119/1, 241119/2, 148905/1 and 148905/2).

Collectively, these land parcels are referred to as ‘the Land’ for permitting purposes and define the area in which the level 2 activity will occur. Throughout this document, the Land is referred to as the Project Site. The Project Site general location is illustrated in Figure 1-1, with the Project Site features such as waterways, roads, topography, and closest sensitive receiver shown Figure 1-2.

There are a small number of residential properties within and adjacent to the Project Site. All owners of residential properties within the Project Site and select properties neighbouring the Project Site are involved with the Project, with commercial agreements in place with the Proponent. They are therefore considered differently to those residential properties not commercially involved when assessing certain environmental aspects of the Project, including noise. These two types of residential premises, marked as involved or uninvolved accordingly, are shown in Figure 6-19.


Project site (the Land)

EXISTING INFRASTRUCTURE

Towns/communities

Roads

NATURAL FEATURES

Rivers and streams

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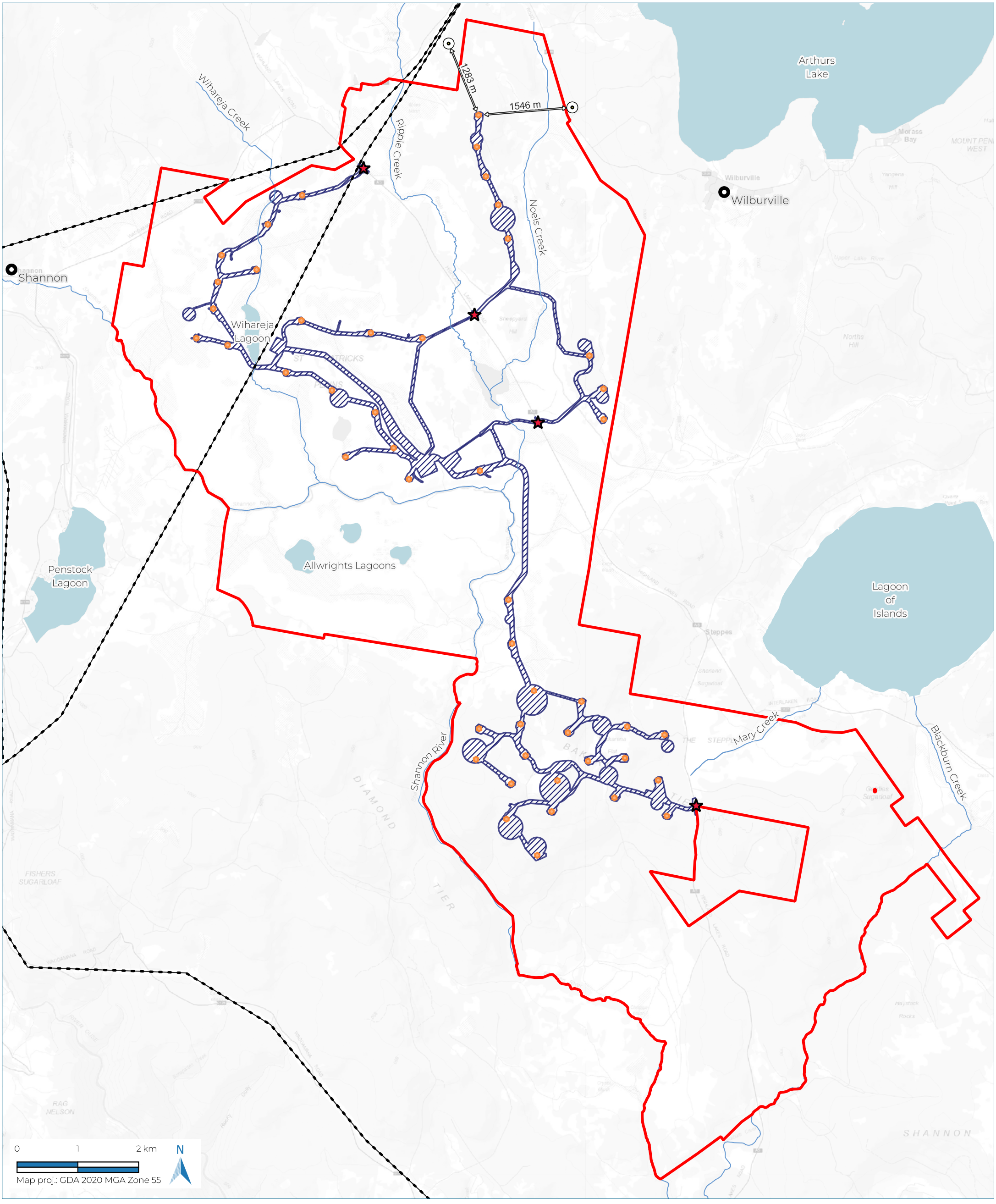
St Patricks Plains Wind Farm

Figure 1-1
Project Location




Project site (the Land)

EXISTING INFRASTRUCTURE

- Closest non-involved sensitive receivers *
- Towns/communities
- Power line

NATURAL FEATURES

- Rivers and streams
- Lakes and lagoons

PROPOSED INFRASTRUCTURE

- Access location
- Construction footprint
- Wind Turbine

* Involved and non-involved receivers are defined in Section 6.4 and are subject to change as discussions between Landowners and the Proponent are ongoing.

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St Patricks Plains Wind Farm

Figure 1-2
Project site details

## 1.4 Project context and background

The St Patricks Plains site was identified by the Proponent as a potential wind farm site owing to its strong and consistent winds, large freehold land parcels, isolation from population centres, and access to existing electrical transmission infrastructure (the Liapootah-Palmerston 220 kV transmission line).

The Proponent's other projects in Tasmania include the Western Plains Wind Farm in Stanley (12 WTGs), the Guildford Wind Farm near Waratah in north-west Tasmania (~80 WTGs), and the Hellyer Wind Farm south of Burnie (~40 WTGs), which are all currently in the project approval phase. The Proponent also gained approval for two solar farms in the north of the state.

The Project is located north east of the 144 MW Cattle Hill Wind Farm (the nearest proposed WTG lies approximately 10 km from the nearest existing Cattle Hill WTG), which is on the eastern shore of Lake Echo and includes 48 Goldwind 3 MW WTGs. The Cattle Hill Wind Farm became operational in 2020 and employs nine full-time workers and an equal number of FTE contractors.

The remaining wind farm projects in the North East and North West Renewable Energy Zones in Tasmania are generally coastal projects, which are in various phases, including operational, approval and developmental.

The Proponent will look to build on the success of existing wind farms in Tasmania, contributing towards Australia's green energy target and working with Tasmanians to make the State Government's 2040 renewable energy target of 200% generation a working reality.

While the Proponent is involved in several other wind energy projects in the state, this Project is proposed in isolation and does not rely upon or directly connect to any other project.

## 1.5 Legislative framework

Wind farms are considered level 2 activities under the *Environmental Management and Pollution Control Act 1994* (EMPC Act) if they meet the definition of a Wind Energy Facility as outlined under Schedule 2 (7)(f) of the Act, namely *'facilities for generating energy through wind with a maximum generating capacity of 30 megawatts or more'*.

As the Project exceeds the 30 MW threshold, the Proponent submitted a Notice of Intent (NOI) for the Project to the Environment Protection Authority Tasmania (EPA) on 7 June 2019. Following receipt of the NOI, the EPA responded in a letter dated 22 July 2019 with the advice that the Project would require a class 2C assessment under the EMPC Act. On 28 October 2019, the EPA issued project specific guidelines (PSGs) for the Project, requiring the submission of an Environmental Impact Statement (EIS) (this document). The EPA also issued two letters amending the PSGs, one dated 15 November 2019, instructing the Proponent to incorporate fire risk into the EIS, and the other dated 23 February 2022 amending the noise assessment requirements for the Project.

This EIS has been prepared in accordance with those PSGs and amendment letters, and the EPA *Guidelines for Preparing an Environmental Impact Statement* (March 2019). Both guideline documents are available on the EPA website at the time of publishing.

The Project will be subject to assessment under Section 25 of the EMPC Act through the lodgement of a planning permit application to the Central Highlands Council (along with a copy of this EIS), which will then be referred by the Council to the EPA for assessment.

The Project was also referred under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to the Australian Government Department of Climate Change, Energy, the Environment and Water (DCCEEW) (which was the Department of Environment and Energy at the time of referral), as it was assessed that the Project had the potential to significantly impact several matters of national environmental significance (MNES).

In September 2019 the DCCEEW notified the Proponent that the Project would be a controlled action and would therefore require Australian Government approval under the EPBC Act. The referral number for the Project is 2019 / 8497. The Proponent has elected that the Project be assessed under the bilateral assessment agreement between the State and Australian governments.

In addition to the above statutory approval process, the proposed Project must also comply with a broad range of environmental and planning legislation, guidelines, standards and policies as described in the relevant sections of this EIS. Some of the key acts, regulations and policies most relevant to the Project include the following (noting that further detail on the application of these and other documents is provided in the relevant sections of this EIS):

- *Environmental Management and Pollution Control Act 1994*
- *Environment Protection and Biodiversity Conservation Act 1999*
- *Threatened Species Protection Act 1995*
- *Nature Conservation Act 2002*
- *Forest Practices Act 1985* and associated regulations and policies
- *Weed Management Act 1999*
- *Water Management Act 1999*
- *Inland Fisheries Act 1995*
- *Dangerous Substances (Safe Handling) Act 2005* and associated regulations
- *Dangerous Goods (Road and Rail Transport) Act 2010* and associated regulations
- *Environmental Management and Pollution Control (Noise) Regulations 2016*
- *Environmental Management and Pollution Control (Waste Management) Regulations 2020*
- *Tasmanian Environmental Protection Policy (Noise) 2009*
- *Tasmanian Environment Protection Policy (Air Quality) 2004*
- *State Policy on Water Quality Management 1997*
- *Work Health and Safety Regulations 2012.*

## 1.6 Proponent information

The Proponent is St Patricks Plains Wind Farm Pty Ltd, a wholly owned subsidiary of Ark Energy Projects Pty Ltd (Ark Energy) and was formerly Epuron Projects Pty Ltd. Epuron Projects was purchased by Ark Energy Corporation Pty Ltd on 5 May 2022, part-way through the development of approvals for the Project.

Ark Energy Corporation is an Australian subsidiary of Korea Zinc Co. Ltd, which is the largest zinc, lead and silver producer in the world. Established in January 2021, Ark Energy's mandate is to decarbonise the energy supply of the Korea Zinc group, starting with Sun Metals Corporation Pty Ltd in Townsville, North Queensland. In November 2020, Sun Metals joined RE100 and aims to become the first refinery in the world to produce green zinc. The company has a hydrogen project and a mission to become the safest and most competitive producer of green hydrogen in the world.

Ark Energy has a focus on greenfield development of utility-scale wind and solar energy projects in Australia. Incorporating Epuron, which was established in 2003, Ark Energy is the pre-eminent wind farm developer in NSW and one of the most experienced renewable energy developers in the Australian market.

Ark Energy has secured approvals for 10 large-scale wind farms including four in New South Wales that are now in operation, and three in New South Wales and three in Queensland that are in pre-construction or under construction. The team has also developed eight solar farms currently in operation.

Ark Energy has offices in Sydney, Brisbane and Townsville. It is a key driver of progress in the renewable energy sector in Australia and has a large portfolio of renewable energy assets and projects in development across New South Wales, Queensland, the Northern Territory and Tasmania.

There are no proceedings and have not been any proceedings against Ark Energy under a Commonwealth, state or territory law for the protection of the environment or the conservation of sustainable use of natural resources.

Ark Energy is committed in its business activities to abiding by the principles of ecologically sustainable development. Ark Energy's mission is to produce electricity through the commercialisation of renewable energy resources and Ark Energy is proud of its environmental, health and safety records and continues to maintain and develop policies and procedures that endorse and support them.

All documents referencing Epuron, Epuron Projects, Ark Energy or Ark Energy Projects should be taken to refer to St Patricks Plains Wind Farm Pty Ltd.

St Patricks Plains Wind Farm Pty Ltd is a special purpose vehicle that enables the Project to be a separate, transferable business entity.

Proponent and activity operator details are as follows.

**Name of Proponent (legal entity):** St Patricks Plains Wind Farm Pty Ltd
**Name of Proponent (trading name):** St Patricks Plains Wind Farm
**Registered and Postal Address of Proponent:** Level 2, 275 George Street, Sydney, NSW 2000
**ABN:** 99 665 062 493
**ACN:** 665 062 493
**Contact Person:** Donna Bolton
**Phone:** 1800 731 296
**Email:** info@stpatricksplainswindfarm.com.au

# 2 Proposal description

## 2.1 Project overview

The proposed Project is the development of a 47 WTG wind farm at St Patricks Plains with a generating capacity of up to 300 MW. The final generating capacity of the Project will depend on the WTG model selected, which will be chosen post-approval to ensure the most efficient and suitable WTG for the Project Site is used.

The Project includes an electrical reticulation system to collect and distribute the power generated, which will consist of a substation with transformer, underground 33 kV cabling from the WTGs to the substation, and an overhead (or potentially underground) 220 kV transmission line from the substation to a switchyard where the Project will connect to the existing TasNetworks Liapootah-Palmerston 220 kV transmission line. A BESS will be located alongside the substation to assist with the control of the output from the Project; it is anticipated this would be sized at between 70 and 140 MWh.

Approximately 52.5 km of all-weather access tracks will be required within the Project Site during the construction and operational phases. This includes development of new tracks and upgrades to existing tracks where suitable.

An operations facility with a storage area and a large workshop also forms part of the Project.

Two meteorological masts (met masts) will be installed within the Project Site to collect data on variables such as wind speed and wind direction. Note there are currently two temporary met masts on site which will be removed following the installation of the new met masts.

There will be 24 automated WTG curtailment units on simple towers of varying heights installed across the Project Site to minimise eagle impacts by reducing or halting WTG blades when the system identifies an approaching eagle. The 24 units will collectively control all 47 WTGs. Power and communications for these units will be installed in the underground reticulation trenches back to the operations facility.

More detailed descriptions of the various Project components are provided in the following sections and illustrated in the operational site plan in Figure 2-1 (this layout is indicative and subject to micro siting, as discussed in Section 2.4.1). All Project works will be contained within the Project Site, including the connection to the existing transmission line.

Prior to the commencement of construction, a final design and layout of the Project will be detailed in a Wind Farm Design Report, which will be provided to the EPA.

## 2.2 Construction overview

The construction of the Project is expected to take approximately two years and will involve a construction team of approximately 200 workers during peak periods. Given the remote location of the site, the majority of the construction team will be working on a drive-in drive-out basis and stationed at either a temporary camp outside the Project Site (excluded from this application) or spread over local and regionally available accommodation in towns such as Bothwell and Miena. This will be determined post-approval of the Project.

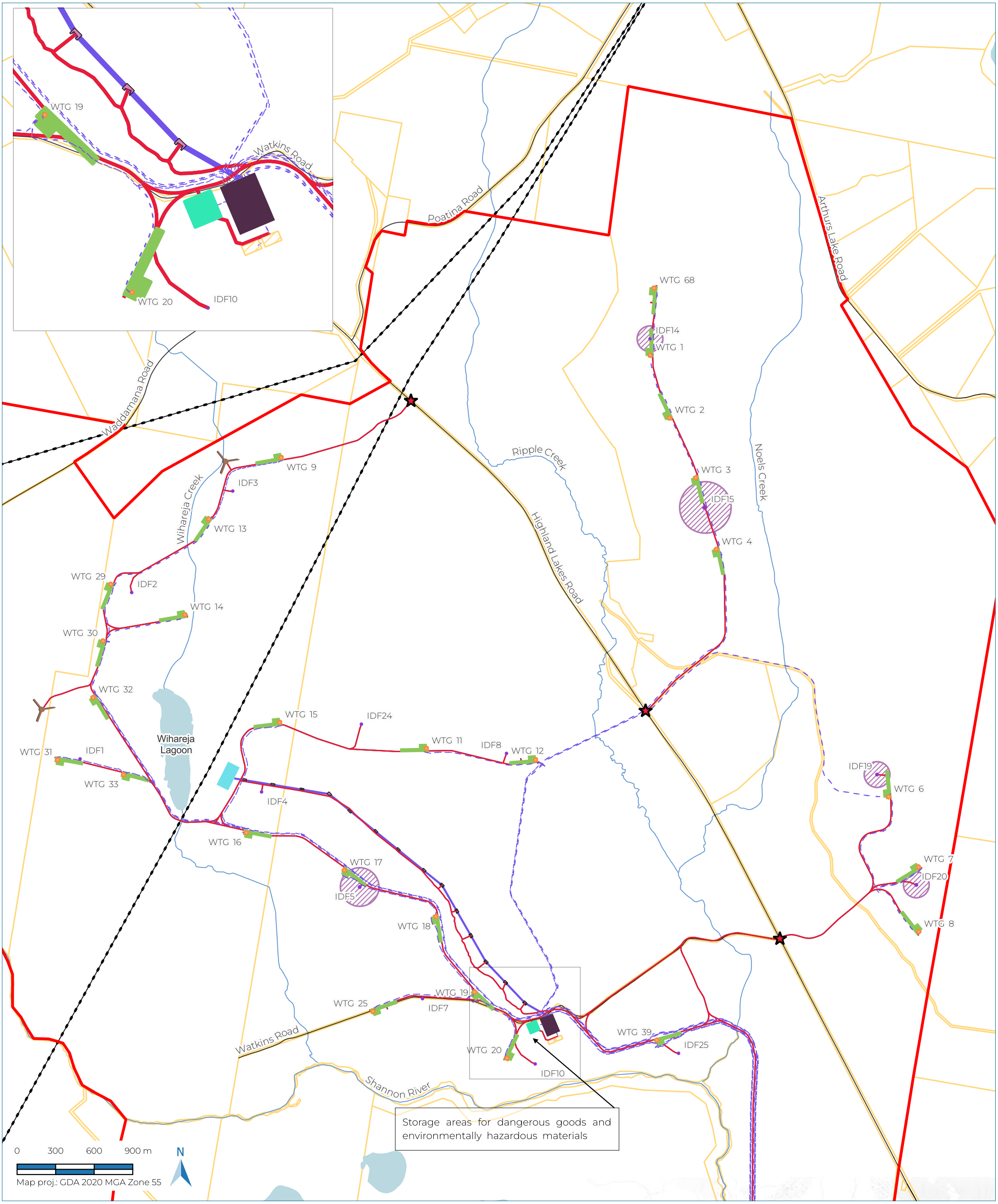
All components and materials will be brought to Project Site via existing road networks, with the majority of WTG components being transported from the Bell Bay Port to the Project Site via the predetermined routes outlined in Section 6.14. Materials will be sourced from a variety of locations, including local and regional quarries and material supply depots further afield around Tasmania. Water will be sourced from the Project Site (refer Section 2.4.3.1).

Temporary construction compounds consisting of crib rooms, amenities and storage containers will be built in the north and south of the Project Site for the workforce.

Concrete will be batched on site at temporary plants to be located in the north and south of the Project Site adjacent to the construction compound in the north and laydown area in the south, as shown in Figure 2-2.

Additional construction infrastructure will include bunded refuelling facilities, a washdown bay, and water supply pumps and tanks.

More detailed descriptions of the construction process and components are presented in Section 2.4, and a construction site plan is provided in Figure 2-2 (this layout is indicative and subject to micro siting, as discussed in Section 2.4.1).




Project site (the Land)

EXISTING INFRASTRUCTURE
- Roads
- Power line
- Parcels

NATURAL FEATURES
- Rivers and streams
- Lakes and lagoons

PROPOSED INFRASTRUCTURE
- Access location
- Wind Turbine
- Turbine curtailment device
- Met mast
- Battery energy storage system
- Hardstands
- Overhead poweline pole
- Operations facility
- Substation
- Switchyard
- Turbine curtailment device radial clearing
- Overhead powerline
- Proposed road
- Underground reticulation

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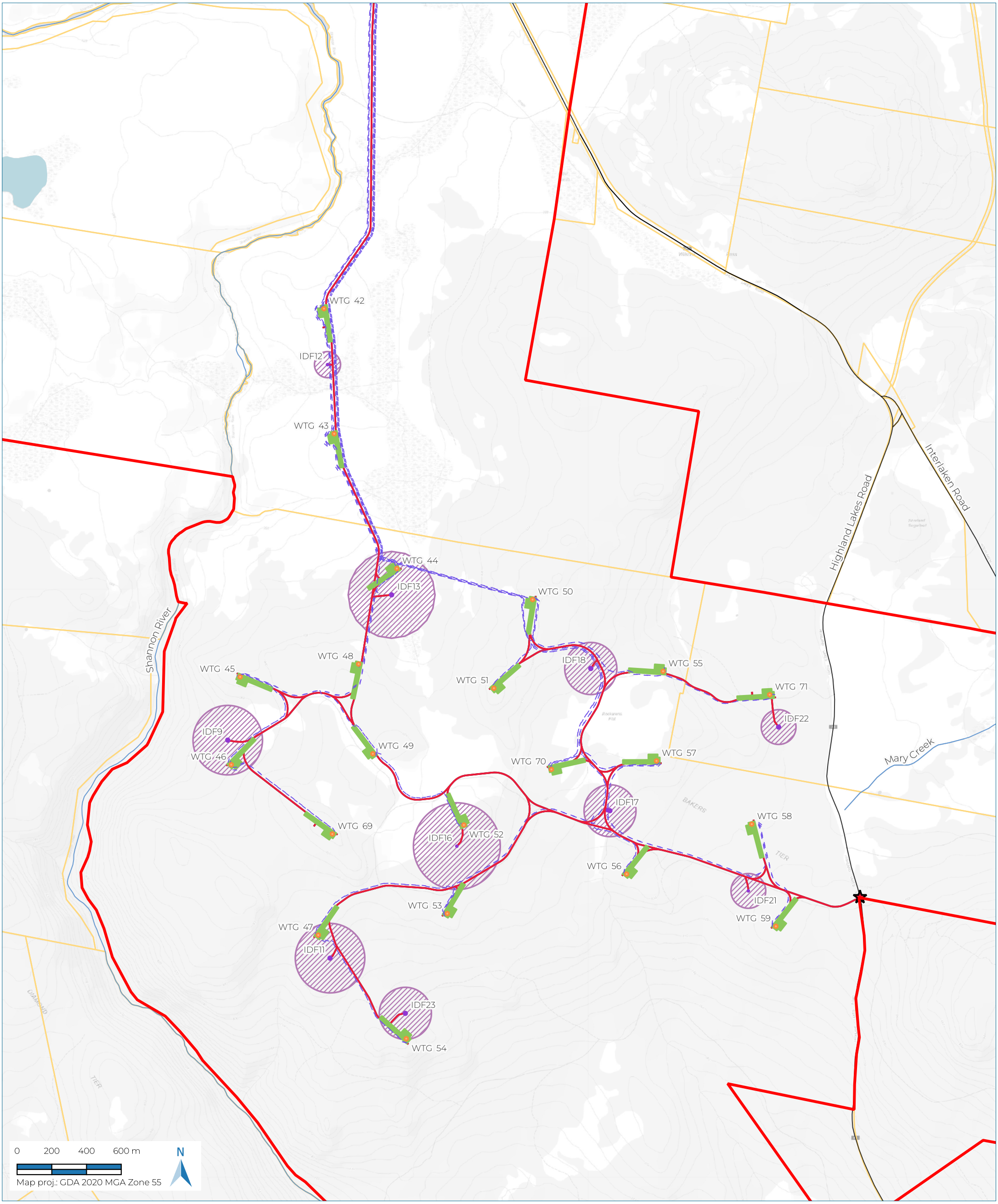
St Patricks Plains Wind Farm

Figure 2-1a
Operational layout (north)




Project site (the Land)

EXISTING INFRASTRUCTURE
- Roads

NATURAL FEATURES
- Rivers and streams
- Lakes and lagoons

PROPOSED INFRASTRUCTURE
- Access location
- Wind Turbine
- Turbine curtailment device
- Hardstands
- Proposed road
- Underground reticulation
- Turbine curtailment device radial clearing

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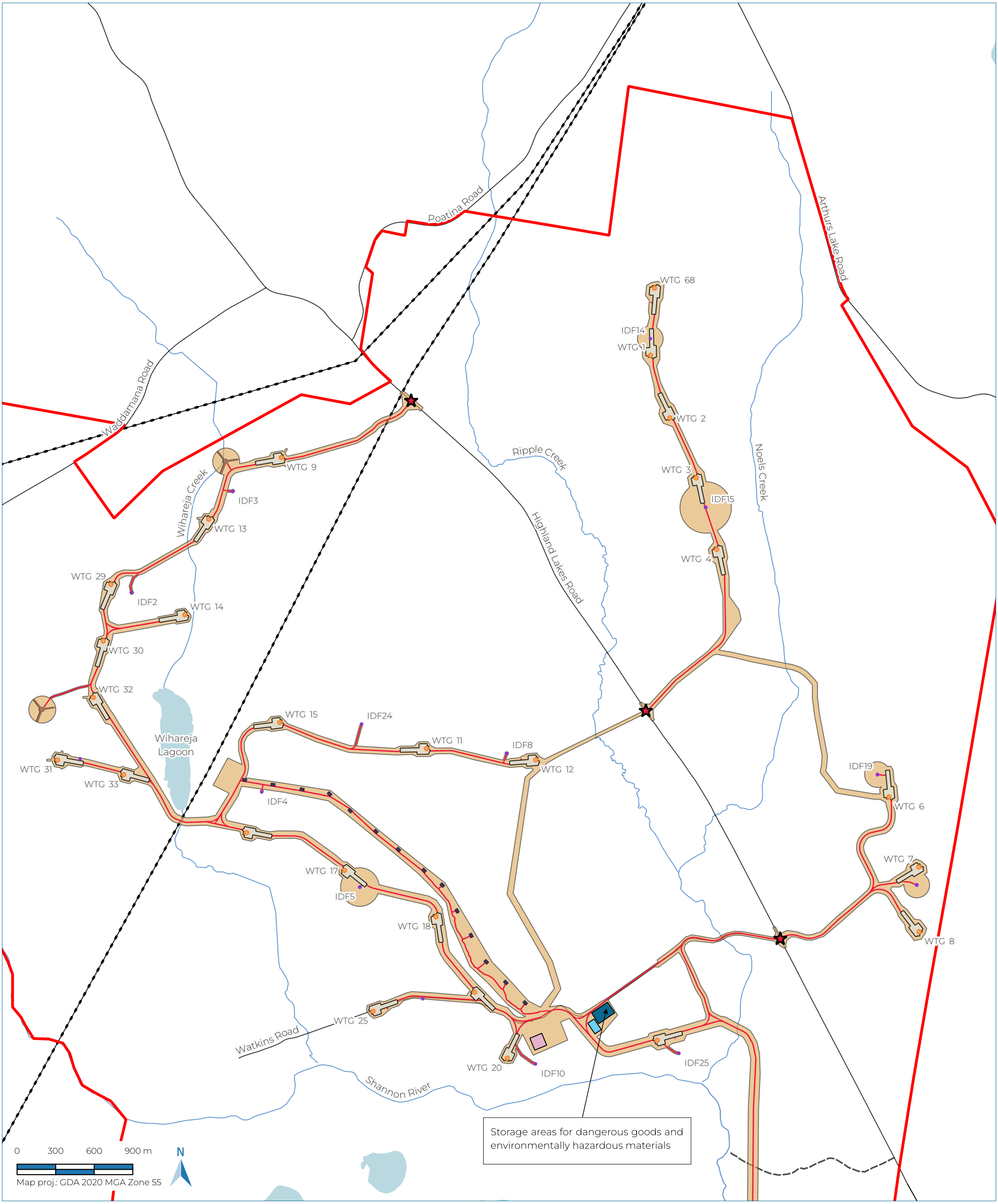
St Patricks Plains Wind Farm

Figure 2-1b
Operational layout (south)




Project site (the Land)

EXISTING INFRASTRUCTURE
- Roads
- Power line

NATURAL FEATURES
- Rivers and streams
- Lakes and lagoons

PROPOSED INFRASTRUCTURE
- Access location
- Wind Turbine
- Turbine curtailment device
- Met mast
- Proposed road
- WTG construction hardstand
- Construction footprint
- Laydown area
- Batch plant
- Construction compound
- Overhead pole clearing

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St Patricks Plains Wind Farm

Figure 2-2a
Construction site plan (north)

WTG 20
IDF10
IDF25
Shannon river abstraction point
WTG 42
IDF12
WTG 43
WTG 44
IDF13
WTG 50
WTG 48
WTG 45
WTG 51
WTG 55
WTG 71
IDF22
IDF9
WTG 49
WTG 70
WTG 57
WTG 46
IDF17
WTG 58
WTG 52
IDF16
WTG 69
WTG 56
IDF21
WTG 47
WTG 53
WTG 59
IDF11
IDF23
WTG 54
Storage areas for dangerous goods and environmentally hazardous materials
Lagoon of Islands
Interlaken Road
Highland Lakes Road
Mary Creek
Shannon River
0 300 600 900 m
N
Map proj.: GDA 2020 MGA Zone 55

Project site (the Land)

EXISTING INFRASTRUCTURE
- Roads
- Access track

NATURAL FEATURES
- Rivers and streams
- Lakes and lagoons

PROPOSED INFRASTRUCTURE
- Access location
- Wind Turbine
- Turbine curtailment device
- Proposed road
- WTG construction hardstand
- Construction footprint
- Laydown area
- Batch plant
- Construction compound

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St Patricks Plains Wind Farm

Figure 2-2b
Construction site plan (south)

## 2.3 Project components

### 2.3.1 Wind turbine generators (WTGs)

The WTGs to be used for the Project will be of a standard three blade design, with a nacelle[1] containing all the motor and electrical components sitting atop a tubular steel or concrete tower. A central hub attached to the nacelle will support the three blades, which will likely be constructed of a composite material (e.g. fibreglass reinforced with epoxy, carbon fibre, and solid metal tip).

The current candidate WTG is the Vestas V162, which comes in a variety of power generating versions, currently from 5.6 MW to 6.2 MW models. There are also other, higher rated models using the same dimensions on the design horizon, including a 7.2 MW version. The 6.2 MW version has been used for the various studies completed for this assessment, as it is expected to be comparatively close to the final model used for the Project.

The final model will be selected post approval, as new models are becoming available regularly; the Project will seek to have the most efficient WTG model available at the time of construction to reach the 300 MW Project limit. It is important to note that the final model chosen will be constrained to the physical envelope and characteristics of the candidate model used for this assessment, including the footprint, dimensions and noise-generation potential. The final output of the Project will not exceed 300 MW; therefore only a reduction, not an increase, in WTG numbers from a total of 47 is possible.

Each WTG will sit atop a concrete foundation with a diameter of 20–30 m, which will extend typically 3–5 m below ground level and may include piling or rock anchors, depending on geotechnical conditions encountered at each WTG location on site, for anchoring support. The concrete foundation volume will be around 700 $m^3$ and surrounded by a permanent gravel hardstand to allow access and ongoing maintenance for the WTG. This will collectively make up the ground disturbance footprint of each WTG during operation; with 47 WTGs, this equates to approximately 43 ha.

The final footprint of each WTG will be approximately half of the total disturbance required at each WTG location during the construction phase, when temporary sections of hardstand will be required for multiple cranes and WTG components. An example of the construction WTG footprint arrangement and general layout with permanent and construction disturbance areas is shown diagrammatically in Figure 2-4 and Appendix A. A maintenance laydown area, shown in Figure 2-4, will be retained for the use of cranes during maintenance works; this area will be allowed to partially regenerate with grasses, but will retain structural integrity to still allow crane operations to occur as required.

The proposed maximum measurement values, including the permanent hardstand area following construction for the various WTG parameters are summarised in Table 2-1, with the parameters illustrated in Figure 2-3.

Table 2-1 Proposed maximum WTG parameters

| WTG parameter | Maximum value |
|---|---|
| Rotor diameter | 162 m |
| Blade length | 80 m |
| Rotor swept area | 20,612 $m^2$ |
| Maximum blade tip height | 231 m |
| Hub height | 150 m |

[1] A nacelle is a cover that houses generating components in a wind turbine, which sits atop the turbine tower behind the blades.

| WTG parameter | Maximum value |
|---|---|
| Total WTG construction hardstand | 1.1 ha |
| Total WTG permanent hardstand | 0.92 ha |

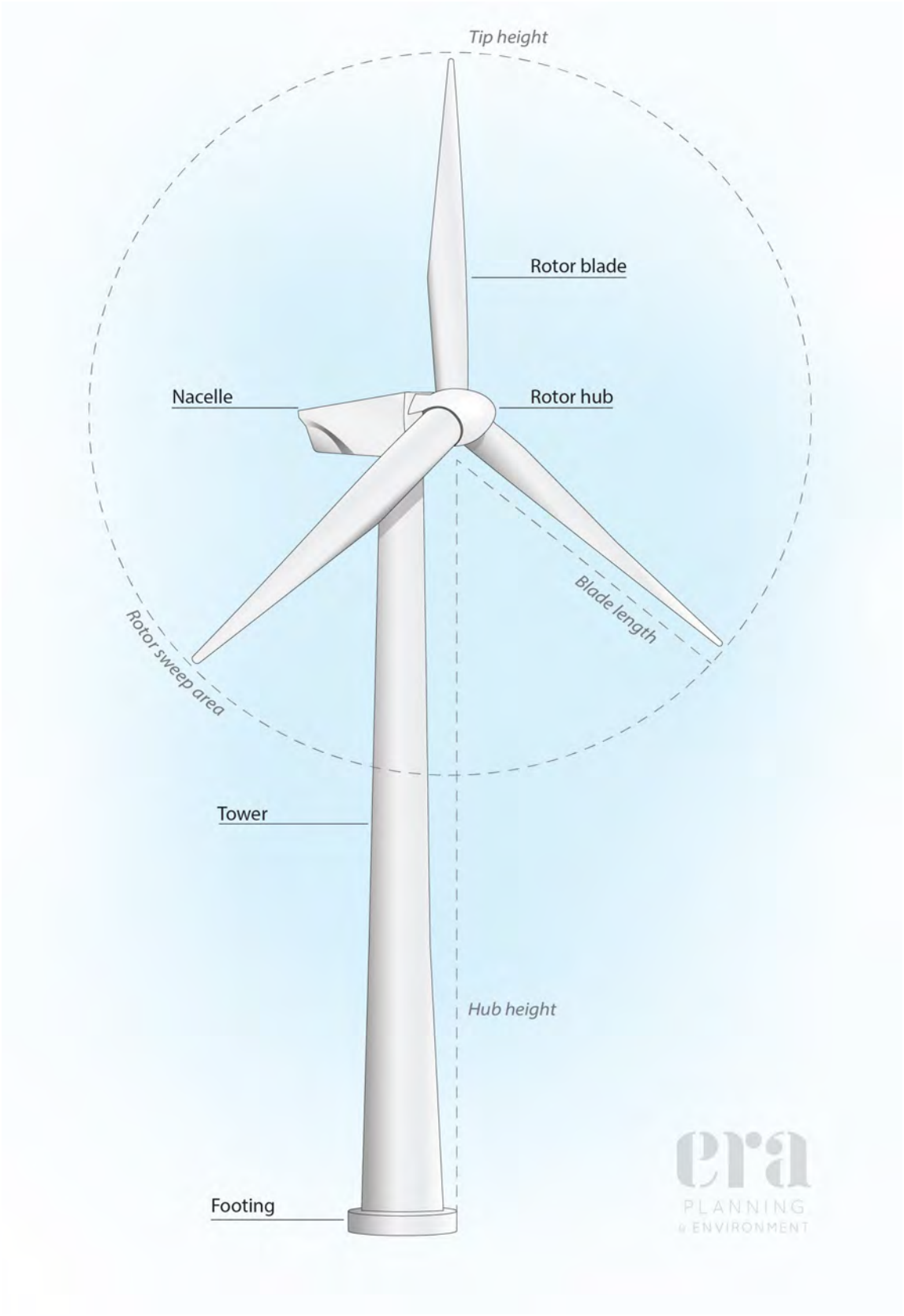


Figure 2-3 WTG schematic

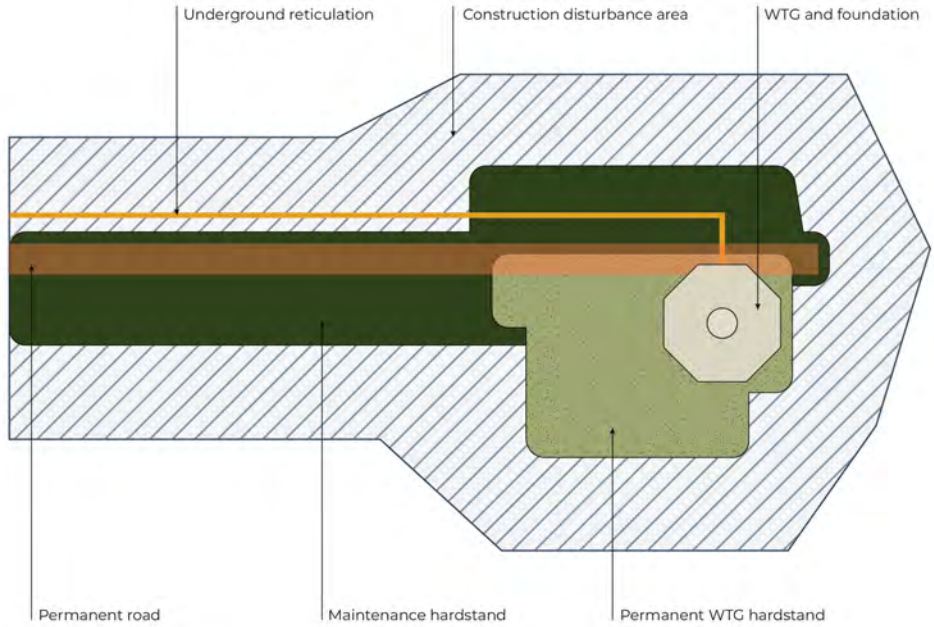


Figure 2-4 WTG ground disturbance during construction and operation

The WTGs can operate in a wind speed range of approximately 3–25 m/s (10.8 – 90 km/hr). The energy from the WTG blades will be captured via a central shaft within the nacelle attached to the WTG hub, which is then transferred to a generator either via a series of gears or a direct drive system. The power generated is then fed via cabling inside the tower structure into the electrical reticulation of the Project.

To ensure energy collection is optimised, WTGs will include a control system that will change the yaw or rotation of the nacelle via a mechanical swivel system to ensure the optimal wind direction is faced. Also, the control system will be able to change the pitch of the blades to suit the wind conditions.

During winds exceeding the design capacity of the WTG (in this case >25 m/s or 90 km/hr), the control system will pitch the blades to an angle to slow or stop rotation, ensuring the integrity of the internal mechanics of the system is maintained. A braking system is also integrated into the design of the WTG that can halt or slow rotation as required, including during maintenance, extreme weather events or when curtailment is required (e.g. to avoid eagle collision).

Each WTG will require an approximately annual routine service, which will take in the order of one week to be completed by an onsite operational maintenance crew of 4 to 5 workers. Maintenance crews will work year-round with the 47 WTG layout proposed.

### 2.3.2 Electrical system

The Project's electrical system will consist of five main components:

- The underground 33 kV electrical cabling from the WTGs to the substation
- A substation that will collect the power from the WTGs
- A transmission powerline (to be either overhead or underground subject to final design) that will transfer the power from the substation to a switchyard
- A switchyard that will connect to the existing TasNetworks Liapootah-Palmerston 220 kV transmission line via a new overhead transmission line

- Two battery stations to assist in smoothing of power delivery to the transmission system as required

This arrangement is summarised in the electrical system schematic in Figure 2-5. The final arrangement of the electrical infrastructure will not be known until final designs are completed. The disturbance footprint for the various electrical infrastructure is summarised in Section 2.6. The disturbance footprint used for the purposes of vegetation clearance calculations has been sized to ensure a conservative approach. Where possible, priority will be given to disturbance of non-native vegetation over native.

The base of each WTG will connect to a buried 33 kV electrical cable that will be trenched to the substation, typically alongside the access road, and groups of four to five WTGs will be connected in strings. As cables are joined by those from other groups of WTGs, these cables will then continue underground trenched in parallel, typically along the main arterial roads, to the substation.

Individual cable trenches will be approximately 1.2 m deep and 0.6 m wide. Towards the substation, where multiple cables will align, the total width of trenching alongside arterial roads will increase proportionally. Cables trenched in parallel must be spaced apart to minimise any electrical interference issues between the cables.

In total there is expected to be approximately 84 km of trenched cable (noting some cables will be trenched parallel), the ground disturbance of which has been included in the overall site disturbance.

The buried cable network will resurface and connect at the substation, which will subsequently convert the incoming 33 kV electricity to 220 kV via transformers and other related electrical infrastructure. The substation will consist of various electrical infrastructure which will be housed on an approximate 150 m x 170 m fenced concrete and gravel slab.

Once transformed to 220 kV, the power will then be transferred from the substation via double circuit overhead or underground powerlines to the next stage in the power transition process, the switchyard. If overhead powerlines are adopted this would be 220 kV double circuit monopole structures with a height of approximately 40 m. The final number of overhead powerlines would depend on the final Project layout and geotechnical results, but with the current proposed layout, 14 towers are proposed. Each tower will require an approximate 20 m x 30 m clearance area to allow construction, totalling 0.84 ha. Once the towers are constructed, the ground will be either revegetated or left to re-establish. The spans of wires between the towers are unlikely to need vegetation clearance other than potential trimming of occasional tree limbs; an allowance of 3.94 ha has been provided in the operational footprint for vegetation maintenance.

The BESS will be positioned next to the substation, which the batteries will be connected to. Each battery station may consist of multiple batteries and transformers with a total indicative capacity per station of 30 MW. Example sizing of a battery pack unit is approximately 14.4 m x 3.4 m and transformer approximately 3.5 m x 3.5 m; the BESS will be set on an approximate 28 m x 52 m concrete slab and gravel area with adequate spacing for servicing.

The construction of the major components of the electrical systems, including the substation, BESS, switchyard and associated overhead and underground transmission lines, will commence after the development of the construction access roads early in the construction phase. The WTGs will then be constructed and connected into the system on an as-completed basis. Each WTG could start producing power following commissioning during the construction phase (subject to connection arrangements). Where possible, it is preferred that some WTGs generate output while others are still being commissioned.

The operation of the electrical infrastructure will be managed and maintained by the permanent site workers and contractors as required.

The distance from the substation to the switchyard will be approximately 3.2 km. If overhead powerlines are chosen in the final design, spans between towers would vary from 80 m to 257 m, resulting in a maximum easement footprint of 3.94 ha. A 60 m construction buffer around the whole alignment has been included, although this is a conservative impact area and is expected to be significantly less.

The switchyard will consist of an approximate 100 m x 200 m concrete slab housing various electrical infrastructure that will allow connection to the Liapootah-Palmerston 220 kV transmission line via a short length (i.e. less than 50 m) of 220 kV overhead transmission line (within the existing transmission line easement).

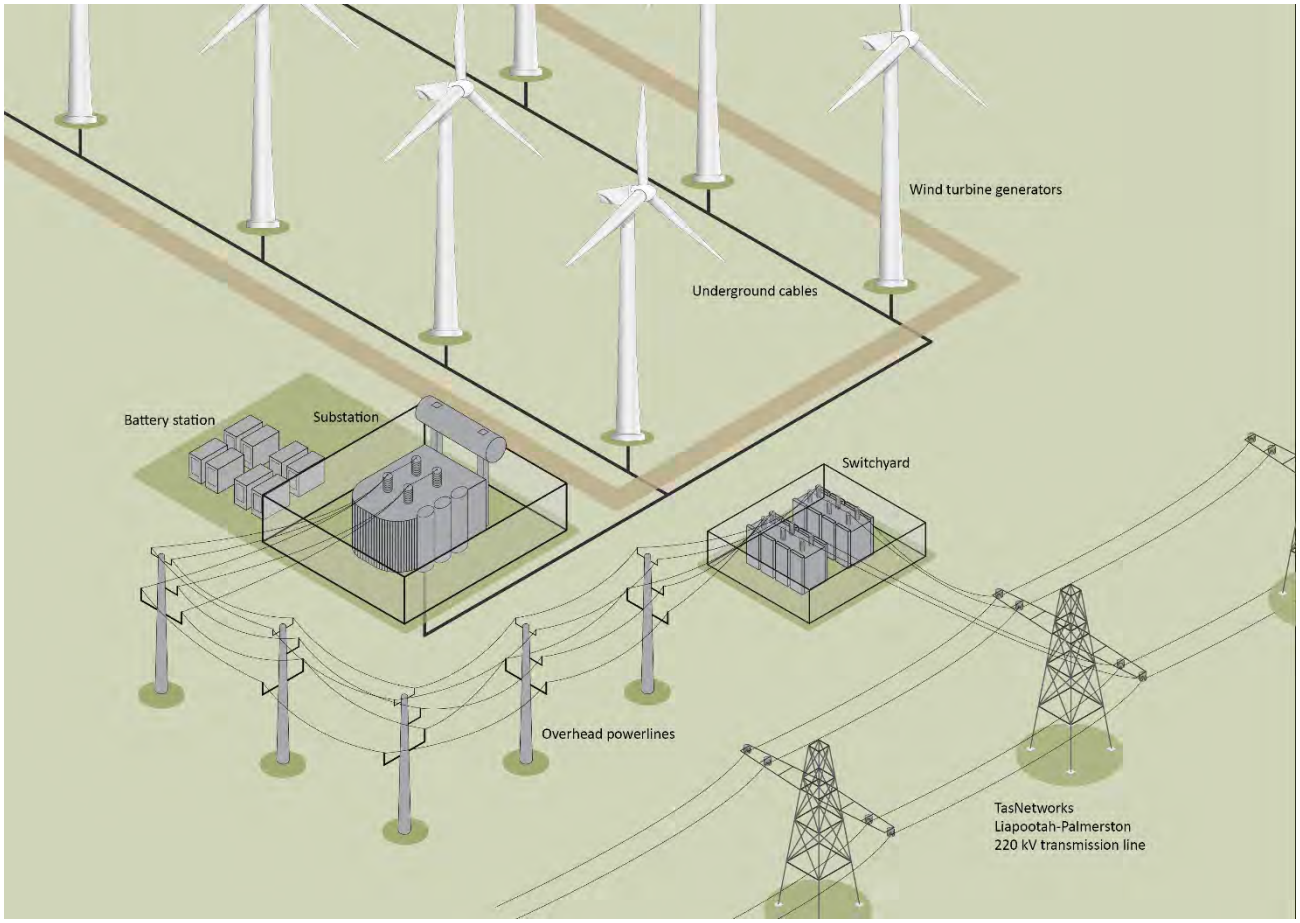


Figure 2-5 Electrical system schematic

### 2.3.3 Road network

Approximately 52.5 km of all-weather access roads will be required for the Project, with a combination of new roads and upgrades to existing tracks throughout the Project Site. Roads will be designed in accordance with the general design principles outlined in Appendix A. Roads will typically have a pavement layer depth of approximately 300 mm.

The internal access roads will typically be 5.5 m – 6 m trafficable width on straights, with localised widening on curves and where required to support transportation of the over-dimensional WTG component vehicles. There will be an additional 2 m either side to allow for installation of drains, resulting in a total permanent disturbance width of approximately 10 m (6 m road surface, plus 2 m either side for drains). The internal access roads will be constructed using unsealed pavements and will be generally in accordance with the Australian Road Research Board (ARRB) Unsealed Roads Manual.

During construction there will be additional disturbance alongside the roads associated with trenching for electrical cabling and for general construction; this portion of the impact area will be rehabilitated. The total road disturbance width is variable across the site and has been calculated to allow sufficient construction room for each road length across the site, as shown in the construction footprint in Figure 2-2. The width of

the road (and trenched electrical cable) construction footprint generally ranges from 50 m to 80 m. Approximately 10 m of this is the final road footprint (inclusive of drains) and the remainder is to facilitate construction vehicles, stockpiling of construction materials, and cable trenching and installation, noting that the width of the corridor increases in areas where more than one cable is required to be installed: sections of electrical cabling laid in parallel must be sufficiently spaced apart to prevent electrical interference between cables.

All roads will include suitable drainage systems (e.g. table drains) and culverts will be installed where necessary. Drainage from roads will be designed to discharge appropriately to the surrounding vegetation or drainage lines. Roads will mostly be gravel, but some portions near to the entrance of the Project Site and around the operations facility may be bitumen to minimise dirt transport onto main highways and facilities.

A typical road cross section is illustrated in Figure 2-6, and the road layout for the Project is shown in Figure 2-1.

The Traffic Impact Assessment completed for the Project (provided in Appendix G) assessed the suitability of the early design stage proposed Project Site entrances. Of the existing three site entrances and one junction (i.e. consisting of two additional entries), two were required to be relocated due to restricted sight distances that did not meet the minimum required Safe Intersection Sight Distance at the 100 km/h speed limit. This includes moving 'Access Location 1' approximately 30 m to the north, while 'Access Location 3' required the entrance to the road to be relocated 130 m to the south-east to meet requirements, as shown in detail in Appendix G.

Site entries will also be enlarged to accommodate the swept path of the 80 m WTG blades and will have a maximum 10% grade to accommodate the movement of heavy vehicles. They will also be upgraded to a hard-wearing gravel surface. The enlarged entrances for construction are visible in Figure 2-2.

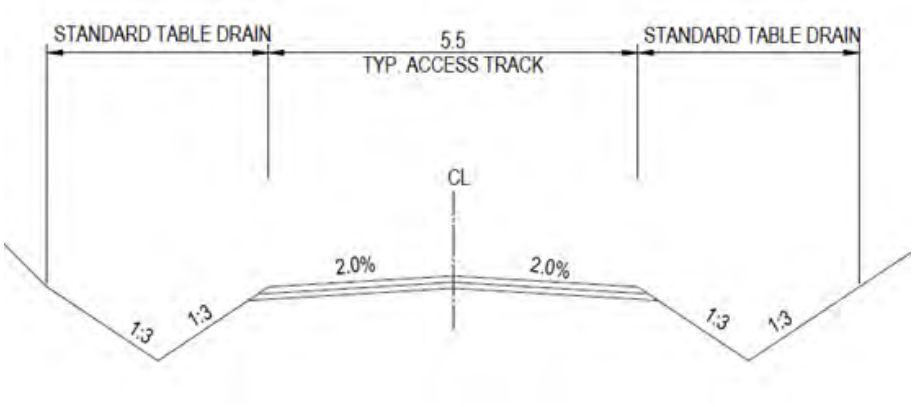


Figure 2-6 Typical road cross section (Project roads will have a trafficable width of 5.5 – 6.0 m)

### 2.3.4 Operations facility

The operations facility will be located in the northern half of the Project Site and will be the main hub for the Project during operation. The facility will house an administration building, a servicing shed, a washdown facility, and hardstands for vehicle and equipment storage. All environmentally hazardous materials, including fuel, will be kept within the bounds of the facility. Key components of the facility include the following:

- The facility will be located within an approximate 80 m x 80 m footprint and is likely to be fenced for security.
- The administrative building will contain permanent mess and toilet facilities for workers, which will use an 'enviro-cycle' style septic system.

- The servicing shed will be of a size suitable to house required spare parts, equipment, and environmentally hazardous materials.
- A roof rainwater collection system and storage tank will be included to provide water for the facility.
- A fuel bowser using an aboveground tank with bunded drainage will also be included in the facility grounds.
- A permanent washdown facility will be located at the operations compound to minimise the potential for weed and pathogen introduction to the site. This facility will consist of a bunded concrete platform to collect washdown water (which will be sanitised in accordance with the *Tasmanian Washdown Guidelines for Weed and Disease Control 2004*) and a high-pressure hose system and generator in a small shed. Wastewater from the system will be collected by a contractor and regularly disposed of at a suitably licensed facility. The footprint of this facility will be large enough for a service truck or single carriage semi-trailer.

The operations facility will be constructed towards the latter stages of the Project construction timeframe.

### 2.3.5 WTG curtailment devices

As part of the mitigation strategy for minimising eagle strikes, WTG curtailment devices, namely the IdentiFlight system, will be installed throughout the Project Site. The IdentiFlight system (IDF) works using high precision camera optics to identify eagles approaching the rotor swept area of the WTG and then to send a message to a particular WTG to stop or slow blade motion, thus avoiding a potential strike at that particular WTG.

Each IDF system comprises a single steel tower ranging in height from 6–30 m, depending on surrounding vegetation and topography, with the IDF optical components mounted on top of the tower. Some IDF units may have the potential to control more than one WTG, creating a network effect where a single WTG can receive curtailment signals from multiple IDFs.

The IDF units require vegetation trimming where vegetation is higher than the tower height. This will be required out to a defined radius to ensure there are no 'blind spots' on the optics of the IDF cameras. The calculated vegetation management areas are identified in the Project footprints in Figure 2-1 and Figure 2-2. IDFs in low vegetation areas (e.g. grass plains) require no vegetation management and hence do not have the same vegetation reduction clearance radii applied to them. While the vegetation management areas are counted in the construction disturbance footprint, it should be noted that this does not entail complete loss of vegetation or habitat, as only taller vegetation above 6 m in height will be removed to the base of the trunk and managed, with ground vegetation left undisturbed and suitable for fauna use as habitat after construction.

Providers of the IDF system have advised that at least 24 individual IDF units will be required across the Project Site for complete coverage of all WTGs. The footprint of each IDF unit is expected to be approximately 4 m x 4 m with fencing around the system to prevent access by wildlife and people. Each IDF will have a narrow access road (approximately 4 m wide) suitable for a single light vehicle to access. The area of construction impact for the IDF units will be relatively contained, impacting approximately 10 m beyond the edge of the operational footprint (this construction area has been included in the total construction disturbance footprint provided in Section 2.6).

Additional information on the functionality of the IDF devices is included in Section 6.1.4.

### 2.3.6 Met masts

To provide ongoing meteorological data for the Project, two permanent met masts will be installed within the Project Site, as shown in Figure 2-1. The met masts will collect data on temperature, humidity, pressure, wind speed and direction, which will be used in the management of the Project.

The met masts will have a triangular metal lattice construction approximately 750 mm wide and will extend to a height of approximately 150 m (WTG hub height). The masts will be secured by groups of multiple guy wires, which will extend out from the tower to nine excavated trench anchor points with three locations each in three concentric rings.

Met mast foundations for guy anchor points will be 1 m x 3.2 m and up to 2.5 m deep and will be located up to 100 m from the structures. The clearance for each permanent met mast is 0.38 ha.

Guy wires will have bird flappers installed at regular intervals to minimise avian collision risk. Minimal ground disturbance will be required for the erection and securing of the masts.

Meteorological sensors will be located at various heights up the mast, with the top mounting consisting of two sensor poles approximately 2 m high. A solar panel and a data logger will also be affixed to the structure at a serviceable height.

During construction, short-term validation masts (nominally four in total) will be installed in or near the footings of the WTGs that the permanent met masts will serve. These short-term validation masts will be removed once the data has been correlated, and the WTGs will be installed in the foundations laid. The validation masts have been included in the construction footprint.

### 2.3.7 Water supply

Once operational, water demand will be very low (amenities only) and will be sourced from captured rainwater stored in tank(s) at the operations facility. Water deliveries would be received during the summer months if required. Construction water supply is discussed in Section 2.4.3.1.

## 2.4 Construction

### 2.4.1 Pre-construction phase – micro-siting, detailed design and management plans

Prior to the commencement of construction, the Project will be subject to detailed design, including finalisation of component selection and the final positioning of all infrastructure within the Project Site.

The following steps will guide the detailed design and development of the Project during this stage to ensure environmental harm is minimised, while ensuring the constructability of the Project and retaining its required functionality:

- Completion of all post-approval environmental surveys committed to in this EIS
- Completion of all engineering assessments required
- Micro-siting of infrastructure to inform the final design
- Completion of final design and compilation of a Wind Farm Design Report to be submitted to the EPA
- Preparation of a Construction Environmental Management Plan (CEMP) to be submitted to the EPA
- Pre-clearance fauna habitat surveys prior to construction.

Some aspects of this process will be undertaken in parallel for some areas of the Project Site but will generally follow the above step-wise fashion. The following provides detail of each of these steps.

Several environmental and engineering surveys will be required to be undertaken post-approval (but prior to construction), including the surveys committed to in this EIS (e.g. final eagle nest search) and any resulting permit conditions. Engineering surveys will also be undertaken, including those required to ensure the constructability of the Project, such as a detailed geotechnical assessment and cut and fill surveys. The

results of these surveys will progress Project design and allow the completion of a first-pass optimisation of the concept Project layout provided in this EIS.

To ensure final optimal positioning of all Project components and ancillary infrastructure throughout the Project Site with respect to environmental and physical constraints, micro-siting of all infrastructure will then be undertaken on the optimised layout (using information from environmental and engineering surveys). Micro-siting will involve an on-ground assessment of proposed locations of infrastructure by environmental specialists and engineers, who will work together to optimise positioning of infrastructure to minimise environmental impacts while maintaining the functional and structural requirements of the Project.

Micro-siting from an environmental standpoint will include positioning of infrastructure (and construction zones) to avoid (where practicable) threatened flora and vegetation, and distinct fauna habitat such as dens and nests discovered on ground. The avoidance of environmental values will be balanced with assessment of constructability of infrastructure from an engineering standpoint, taking into account aspects such as geotechnical stability and physical constraints.

The outcomes of the micro-siting task will inform the final locations of all infrastructure, which will allow detailed design to be finalised. These outcomes will be compiled into a Wind Farm Design Report, which will contain the final footprint of the Project. The final Project footprint will be cross-checked against the environmental constraints in this assessment to ensure no greater net environmental impact than that approved in this EIS would result. The Wind Farm Design Report will include the results of all post-approval surveys and descriptions of micro-siting decisions as appendices; the report will be submitted to the EPA prior to the commencement of construction. Commitments relating to the Wind Farm Design Report are provided in Section 6.

At this time a detailed Construction Environmental Management Plan (CEMP) will also be prepared to address all construction phase environmental controls documented in this EIS (and any resulting approval conditions), as well as any additional measures necessary to manage and monitor environmental impacts during construction. The CEMP will be submitted to the EPA prior to the commencement of construction. Commitments relating to the CEMP are provided in Section 6.

Immediately prior to the commencement of clearing for each component (nominally within two weeks), final flora and fauna clearance surveys[2] will be completed, and any removal or relocation of any product of wildlife will be undertaken in accordance with any Permits to Take obtained under the *Nature Conservation Act 2002* or the Tasmanian *Threatened Species Protection Act 1995*.

The pre-clearance surveys will be the final step in the pre-construction phase. The Project will then transition to the construction phase, which will be managed in accordance with the abovementioned CEMP.

### 2.4.2 Construction facilities and equipment

The Project will likely be constructed via two individual construction hubs, one for the northern group of WTGs and one for the southern.

The main hub in the north will have a temporary construction compound with a footprint of approximately 100 m x 150 m. It will contain a site office and crib rooms, diesel powered generator, toilet facilities ('port-a-loo' or containerised treatment system), laydown areas, storage containers/sheds (including for storage of environmentally hazardous materials), bunded refuelling facility, bunded washdown area, and vehicle parking. There will be a similar, smaller compound in the south of the Project Site with an approximate 100 m x 100 m footprint.

[2] Pre-clearance surveys are designed as a final check for any transient species (i.e. fauna) that could move into an area in the intervening period between environmental survey and construction.

Adjacent to each construction compound will be a concrete batching facility, which will occupy an area of approximately 100 m x 100 m. The batching facilities will include a trailer mounted concrete mixer, cement storage silo, sand and aggregate and associated material stockpiles, concrete batching water supply, truck washout containment tanks, and storage containers for various equipment and tools. The mixer will be powered by a diesel generator within the facility.

Machinery that will be required to be used throughout the construction period includes:

- Several heavy tonnage cranes for WTG construction
- Medium and small cranes
- Several articulated dump trucks, rollers, dozers and excavators for roadworks and WTG construction
- Several concrete delivery trucks for each batch plant
- Semi-trailers for delivery of materials including construction materials, pipes, steel rebar, electrical cabling/componentry
- Light vehicles and maintenance trucks.

The proposed locations of the construction facilities are illustrated in Figure 2-2.

### 2.4.3 Construction materials

A summary of project construction raw material estimates is provided in Table 2-2. This material will be sourced both regionally and further afield, if necessary, from the larger population hubs (e.g. Launceston or Devonport).

As outlined in Section 2.4.2 the Project proposes the use of onsite concrete batching plants, to facilitate onsite concrete production and avoid the need to transport concrete to the site (hence raw materials will be transported and batched on site) therefore lowering the overall transport task. It may be possible to repurpose some of the material excavated for foundations in the concrete manufacturing process or for internal road construction. However, further detailed geotechnical investigations will be required to inform this opportunity; hence the estimate of material (Table 2-2) and associated transport task (Section 2.4.5) has assumed all required materials are transported to site from suitable offsite facilities. Any subsequent repurposing of excavated material on site will reduce the final transportation task.

Table 2-2 Construction raw material estimates

| Component | Material | Estimate | Source[3] |
|---|---|---|---|
| Concrete foundations | Cement | 33,000 $m^3$ | Major city |
| | Aggregate | 113,000 $m^3$ | Regional quarry |
| | Sand | 90,000 $m^3$ | Major city |
| | Fly ash | 33,000 $m^3$ | Major city |
| | Water | 300 $L/m^3$ | Surface water offtake from Shannon River |

[3] The final source for all construction materials will not be confirmed until further geotechnical studies are complete, a contractor has been engaged and detailed design is complete. The indicative source locations in the table have been used to inform the traffic impact assessment (Appendix G), which applies a 'worst case scenario' approach and assumes all bulk materials (such as aggregate and gravel) will be sourced from outside the Project Site and therefore includes these traffic volumes in the assessment. At this stage it is likely that pavement gravel and aggregate will be sourced from existing local quarries near Bothwell and off Arthurs Lake Road (pending further investigation) and this assumption has been used in the traffic assessment. The traffic assessment (Appendix G) also uses slightly higher estimates of raw materials to be transported to the site, providing additional conservatism to the traffic assessment.

| Component | Material | Estimate | Source[3] |
|---|---|---|---|
| | Steel reinforcement (rebar) | 6,000 tonnes | Major city |
| Roads and hardstands | Road pavement gravel | 121,000 $m^3$ | Regional quarry |
| Construction water total | Water | 84.6 ML | Surface water offtake from Shannon River |

#### 2.4.3.1 Construction water supply

Water will be required for general construction and amenity purposes during the construction phase, with the highest water demand being the concrete batching process, estimated at 84.6 ML over the 24-month construction period. Advice from the candidate WTG manufacturer Vestas suggests that approximately 1.8 ML of water per WTG is required to construct all aspects of a standard wind farm project, including all concrete, road and other development requirements; therefore 47 WTGs is multiplied by 1.8 ML to arrive at the 84.6 ML referred to in Table 2-2.

Water is abundant in the area and there are several options to supply the project through both construction and operation. The preferred and proposed option for the Project is supply from the Shannon River via an agreement with Hydro Tasmania. The anticipated offtake location is an existing measurement station on the river within the Project Site, as shown in Figure 2-2; however, this will be subject to final arrangements with Hydro Tasmania. Hydro Tasmania has confirmed the availability of 100 ML to be sold over a 24-month period to the Proponent.

Water would be pumped from the river via a temporary pump with foot valve, up to a temporary holding tank within the existing turning circle of the measurement station. Construction water trucks would then collect water as required from the holding tank and deliver it to the required locations.

All approvals for the water abstraction would be obtained from Hydro Tasmania by the construction contractor. Hydro Tasmania has noted the volume requirements to be relatively small for the Project and would be unlikely to require the release of any additional water to the current environmental flow releases occurring from the upstream Miena Dam; Hydro Tasmania would be responsible for managing any additional releases should they be required.

While groundwater was looked at as a potential option for water supply, for concrete batching there is a preference for using less mineralised surface water and, following confirmation that Hydro Tasmania could provide the volume of water required from the Shannon River, the potential use of groundwater for construction was abandoned. Regardless, the results of a groundwater quality and availability assessment around the Project Site are included in the hydrogeology report provided in Appendix J.

### 2.4.4 Construction staffing

It is expected that up to 200 construction workers will be required on site during peak construction. Although this number is expected to fluctuate with project stages, the assessment has used this peak figure to be conservative.

Construction workers will be sourced locally and regionally as a preference; however, it is not expected that a large enough skilled workforce will be available outside the main population centres of Tasmania. In light of this, it is expected that the majority of workers will be attending site on a drive-in/drive-out basis and will require accommodation.

Several options are being investigated, including the use of a combination of rental and holiday accommodation in local towns such as Miena and Bothwell and nearby townships, or potentially the development of a temporary or semi-permanent accommodation facility near the Project Site, or a combination of both options.

Given the remote location of the site, this will be an ongoing matter and hence the final outcome will be determined during the pre-construction phase. Note that the development of construction accommodation facilities does not form part of this application.

### 2.4.5 Construction traffic

Construction workers are likely to be sourced from Tasmania's major population centres and will work on a drive-in/drive-out, multi-day shift basis. Workers will be located at the chosen accommodation facility(s) for the duration of their multi-day shift. This will result in two major traffic movements per week, one to the region at shift commencement and one returning home at shift end. It is likely that the majority of the workers at full construction stage capacity will use their own vehicles, resulting in up to approximately 200 light vehicle movements to, and 200 light vehicle movements from, the region over a one-week period.

Once at the accommodation facilities, daily movements to and from the Project Site will occur, possibly via individual vehicles, shared vehicles, or a bus system. Onsite temporary parking facilities will be developed at the Project Site as required within the construction footprint. The traffic impact assessment (Appendix G) has been prepared on the assumption that all workers drive their own vehicle to site (no carpooling or buses) and therefore represents a 'worst case' traffic scenario to ensure all impacts are fully addressed. The traffic impact assessment also makes an assumption that workers will be accommodated in several locations near the site (including Miena, Bothwell, Bronte Park, Waddamana, Flintstone and Wilburville) and predicts traffic flow accordingly.

Delivery of raw materials such as cement, sand, aggregate and steel rebar will occur several times a day via semi-trailer during the construction period. An average of 29 heavy vehicles are predicted to arrive (laden) and leave (unladen) site each day over the construction period using 8-axle trucks (this average will vary with construction activity requirements on site) from a variety of locations; further details of this estimate are provided in the Traffic Impact Assessment in Appendix G. Other consumables and services will also require truck and light vehicle movements to and from the Project Site on a regular basis. These deliveries will likely come from the major population centres of Tasmania.

The large WTG components, including blades, tower sections, and nacelles, will be coming as oversized loads on semi-trailers from the Bell Bay Port and will follow the predetermined routes discussed in Section 6.14. These deliveries will be ongoing throughout the construction phase and will likely occur mostly at night as far as Bothwell to avoid traffic issues on state highways.

Further information on construction traffic movements and predicted total and average daily movements is provided in Section 6.14 (Traffic) and Appendix G.

### 2.4.6 Construction timeframes

General construction hours are likely to be based on 10 to 12-hour day shifts between 6 am and 6 pm 7 days per week on rotating drive-in/drive-out rosters; this will depend on the construction contractors' arrangements. Construction activities with potential to generate noise will be restricted to the timeframes outlined in Section 6.4.

As crane operations involving large equipment are heavily wind-dependent, teams erecting WTG components will occasionally need to work during the night to use all available low wind periods and maintain the construction schedule. This will be undertaken by agreement with Council and stakeholders.

Delivery of most equipment and materials will be in line with the abovementioned general construction hours. However, as mentioned, large WTG components may use low traffic levels during night-time hours to minimise disruptions. Hence, delivery of these components will need to occur on a 24-hour basis, which will be undertaken by agreement with Council and advance notification to relevant stakeholders around the Project Site boundary.

The proposed construction schedule for the Project will occur over a 24-month period, with a breakdown of timeframes detailed in Table 2-3.

Table 2-3 Proposed construction schedule

| Stage | Timeframes |
|---|---|
| Pre-construction surveys/engineering design | For ~6 months prior to construction commencement. |
| Site establishment and mobilisation of earthwork plant and equipment | For 3–5 months from construction commencement. |
| Construction of access tracks, construction compound and hardstand areas | For 10 months following site establishment and mobilisation of earthwork plant and equipment. |
| Construction of met mast footings and WTG footings | Commencing as soon as the access tracks are suitable for constructing the first WTG footing, for 9–11 months. |
| Delivery of WTG and other Project components | Commencing as soon as access tracks are suitable and the first WTG footing is ready for installation, to continue for 8–10 months. |
| Construction of substation and switchyard compounds | Commencing as soon as the access track to the substation/switchyard location is ready, lasting for 6–9 months. |
| Construction of operations facility | Commencing as soon as access track to the operation facility is ready and materials/equipment are in place, for 4–6 months. |
| Erection of met masts and WTG components | Met masts will be installed once the access tracks are ready, before WTG installation.<br>The erection of WTG components will commence when the first WTG footing is ready. Two main cranes will be used to install 1–1.5 WTGs per week, for 8–11 months. |
| Installation of substation and switchyard infrastructure | Commencing as soon as the substation and switchyard compounds are ready, for 3–6 months. |
| Construction of transmission line | Commencing as soon as the access track to transmission line corridor is ready and earthwork equipment is in place, for 12 months. |
| Electrical cabling trenching | Commencing as soon as the access tracks are suitable; running in parallel with the construction of WTG footings and installation of WTG components, for 12 months. |
| Installation of internal electricity network (underground cables/overhead powerlines) | Commencing with the first WTG installation and ending until the last WTG is installed, lasting for 9–12 months. |
| Wind farm commissioning and testing | Progressively commissioned, subject to TasNetworks arrangements. |

### 2.4.7 Construction methods

#### 2.4.7.1 Roads and hardstands

Typical road and hardstand construction will involve:

- Removal of vegetation and topsoils as required, with topsoil to be stockpiled in dedicated areas within the Project Site construction footprint for future use during site rehabilitation; stockpile locations will be selected based on factors such as drainage and convenience for re-use.
- Areas will then be cut and filled as per design requirements, including construction of batter slopes and drains (and potentially trenching for cables).

- Once area preparation is complete, road base will be added to a depth of approximately 300 mm, or as required.
- The base will then be compacted, shaped and graded according to design.
- Any specified sections of road or laydown will then be bituminised as required.

#### 2.4.7.2 Electrical works

It is likely a dedicated specialised contractor will be installing the electrical components for the Project, especially the substation, switchyard, and overhead/underground powerlines, towers and cables. These works will be undertaken in parallel with the WTG works.

The concrete slabs for the substation and switchyard will be poured following site preparation. Components will then be delivered and installed as they arrive or stored within the construction compounds and installed as needed.

Trenching for the underground electrical reticulation system may either be undertaken at the time of roadworks or post road development, depending on contractor arrangements and material availability.

#### 2.4.7.3 WTGs

The construction process of each WTG will be approximately as follows, with some steps occurring concurrently:

- Access road, laydown area and foundation site cleared and excavated/developed as required (an example is shown diagrammatically in Appendix A)
- Foundation rebar tied-in ready for pour
- Foundation poured in situ with concrete from nearest batch plant
- Components delivered and stored in laydown area surrounding foundation (ongoing)
- Crane(s) moved into position on crane pads as required
- Tower sections assembled onto foundation, with the number of sections depending on the final WTG selection
- Following completion of tower, nacelle craned into place and secured to tower
- Hub attached to nacelle and then each of the three blades craned into position.

For several of the WTG locations, once the foundations are complete, temporary validation masts will be installed, which will be similar in appearance to the met masts with a similar guy wire arrangement. The validation masts, as the name suggests, confirm the modelled wind speeds at the location, with measurements taken for several weeks before the mast is subsequently removed and the WTG erected in its place. This is a very temporary measure in the construction process.

Most ground excavation is expected to be undertaken by excavator. However, there is a possibility some parts of the construction footprint may require blasting where hard rock is encountered (for WTG footings or other ground excavation such as cable trenching).

Once the WTG structure is complete, all underground cables (described in Section 2.3.2) are buried, and the access road and permanent laydown areas are gravelled and complete, the construction disturbance area will be rehabilitated via ripping and reseeding (if required). It is envisaged that not all vegetation in the temporary laydown areas would be destroyed, as several components, including the blades, can be elevated above shrub-sized vegetation via supports rather than being laid directly on the ground.

#### 2.4.7.4 Ancillary infrastructure

Geotechnical investigations will require drill rigs to be brought on to the Project Site. Remaining construction activities will use general civil construction techniques and are unlikely to require any specialised equipment or contractors.

## 2.5 Commissioning

Project components that will need a commissioning phase are the electrical transfer system and the WTGs themselves. Commissioning requirements of all remaining components are considered minor in nature.

The electrical system will be the first Project component to be fully commissioned upon completion of the substation, switchyard and overhead/underground powerlines. Once this system is fully commissioned, WTGs can then be linked into the system via the underground cabling on an as-completed basis, allowing generation and capture of energy to theoretically commence once the first group of WTGs are connected, subject to safety and connection arrangements.

Each WTG will take around one week to commission once fully installed; this will involve testing of all mechanical components and electrical connections. As each WTG is completed, it will be added to the substation either individually or as part of a cabled group.

## 2.6 Project footprint summary

The maximum construction disturbance footprint for the Project ('construction footprint') is shown in Figure 2-2 and totals 481.13 ha; this assumes all construction disturbance is counted as disturbance and does not include any rehabilitation.

The construction footprint has been developed by project engineers based on previous experience on large civil infrastructure and wind farm projects. This footprint ensures there is adequate working space to construct each item of infrastructure, including roads, the WTGs, areas of hardstand and power cables. Construction buffers around the permanent infrastructure (e.g. roads, turbine hardstands etc) vary across the site and range from 15–70 m to allow multiple pieces of machinery and equipment to operate in the same area, vehicles to pass one another, stockpiles to be created, and, in the case of roads, enough space for electrical cabling to be installed in parallel in areas to prevent electrical transmission interference. The construction buffer areas also allow for some refinement in the final footprint to micro-site infrastructure as required. Where possible the permanent infrastructure locations will be used for temporary construction disturbance to minimise the overall disturbance footprint. It is unlikely the entire construction footprint will be disturbed; however, to ensure all impacts are thoroughly considered, a conservative impact area has been applied.

The actual footprint for the operational phase of the Project ('operational footprint') is shown in Figure 2-1 and totals 193.88 ha, with a breakdown of individual operational components provided in Table 2-4. This operational footprint represents a figure closer to the anticipated actual site disturbance post construction, after rehabilitation and regrowth. It is noted that the areas allocated for curtailment system vegetation management and overhead powerline maintenance clearance will be subject to woody vegetation management (e.g. tree removal) rather than full vegetation clearance, hence they will remain viable habitat for many species.

Note the operational breakdown shown in Table 2-4 does not include construction-specific compounds that will be removed following completion of the Project, including the batch plants (2.4 ha), the blade laydown areas (1.4 ha) or the site compounds (3.0 ha) in the north and south of the Project Site.

Table 2-4 Operational Project footprint summary

| Component | Operational footprint (ha) |
|---|---|
| WTG footprints (including laydown areas) | 43.26 |
| Roads | 40.85 |
| Underground cable easements/trenches | 11.77 |
| Substation | 1.62 |
| Switchyard | 2.00 |
| Overhead powerline (power poles only) | 0.52 |
| Overhead powerline (maintenance clearance) | 3.94 |
| Operations facility | 0.81 |
| BESS | 0.30 |
| Curtailment system vegetation management zone (with vegetation trimming/removal) | 87.15 |
| Curtailment system footprint (IDF hardstands) | 0.89 |
| Joint box | 0.01 |
| Met masts (two masts, 0.38 ha each) | 0.76 |
| **Total** | **193.88** |

## 2.7 Operation and maintenance

The Project is proposed to have a design life of approximately 30 years but is likely to be extended beyond this with equipment upgrades as required. The design life of individual components, with appropriate maintenance, includes:

- WTGs – 30 years
- Electrical infrastructure – 50 years
- Operations facility – 30 years
- Roads – 30 years.

Once the Project is operational, it is a comparatively low maintenance activity and can be successfully managed throughout the year by a team of fewer than 10 people permanently on site and 10 FTE contractors. The greater part of the operational work will revolve around maintenance of the facility, especially the WTGs, which will require annual servicing.

Each WTG will take a single maintenance crew of four to five people approximately one week to service.

It is expected that most electrical infrastructure will be maintained by specialist contractors on an 'as needs' basis.

While the Project will operate on a 24-hour basis, the site will typically only be fully staffed from Monday – Friday, 8 am – 6 pm, with weekend work as required. Security and/or caretakers will be present on site at all times.

## 2.8 Offsite infrastructure

The Project will require the use of the Bell Bay Port to import large-scale WTG parts, which will be stored in existing laydown areas in the port facility prior to delivery to site.

The delivery of the WTG parts will be via a range of vehicles suitable for over-dimensional parts, which will require the use of the existing road network from the Bell Bay Port to the Project Site; suitable routes have been assessed for the various components as part of the Traffic Impact Assessment for the Project (refer Section 6.14). It is expected that some vegetation may need to be removed or corners temporarily built up to enable the successful transportation of the components. Any required approvals for these minor road modifications will be sought separately from the current approval for the Project, as the action will occur outside the Project Site and potentially the municipality.

Raw materials required for construction will be sourced from existing local or regional quarries or recovered from onsite works; there is no requirement to establish new quarries on site or elsewhere.

All required power during construction will be available via the existing transmission lines through the Project Site, and therefore no additional offsite power infrastructure is required for the Project.

If a construction camp is chosen as the method to house workers, this will form a significant piece of offsite infrastructure. Approvals for this facility would be sought separately from the current Project.

# 3 Project alternatives

The number of wind farm projects in Tasmania has grown significantly in the last decade. Contributory factors are the development of the Battery of the Nation initiative by Hydro Tasmania and rising interest from investors in Tasmanian hydrogen plants (which require significant power inputs); general load growth in Tasmania; and the urgent, increasing requirement to transition to renewable energy across Australia. As a renewable energy development company, the Proponent began searching out viable projects throughout Tasmania several years ago, and the St Patricks Plains development is one of several projects now in the planning assessment phase. The other three sites under development are not alternatives but are other sites deemed suitable.

Many more projects are now in development across the state in response to the Government's 200% Renewable Energy Target and the Australian Energy Market Operator's Integrated System Plan, which identified candidate Renewable Energy Zones and put the Marinus Link onto the map. At the time the Project Site was identified such reports, zones and projects were conceptual.

Other sites on the west coast of Tasmania were considered but a combination of land tenure and distance to the grid, plus over-dimensional transport issues, ruled these out. Other sites in the Central Highlands were considered, but distance to the grid in combination with the lower wind regime meant these locations were not selected at the time.

Tasmania has some of the best wind regimes in Australia, so the focus was on good wind sites rather than solar, as the state has lower solar irradiation than other states due to its latitude, weather, and cloud cover.

The St Patricks Plains site was initially under investigation by another wind farm developer. The Proponent acquired an existing met mast at the site and associated data from the previous developer in late 2017 and began its own investigations into the viability of a wind farm project. In general, the site was seen as a viable location as it met the three principal criteria for a wind farm project, that is, having a good wind resource, connection options to the Tasmanian electricity grid, and freehold landowners willing to consider a wind project.

Various options for land to be included in the Project were initially considered, including land adjoining Cattle Hill Wind Farm, land west of Penstock Lagoon, and land north of the current Project Site boundary. Alternative versions of the Project Site are shown in Figure 3-1. The alternative versions were not progressed due to the following issues:

- Land north of Cattle Hill had tenure issues and introduced a disconnected section of the wind farm in terms of land continuity.
- Land west of Waddamana Road at Penstock was available but considered too close to existing shacks.
- Land north of Waddamana Road was available but introduced new neighbours and increased proximity to the Barren Tier communications tower (which might have generated interference).

Essentially the elevated land around St Patricks Plains has the highest wind resource but also opens up the Project to greater visibility across the highlands and greater proximity to residences. Avoiding the elevated land to the west and north of the site and containing the site to the east addressed a number of potential constraints prior to more detailed studies.

The final Project Site boundary was decided following discussions between the Proponent and local private landowners, TasNetworks, and local consultants. Some of the reasons for the decision on the initial Project Site and Project layout included willing freehold landowners; compatible land use; opportunity and capacity to connect a suitably sized wind farm to the electricity network on site; a visually contained setting being surrounded by higher land in each direction; low population and distance to neighbours; access along good

roads (Cattle Hill having demonstrated transport routes to site); and, other than some onsite private forestry in the south and north east, limited tree clearance requirements.

With the site selected, a generic layout concept for WTGs based on separation distances indicated that the site could accommodate up to 80 medium-scale WTGs (e.g. 3.75 MW WTGs).

The WTG layout was the next element involving consideration of alternatives. Wind resource information was used to develop an initial WTG layout containing 67 WTGs, maximising the energy yield from the site. The 67 WTG layout was used for the Notice of Intent, which then triggered the planning process.

This initial layout was then subject to high-level, multicriteria analysis including consideration of topography, view fields, proximity to residences, electromagnetic interference, waterways, vegetation communities, eagle nest sites, threatened flora and fauna locations, geology and Aboriginal and European heritage values. Two years of eagle utilisation surveys provided information about the usage of the site by eagles. The layout design was an iterative process involving the relocation and removal of WTGs as required to reach an optimal layout that seeks to maximise the site yield without compromising the environmental, heritage, and social values of the area.

Through the planning process, consideration was also given to the location and layout of ancillary infrastructure such as transmission lines, substations, and construction and operational compounds.

The studies undertaken to address the PSGs and general guidelines enabled continual review of the layout and, as a result of this process, the Project layout was reduced to 47 WTGs and associated infrastructure, as documented herein. Further refinement of the layout will occur in the detailed design phase through the micro-siting of infrastructure to minimise impacts wherever possible.

Technology and material selection for the Project was mostly guided by the original equipment manufacturer of the WTG, rather than the Proponent. More WTG locations enables selection of WTGs from a wider range of models on the market; fewer locations focuses the selection to the larger WTGs to ensure that the capacity of the site is maintained, and the site provides the most energy possible. WTG height and size are important considerations based on the available area for the Project and the environmental conditions and also on the practicalities of delivering to the Project Site.

Eagles have the potential to be substantially impacted by wind farm projects. The risk of strike has been reduced to as low as reasonably practicable by the incorporation of a leading mitigation system specifically for large raptors into the environmental management of the project, including the latest WTG curtailment system (IDFs) described in Section 6.1, and the adaptive management measure of painting one blade black of some WTGs if required. Any new technologies that appear post or during the approval phase will also be considered.

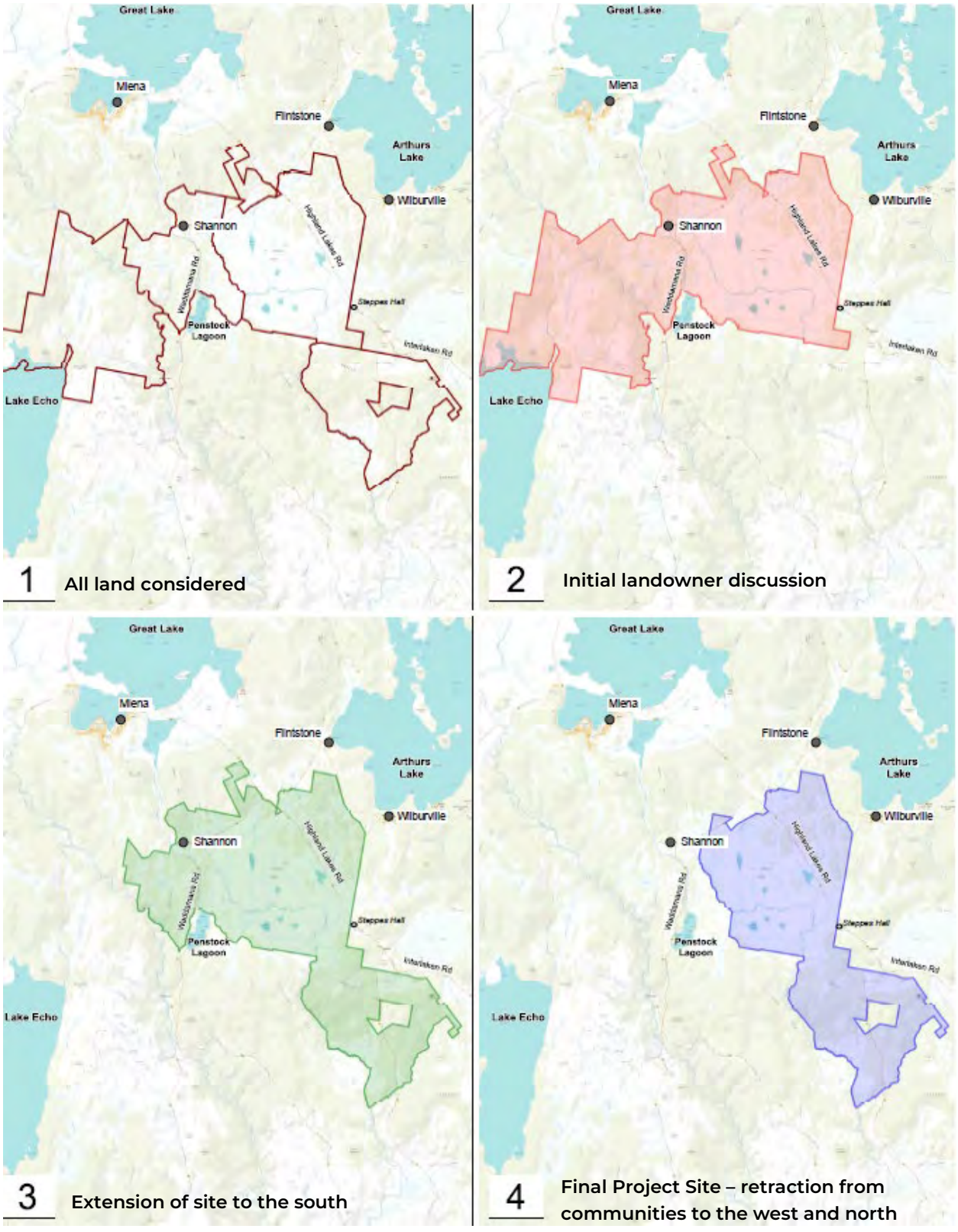


Figure 3-1 Land considerations

# 4 Consultation

The Proponent's approach to consultation is informed by the International Association for Public Participation's (IAP2) Core Values and Public Participation Spectrum. This is widely accepted as the benchmark for community consultation and provides a framework for considering the appropriate style of engagement and associated activities to implement at each stage.

The IAP2 Core Values for Public Participation define the expectations and aspirations of the public participation process. It states that public participation:

- Is based on the belief that those who are affected by a decision have a right to be involved in the decision-making process
- Includes the promise that the public's contribution will influence the decision
- Promotes sustainable decisions by recognising and communicating the needs and interests of all participants, including decision-makers
- Seeks out and facilitates the involvement of those potentially affected by or interested in a decision
- Seeks input from participants in designing how they participate
- Provides participants with the information they need to participate in a meaningful way
- Communicates to participants how their input impacted or changed the decision.

The approach centres on achieving good community-based outcomes and can be described as genuine, timely, relevant, transparent and inclusive.

In undertaking consultation for the Project, the Proponent has taken guidance from:

- The EPA (March 2019) *Guidance on Community Engagement*
- The Clean Energy Council's *Community Engagement Guidelines for the Australian Wind Industry* (2018)
- The Australian Energy Infrastructure *Commissioner's Observations and Recommendations for Community Engagement* (updated 2020).

With a planning process requiring a minimum of two years of studies, the Proponent has sought to engage the community early, keep all stakeholders updated, and address concerns in a timely and professional manner where it is possible to do so.

## 4.1 Engagement undertaken to date

Engagement activities commenced in 2017 with initial engagement with key landowners and relevant agencies and has continued throughout the planning and investigation phases.

### 4.1.1 Identifying stakeholders

Early in the project planning phase, desktop title searches were undertaken by the Proponent to identify local landowners who may have an interest in the Project. Using information from 100 title searches around the site in April 2019, introductory letters were sent to everyone for whom there was an address available. Contact was attempted with all nearby landowners by the Proponent to understand if there was a residence on their land, if they would like to know about the Project, and how best to keep them up to date and hear about any concerns they may have. Most people contacted elected to be on the stakeholder database to receive further information from the Proponent.

A range of face-to-face engagements were then undertaken directly by the Proponent to follow up and try to contact everyone in the local area who might wish to know about the Project. Addressed correspondence was returned to the Proponent from a small number of neighbours, so in 2020 and again in 2022 letters were sent via Central Highlands Council to try and contact the remaining parties.

Although it is possible some local landowners have not received direct contact from the Proponent during the stakeholder identification phase, it is likely that most local landowners have been identified through this process. Where contacted landowners were willing, their contact details have been retained on a stakeholder database by the Proponent to facilitate engagement throughout the Project.

In the Project planning phase, the Proponent also identified other relevant stakeholders such as local council, government bodies, elected members, community leaders and industry.

The Proponent maintains a stakeholder database for the Project, which currently has 501 stakeholders registered to receive updates. There are a further 429 individuals receiving updates who registered via the website and included St Patricks Plains as one of their projects of interest. Many of these are suppliers or those who have another interest (such as interest in other wind farms being developed by the Proponent).

The Proponent has commercial agreements in place with all landowners on whose land WTGs will be installed. Additionally, the Proponent is in the process of offering neighbour agreements to nearby landowners (within a nominal 2 km and 3 km buffer) to provide financial benefits to acknowledge the potential amenity implications of WTGs on neighbouring land. These agreements are optional, and it is acknowledged by the Proponent that they do not negate their responsibility to manage amenity impacts in accordance with all guidelines and legislation.

### 4.1.2 Engagement activities

Engagement activities undertaken by the Proponent to date have included phone calls, face-to-face meetings, information sessions and the sharing of information via website material newsletters. There have been 17 newsletters to date and 14 inserts into the Highland Digest (see the news and downloads tab at www.arkenergy.com.au/wind/st-patricks-plains/).

Covid-19 restrictions affected some opportunities for direct engagement to be undertaken; however, the Proponent has employed modified techniques where relevant (such as online meetings and phone calls) and taken the opportunity for face-to-face meetings and information sessions when possible. As part of the Proponent's approach to the challenges presented by Covid-19, a resident of the Central Highlands was recruited to assist with community consultation, including contacting neighbours and updating them on the Project, distributing newsletters to venues around the highlands, and keeping the rest of the Sydney-based project team in touch with concerns raised by the community during periods of travel restriction.

Over the course of project planning, the Proponent's project team has met directly with many of the surrounding landowners or had phone discussions with them. Those who wish to have attended information days.

To date there have been nine community information events with 480 total attendances, as follows:

- Steppes Hall (August 2019) – 100 attendees

  The first community information day, held closest to the Project Site itself at the Steppes Hall. Maps and information were displayed, and members of the Proponent's project team were on hand to discuss the Project with attendees. Feedback from individuals at that session was that the community had expected and wanted the Proponent to give a presentation.

- Bushfest, Bothwell (November 2019) – 120 visitors

  The second public event was a Proponent stand at Bushfest in Bothwell, where 120 people visited the stand and 70 people registered to receive updates about the Project.

- Miena (February 2020) – 80 attendees

  The third information event at the Great Lakes Community Centre in Miena responded to the feedback from the Steppes information day, and the Proponent's Project Manager and Executive Director gave a presentation followed by a question and answer session. This event was moderated by an independent planning consultant who gave everyone the opportunity to ask questions during and after the presentation.

- Bothwell and Miena (February 2021) – two separate events with a total of 100 attendees

  Two separate sessions were held, at the Clubs Rooms in the Bothwell Recreation Ground and at the Great Lakes Community Centre in Miena. These events followed the previous format of a presentation with question-and-answer session run by a facilitator. At the Miena event, members of an opposition group displayed information and took to the stage to present their views.

  The feedback from this event was that many people said they would not attend further information sessions in that format, as they did not want to hear from objectors but wanted information about the Project directly and to have their own questions answered by the Proponent.

- Steppes Hall (February 2022) – 80 attendees over four separate meetings

  In response to the feedback from residents and community members who attended the Bothwell and Miena information days, four separate smaller community information sessions were held to brief neighbours and the community specifically about noise, a topic of interest to several attendees and Project Site neighbours. Two meetings were for dwelling owners to the east of the Project Site, one for dwelling owners to the west of the Project Site, and one for any interested members of the public not invited to the local resident events. A representative of Marshall Day Acoustics gave a presentation and answered questions.

All information provided to the community at information days is available on the Proponent's website on the St Patricks Plains Wind Farm news page at www.stpatricksplainswindfarm.com.au.

The Proponent has also met directly with government representatives, businesses and community groups, including but not limited to:

- Federal and state ministers and elected representatives
- The Central Highlands Council Mayor, General Manager, councillors and planning team
- Businesses in the surrounding settlements of Arthurs Lake, Miena, Bronte Park and Bothwell
- Anglers Alliance
- Trout Guides and Lodges Tasmania
- The Johns Group
- Great Lakes Community Centre Committee members
- Hunting groups on each of the Project properties
- Wilburville volunteer Fire Brigade
- Penstock, Hollis Banks and Shannon shack owners
- No Turbine Action Group – including a number of face-to-face meetings to provide updates plus online workshops, phone calls and correspondence.

The Proponent acknowledges the additional advice provided in the PSGs regarding other agencies and organisations with whom engagement is required, and has undertaken separate engagement with Airservices Australia, TasNetworks, Heritage Tasmania and Aboriginal Heritage Tasmania (the latter two guided by the Proponent's heritage consultants, Cultural Heritage Management Australia).

### 4.1.3 Summary of feedback to date

Across the engagement undertaken to date, the Proponent has identified both significant support for the Project as well as concerns and opposition. The areas of support and the reasons for opposition are the issues of interest to the Project development team.

Key support issues raised to date include:

- A sentiment that more renewable energy is needed, and wind is a good form of renewable energy.
- The Project will create jobs in the area.
- The Project provides a potential tourist attraction.
- Wind farms can supplement hydro power and reduce the use of water and coal to generate electricity.

It is noted that in 2022 a community sparked petition of support was launched gathering support in Bothwell, Miena, Arthurs Lake and Flintstone which collected 329 signatures in support of the wind farm.

Key objections raised to date include:

- Potential visual impact, including the effect on fishers at Penstock Lagoon, drivers along the Highland Lakes Road, and changing the sense of place.
- Potential impacts to eagles – concerns about eagles and other species.
- Concerns about noise.
- Concerns about the possibility of bushfire and the ability to fight fires.
- Impacts during construction – based in part on the Cattle Hill Wind Farm experience.
- Wider policy concerns – a sentiment that Tasmania does not need (or want to pay for) more energy.
- Some objectors with a general sentiment that they support renewable energy but do not want a wind farm here.

The key issues of support and objection have been taken into consideration in the design of the Project and have informed the presentation of information in this EIS.

### 4.1.4 Revised layout

A revised layout of 50 WTGs was completed at the beginning of 2021. Key principles for the revised layout were consideration of the Key Issues from the PSGs and addressing specific community concerns, where possible.

The revised layout was presented in a newsletter update and sent by mail and email to all stakeholders and advertised in the Highland Digest in advance of the 2021 community consultation events. This early release was to provide the opportunity for stakeholders to review and consider the changes in advance of the community consultation sessions.

The revised layout reduced the size of the Project from 67 WTGs to 50 and reduced the number of shacks or houses within 3 km from 50 to 20. The rationale for the changes to each turbine location were detailed in a presentation to the community (available at the following location – https://arkenergy.com.au/documents/803/StPatricksPlainsWindFarm_CommunityInfoDays_Feb2021.pdf).

Additional inputs following the completion of other studies and assessments caused a further three WTGs to be removed for visual impact avoidance, resulting in the 47 WTG layout proposed herein.

## 4.2 Engagement proposed to be undertaken

The Proponent will continue to actively engage with the landowners, the local community, elected government and local representatives, organisations and other relevant stakeholders throughout the assessment, construction and post-construction stages. The Proponent will actively promote the formal EIS advertising period through its existing channels and encourage feedback.

A shopfront has been set up in Bothwell for the exhibition phase of the development application, and it opened in January 2023. It is staffed by a local resident and is open one day a week can also be open more frequently during the exhibition period of the Development Application.

A formal Community Engagement Strategy will be established for the construction phase, involving regular stakeholder updates, complaints register, and contact details of a community liaison officer.

## 4.3 Engagement with other agencies

The Proponent has commenced early engagement with several government agencies and will continue to work closely with all relevant agencies throughout project planning and implementation.

The PSGs identify several government agencies who have provided comment on the Project in relation to matters that must be addressed but fall outside the requirements or scope of this EIS, including TasNetworks, Airservices Australia, Heritage Tasmania, and Aboriginal Heritage Tasmania. The Proponent has engaged with, and provided reports to, each of these agencies as required.

# 5 The existing environment

## 5.1 Planning aspects

### 5.1.1 Site location

As detailed in Section 1.3, the Project Site is located at St Patricks Plains, in the Central Highlands approximately 10 km to the south-east of Miena and 35 km to the north of Bothwell. The Project Site is located in the Central Highlands Local Government Area (LGA), which is bounded by Meander Valley LGA to the north, Northern Midlands LGA to the north-east, Southern Midlands LGA to south-east, Derwent Valley LGA to the south and West Coast LGA to the west. The Central Highlands Council area encompasses a total land area of approximately 7,988 $km^2$.

The Project Site has been used for agricultural operations for many years. In terms of structures on site, there is agricultural fencing, some outbuildings on 5057 Highland Lakes Road, and a small structure at 6011 Highland Lakes Road. There are a number of access tracks on the Project Site. There are no known activities likely to cause site contamination on the Project Site.

There are no industrial facilities in the vicinity of the Project Site. The nearest residential enclaves are 1.2 km from the Project Site boundary to the east (Wilburville), 1.5 km from the Project Site boundary to the north (Flintstone), or 1.7 km to the west (Shannon). All residences in these enclaves are 3 km or more from the nearest WTG. Immediately to the east of the broader site, there are some large rural residential holdings, some of which have dwellings located on them. Some of the titles on Arthurs Lake Road are directly adjacent to the Project Site, although some distance from the nearest WTGs. The nearest school is at Bothwell District High School, some 35 km away. The nearest hospital would be in Launceston or Hobart; however, there is a community health centre at Ouse, which is over 80 km away. There is a campground on the publicly accessible western side of Penstock Lagoon (Ladys Walk Campground) around 4.5 km from a WTG. There are a number of campgrounds around Arthurs Lake (Pumphouse Bay and Jonah Bay campgrounds) and at Little Pine Lagoon, but all are significantly separated from the Project. The lakes in the area serve as tourist destinations, particularly for shack owners who enjoy fishing in the area. In addition, the Steppes Historical site, including the hall and the heritage property, is directly adjacent to the Project Site.

### 5.1.2 Land tenure and title details

The Project Site comprises 15 land titles. The land tenure of the Project Site is identified in Table 5-1 and illustrated in Figure 5-2. A copy of each certificate of title (CT) and any associated schedule of easements are contained in a separate Planning Assessment Report. It is noted that any road use except for the direct turn-offs into the Project Site will be addressed separately to this Project.

The general area surrounding the Project Site is a combination of native bushland areas in private freehold titles, and agricultural land used predominantly for grazing. The closest residential zone is located in Wilburville, approximately 1.2 km to the north-east of the boundary of the Project Site.

Table 5-1 Title details

| Property address | Title reference (CT and PID) | Easements and covenants | Area (ha) | Land tenure | Land use |
|---|---|---|---|---|---|
| 'Wihareja'<br>4244a Waddamana Road, Steppes, Tas 7030 | CT 100672/1;<br>CT 156999/1;<br>PID 2813013 | Reservations relating to sewer and waterways in favour of the Crown (15 m depth), transmission line burdening easement (45 m wide) and conservation covenant across CT 156999/1.<br>Caveat by Epuron Projects Pty Ltd on both titles. | 1,337.2 ha | Private freehold (James Glover & Sons Pty Ltd) and partially contained in a conservation covenant. | Grazing pasture |
| 'St Patricks Plains', 6011 Highland Lakes Road, Steppes, Tas 7030 | CT 182190/1<br>CT 182189/1;<br>PID 5000165 | Transmission line burdening easement (45 m wide) and wayleave easement to the benefit of TasNetworks.<br>Three conservation covenants.<br>Caveats by Epuron Projects Pty Ltd. | 2,069 ha | Private freehold (P.E.J.E. Pastoral Company Pty Ltd) and partially contained in a conservation covenant. | Grazing pasture and native bushland |
| 'The Ripple (North)', 6300 Highland Lakes Road, Steppes, Tas 7030 | CT 126982/1;<br>PID 7936127 | Transmission line burdening easement (45 m wide), right of carriageway burdening easement.<br>Caveat by Hydro-Electric Corporation. | 387.3 ha | Private freehold (Robert McDowall Campbell) | Grazing pasture |
| 'The Ripple (South)', Highland Lakes Road, Steppes, Tas 7030 | CT 126983/1;<br>PID 1780918 | Burdening flood easement including rights of carriageway. Benefitting right of carriageway easement. Burdening 12 m wide wayleave easement to the benefit of Aurora Energy.<br>Notice to Treat pursuant to Section 11 of the *Land Acquisition Act 1993*.<br>Private timber reserve pursuant to Section 15(1) of the *Forest Practices Act 1985*.<br>Caveat by Epuron Projects Pty Ltd. | 1,425 ha | Private freehold (Duncan Colin Campbell) | Native bushland |
| 'Ripple Lodge', 6212 Highland Lakes Road, Steppes, Tas 7030 | CT 124603/1;<br>PID 7936135 | Benefitting and burdening right of carriageway easements.<br>Burdening wayleave easement to the benefit of Aurora Energy.<br>Caveat by Epuron Projects Pty Ltd. | 75.9 ha | Private freehold (Duncan Colin Campbell) | Grassland and native bushland |
| 'Allwrights Lagoons', Penstock Road, Shannon, Tas 7030 | CT 100080/2 & 3;<br>CT 205991/1;<br>CT 100081/65;<br>PID 5010136 | Benefitting right of carriageway easement on CT 100080/3. | 988.9 ha | Private freehold (John Albert Rose) | Undulating land with native scrub |

| Property address | Title reference (CT and PID) | Easements and covenants | Area (ha) | Land tenure | Land use |
|---|---|---|---|---|---|
| 'Christian Marsh', 5057 Highland Lakes Road, Steppes, Tas 7030 | CT 148905/1 &2;<br>CT 241119/1 & 2;<br>PID 5000093 | Private timber reserve (partially revoked) and caveats by Epuron Projects Pty Ltd on CT 241119/1 & 2, CT 148905/1 & 2. | 3,613.7 ha | Private freehold (Cluny Pty Ltd) | Native bushland |
| Highland Lakes Road | Road reserve,<br>Acquired Road (46/6704) | N/A | N/A | Department of State Growth | Road corridor |
| Watkins Road | Crown road | N/A | 7 ha | Being acquired by P.E.J.E. Pastoral Company Pty Ltd | Private access track and pasture |
| Hydro Electric Corporation within The Ripple (South) | CT 26886/1,2,3 & 4;<br>CT 28987/1 | Flood easement and right of way. | 6.1 ha | Hydro Tasmania | No longer used |
| Shannon River and Shannon River Conservation Area | N/A | N/A | 33.2 ha | Crown | River and reserve |

### 5.1.3 Consideration under the Tasmanian Planning Scheme – Central Highlands

The Project falls within the area covered by the *Tasmanian Planning Scheme – Central Highlands* (the planning scheme). The planning scheme primarily controls use and development on land through the application of zones. Each zone provides for a table of use and a suite of use and development standards. Development standards are divided into standards for 'building and works' and standards for 'subdivision'.

Additional to the zones there are a suite of codes within the scheme. The codes set out provisions that may apply to more than one zone or cannot be described by zone boundaries. Some codes are applied by way of a spatial overlay and others by textual application (i.e. certain types of use and development). Where there is a conflict between a code and zone provision, the code provision prevails. Some codes require specified technical information to accompany the application to demonstrate compliance.

The planning scheme also provides for exemptions, general provisions (that apply across the entire municipal area) and site-specific provisions in the form of particular purpose zones or specific area plans.

Under the planning scheme, use and development may be classified as:

- No permit required – a permit is not required to commence or carry out a use or development
- Permitted – a use or development must be granted a permit
- Discretionary – the planning authority has a discretion to refuse or permit a use or development
- Prohibited – a use or development permit must not be granted.

Any use and development standard includes an Acceptable Solution and Performance Criterion. The Acceptable Solution is the Permitted standard, and the Performance Criterion is the Discretionary standard.

The Project site is proposed on land zoned Rural with elements located on land zoned Utilities where the Project traverses Highland Lakes Road and Environmental Management where the internal access road is in proximity to Ripple Creek.

The proposal and all its components fall within the Utilities use class, which is defined as:

> *Use of land for utilities and infrastructure including:*
>
> *(a) Telecommunications;*
>
> *(b) Electricity generation;*
>
> *(c) Transmitting or distributing gas, oil, or power;*
>
> *(d) Transport networks;*
>
> *(e) Collecting, treating, transmitting, storing or distributing water; or*
>
> *(f) Collecting, treating, or disposing of storm or floodwater, sewage, or sullage.*
>
> *Examples include an electrical substation or powerline, gas, water or sewerage main, optic fibre main or distribution hub, pumping station, railway line, retention basin, road, sewage treatment plant, stormwater or flood water drain, water storage dam and weir.*

The scheme divides Utilities into minor utilities and other utilities. Minor utilities are defined as:

> *Means use of land for utilities for local distribution or reticulation of services and associated infrastructure such as a footpath, cycle path, stormwater channel, water pipes, retarding basin, telecommunication lines or electricity substation and power lines up to but not exceeding 110 kV.*

The proposed works would not fall within the definition of minor utilities and therefore would be defined simply as Utilities.

#### 5.1.3.1 Rural zone

In the Rural zone, Utilities is a permitted use. The applicable standards under the Rural zone are development standards for the proposed works. The Project will exceed the permitted building height under the acceptable solution.

The Project is likely to comply with the corresponding performance criteria for this standard, provided the proposal is supported by a visual impact assessment that demonstrates the Project will not have a significant impact on the rural landscape, and that unreasonable impacts to environmental values are minimised.

#### 5.1.3.2 Utilities zone

Elements of the Project, including the upgraded turn-in areas and road widening to sections of Highland Lakes Road, are in the Utilities zone. Utilities are a permitted use in the Utilities zone. As the extent of works proposed in the Utilities zone is limited to roadworks only, there are no applicable use or development standards.

#### 5.1.3.3 Environmental management zone

An element of the Project, being a section of internal access road, will be in proximity to Ripple Creek and therefore in the Environmental Management zone. Utilities are a discretionary use in the Environmental Management zone. The relevant use and development standards in the Environmental Management zone address issues that are being assessed by the EPA and therefore no assessment by Council is required under the zone.

#### 5.1.3.4 Applicable codes and overlays

A number of overlays apply to the Project site including the Bushfire Prone Area, Waterway and Coastal Protection Area, Landslip Hazard Area and Electricity Transmission Infrastructure Protection Area, as shown in Figure 5-1. Additional codes apply by way of textual application clause. The codes applicable to the Project, or requiring further consideration, are identified in Table 5-2 below. It is likely that the Project will trigger assessment under performance criteria in some of these codes.

Table 5-2 Applicable codes

| Code | Affected titles | Comments |
|---|---|---|
| Bushfire Prone Areas | All titles | The code applies to vulnerable use, hazardous use, or subdivision. The Project does not include subdivision, and Utilities use in not considered a vulnerable use.<br>A hazardous use is defined under clause C13.3.1 as follows:<br>*"Hazardous use…means a use where:*<br>*(a) hazardous chemicals of a manifest quantity are stored on a site; or*<br>*(b) Explosives are stored on a site and where classified as an explosives location or large explosives location as specified in the Explosives Act 2012."*<br>Although the Project includes storage of hazardous chemicals, these are not of a manifest quantity. No explosives will be stored on site for the operation of the use. Therefore, the code is not applicable. |
| Landslip Hazard Code | CT 126983/1; CT 148905/1; CT 100081/65; CT 124603/1; CT 148905/2; CT 241119/1; CT 182190/1; and CT 182189/1 | This code requires consideration of the potential risk from the works on landslide and geotechnical stability and ensuring that the risk is acceptable or capable of feasible and effective treatment through hazard management measures. |
| Road and Railway Assets Code | Highland Lakes Road | New and upgraded crossovers onto Highland Lakes Road must be designed and constructed in accordance with the Australian Standard. |
| Parking and Sustainable Transport Code | All titles | There are no minimum parking requirements for the Utilities use class. However, where provided, vehicle parking and loading areas must be able to service the likely workforce and attendance on the Project site and be designed to the relevant Australian Standard.<br>Internal access roads must be designed and constructed to a standard suitable for their intended use. This may include passing bays, and it is likely to require onsite turning for large vehicles. If hazardous materials are stored on site, therefore requiring bushfire management, there may be additional requirements around accessibility for emergency services vehicles. |
| Flood Prone Areas Hazard Code | All titles | No flood mapping is available on the planning scheme maps, and the Project site is not known to be subject to risk from flood. |
| Electricity Transmission Infrastructure Protection Code | CT 156999/1; CT 126982/1; CT 100672/1; and 182190/1 | Elements of the Project traverse an electricity transmission corridor. The Project must be located an appropriate distance from electricity transmission infrastructure to minimise safety hazards and ensure no impact on operational efficiency of the infrastructure. Written advice from TasNetworks will be required to satisfy the requirements of the code. |
| Natural Assets Code | All titles | The Project is exempt from the provisions of this code pursuant to clause E11.4.1(a) as it is a Level 2 Activity regulated by the EPA. |
| Attenuation Code | N/A | The Project is exempt from the provisions of this code pursuant to clause E18.2.1(b) as it is a Level 2 Activity regulated by the EPA. |

Flintstone

Wilburville

Shannon

0 1 2 km

Map proj.: GDA 2020 MGA Zone 55

N

Project site (the Land)

EXISTING INFRASTRUCTURE

Towns/communities

PROPOSED INFRASTRUCTURE

Construction footprint

TASMANIA PLANNING SCHEME - ZONES

- Low Density Residential
- Rural Living
- Village
- Local Business
- Rural
- Agriculture
- Environmental Management
- Utilities

Note: Green lines in the map are Environmental Management zones.

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St Patricks Plains Wind Farm

Figure 5-1
Land zoning

Flintstone
Arthurs Lake
Poatina Road
Arthurs Lake Road
Wilburville
Shannon
Wihareja Lagoon
Watkins Road
Highland Lakes Road
Waddamana Road
Penstock Lagoon
Lagoon of Islands
Interlaken Road
Waddamana Road
0 1 2 km
N
Map proj.: GDA 2020 MGA Zone 55

Project site (the Land)

EXISTING INFRASTRUCTURE
- Towns/communities
- Roads

PROPOSED INFRASTRUCTURE
- Construction footprint

LAND TENURE
- Hydro-Electric Corporation
- Inland Water
- Crown Land
- Authority Crown
- Local Government
- Authority Freehold
- Permanent Timber Production Zone Land
- Casement
- Public Reserve
- Local Government Act Reserve
- State Reserve
- Conservation Covenant
- Conservation Area
- Private Freehold

Note: Lines in the map are mainly roads classified as Casement.

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Saint Patricks Plains Wind Farm

Figure 5-2
Land tenure

## 5.2 Environmental aspects

The following provides a summary of the environmental aspects of the Project Site, with all detailed information provided under the relevant headings in Section 6.

The Project is located on St Patricks Plains, on the Central Highlands plateau of Tasmania, approximately 10 km south-east of the township of Miena on Great Lake, 1.5 km south-west of Arthurs Lake and approximately 35 km north of Bothwell. The Project Site covers an area of approximately 10,000 ha of generally flat plains in the northern half of the Project, becoming more undulating in the southern half towards Bakers Tier. The Project Site sits at an average elevation of approximately 875 m, with a range of approximately 700 m – 950 m.

The site can be accessed from multiple directions, including from the south from Highlands Lakes Road (A5), which runs through the Project Site, via Bothwell, and from the north via the same road via Deloraine. Other approaches include Poatina Road (B51) via Longford to the north-north-east, Interlaken Road (C527) via Oatlands to the south-east, or from Midland Highway to the east via Tunbridge Tier Road (C526) and Interlaken Road (C527).

The Project Site is traversed by the Shannon River in the central region, which also forms much of the western boundary of the site. Other waterways in the Project Site include Allwrights Lagoons, Wihareja Lagoon and Wihareja Creek, Noels Creek and Ripple Creek in the central region of the Project Site, and Blackburn Creek bordering the southern side of the Project Site. A number of wetlands and marshlands also occur throughout the area, with Allwrights Lagoons listed as a Wetland of National Importance.

Groundwater levels vary with the topography around the site and are relatively shallow in the flatter areas around the wetlands and waterbodies present. Dolerite bedrock (with minor basalt and sedimentary rocks) forms a single unconfined aquifer, containing low-salinity, slightly acidic groundwater that moves very slowly in varying directions at different depths (Cromer, 2022a).

The climate of the site is temperate to alpine, with an annual mean minimum of 1.6 °C and mean maximum of 12.2 °C. Rainfall is significant in the area with a mean annual rainfall of 916 mm from 2000–21; July and August are historically the wettest months with average monthly rainfalls of 120.3 and 125.8 mm respectively (Bureau of Meteorology, 2021). High rainfall in the area is the most important natural process for the maintenance of the ecosystem as a whole, and numerous wetlands, lakes and rivers rely on a combination of groundwater and rainfall.

Wind in the area is predominantly westerly, with the main wind directions being from the north-west, south-west and west, respectively. There are very few easterly winds experienced at the site or periods of no wind, as can be seen in the wind rose in Figure 5-3, which was generated using data collected by an onsite Proponent met mast over an almost three-year period.

The geology of the area is predominantly igneous, with basalt and dolerite (tholeiitic) dominant; there are also some smaller areas of sand, gravel and mud of alluvial, lacustrine and littoral origin. The northern half of the Project Site occurs within the Central Plateau Terrain Geoconservation Site, which covers over 1,000 km$^2$ and has the following Statement of Significance: '*As a large scale landform the Central Plateau is an outstanding example of both a continental erosion surface and a passive margin horst block*.' The next closest Geoconservation Site is the Shannon Tier ('The Beehive') Melilite Plugs, which is more than 3 km to the south of the site, well outside the influence of the Project.

The Project Site contains many areas mapped as having potential acid sulfate soils (PASS), as shown in Figure 5-4, with 1,411 ha (~14%) within the Project Site mapped as 'low probability inland ASS' (6–70% chance of occurrence in mapping unit), and the remainder of locations, totalling 156 ha (1.6%), mapped as 'extremely low probability inland ASS' (1–5%) (LISTmap, 2021). The extreme range of percentage chance of occurrence for 'low' probability ASS should be noted here and mapped results interpreted with caution; onsite testing is required to confirm the presence of PASS or ASS at each mapped location. The areas mapped as PASS are a

result of the marshlands/wetlands in the area, which typically harbour acidic soils. More information on the ASS investigations undertaken for the Project is provided in Section 6.10.

There are 10 individual conservation covenants within the Project Site totalling approximately 1,084 ha, protected in perpetuity under the *Nature Conservation Act 2002* (NC Act), and these are identified in Figure 5-5. A portion of the Shannon River Conservation Area occurs within the Project Site, which is restricted to the footprint of the Shannon River itself, covering an area of approximately 33.2 ha and protected under the NC Act. The Steppes State Reserve and the Steppes Conservation Area occur outside the boundary of the Project Site to the east. There are also a number of informal reserves bordering the Project Site.

Flora and vegetation surveys undertaken for the Project identified a large number of native and non-native vegetation communities within the Project Site. This included several *Eucalyptus* forest and woodland communities, large tracts of grassland / sedgeland (some of which are state-listed communities), areas of freshwater aquatic herbland (some of which are state-listed communities), and large areas of anthropogenically modified lands for silviculture and farming. No communities listed under the EPBC Act were identified. The surveys also identified 23 threatened flora species listed under either the *Threatened Species Protection Act 1995* (TSP Act), the EPBC Act, or both. An additional three state-listed species are expected to occur within the Project Site but were not identified during on-ground surveys. The Project Site was also found to harbour eight species of weeds declared under the Tasmanian *Weed Management Act 1999*, including gorse (*Ulex europaeus*) and ragwort (*Senecio jacobaea*). There are no areas of high-quality wilderness mapping in or adjacent to the Project Site.

Fauna surveys undertaken at the Project Site confirmed the presence of five terrestrial species listed either under the EPBC Act or TSP Act, including the Tasmanian devil, spotted-tailed and eastern quoll, ptunarra brown butterfly, and the Miena jewel beetle. Although not surveyed for, there are a variety of aquatic species that may occur within the Project Site. The Project Site is also known to support the threatened Tasmanian wedge-tailed eagle and white-bellied sea-eagle, as well as a host of other avifauna species including the listed species Tasmanian masked owl and Latham's snipe.

The Project Site is considered to be vulnerable to several natural processes, as is the case with most areas of Tasmania, with fire considered to be the key potential risk. The Project Site falls within the Bushfire Prone Area overlay in the planning scheme and has been subject to several recorded bushfires. These include an area of just under 400 ha burned in 1983 in the south-western part of the Project Site, an area of land to the south and west of the Project Site in 2019, and several smaller areas in the north-west affected by bushfire at various times between 2014 and 2021 (Source, TheLIST). Overall, the Project Site is considered to be at risk of bushfire, similarly to much of the state.

There are both perennial and ephemeral wetlands across the Project Site. However, advice sought from Central Highlands Council indicates no known history of flooding within the Project Site, and no inundation risk is identified on council available mapping and overlays (Senior Planning Officer, Central Highlands Council pers comm, 1 February 2023). Overall, the Project Site is not expected to be particularly prone to flooding.

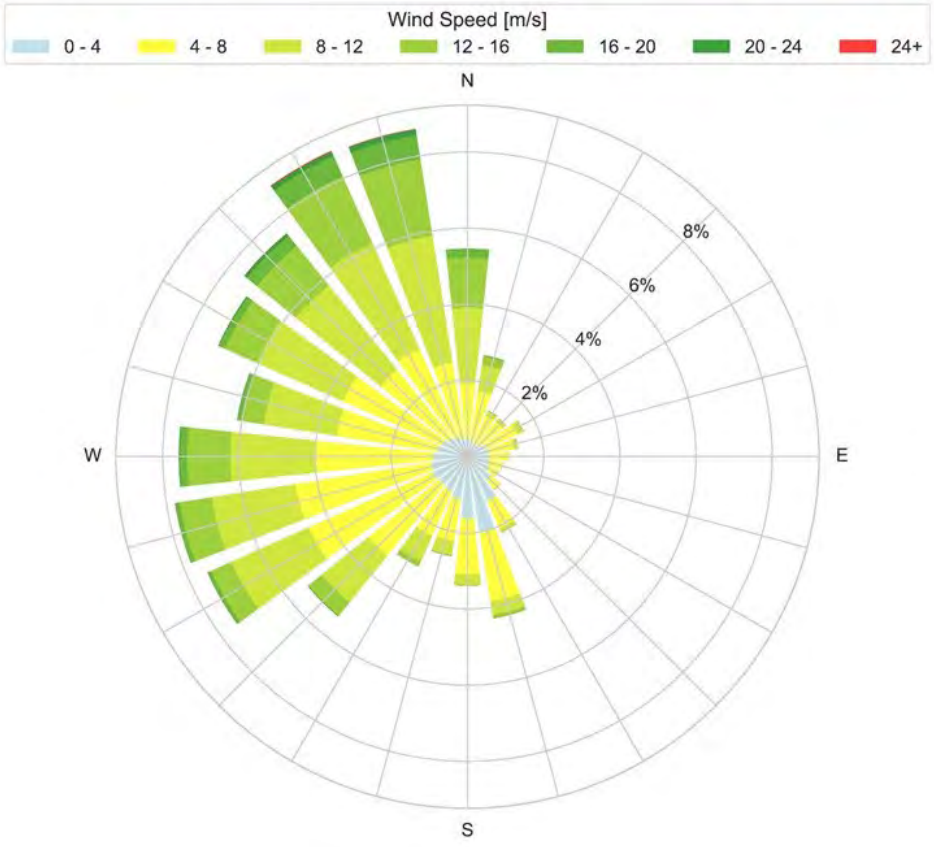
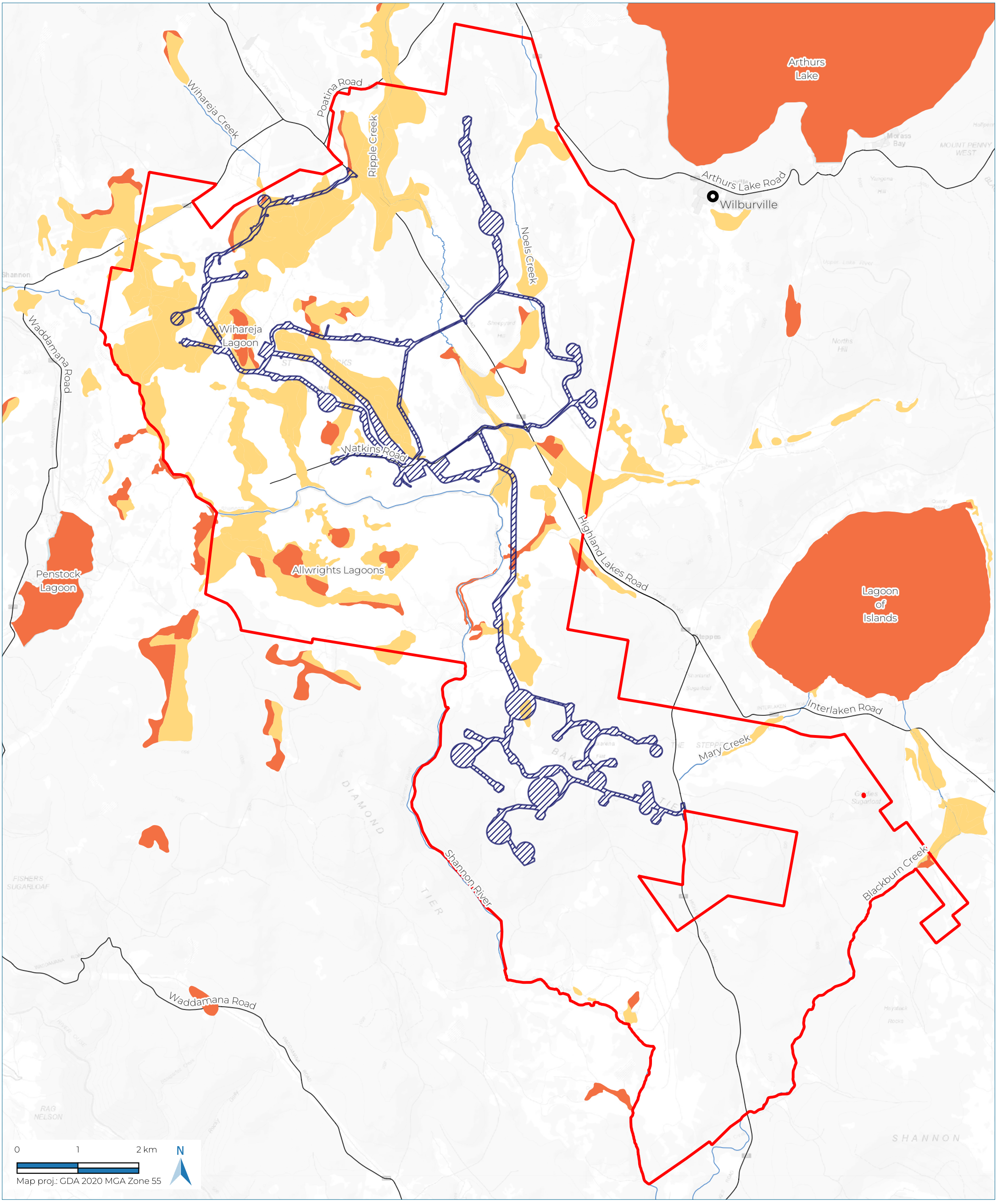



Figure 5-3 Wind rose for the Project Site area (Ark Energy met mast data from 10 July 2019 to 18 April 2022)




Project site (the Land)

EXISTING INFRASTRUCTURE

- Towns/communities
- Roads

NATURAL FEATURES

- Rivers and streams
- Lakes and lagoons

PROPOSED INFRASTRUCTURE

- Construction footprint

ACID SULFATE SOIL PROBABILITY

- Extremely Low
- Low

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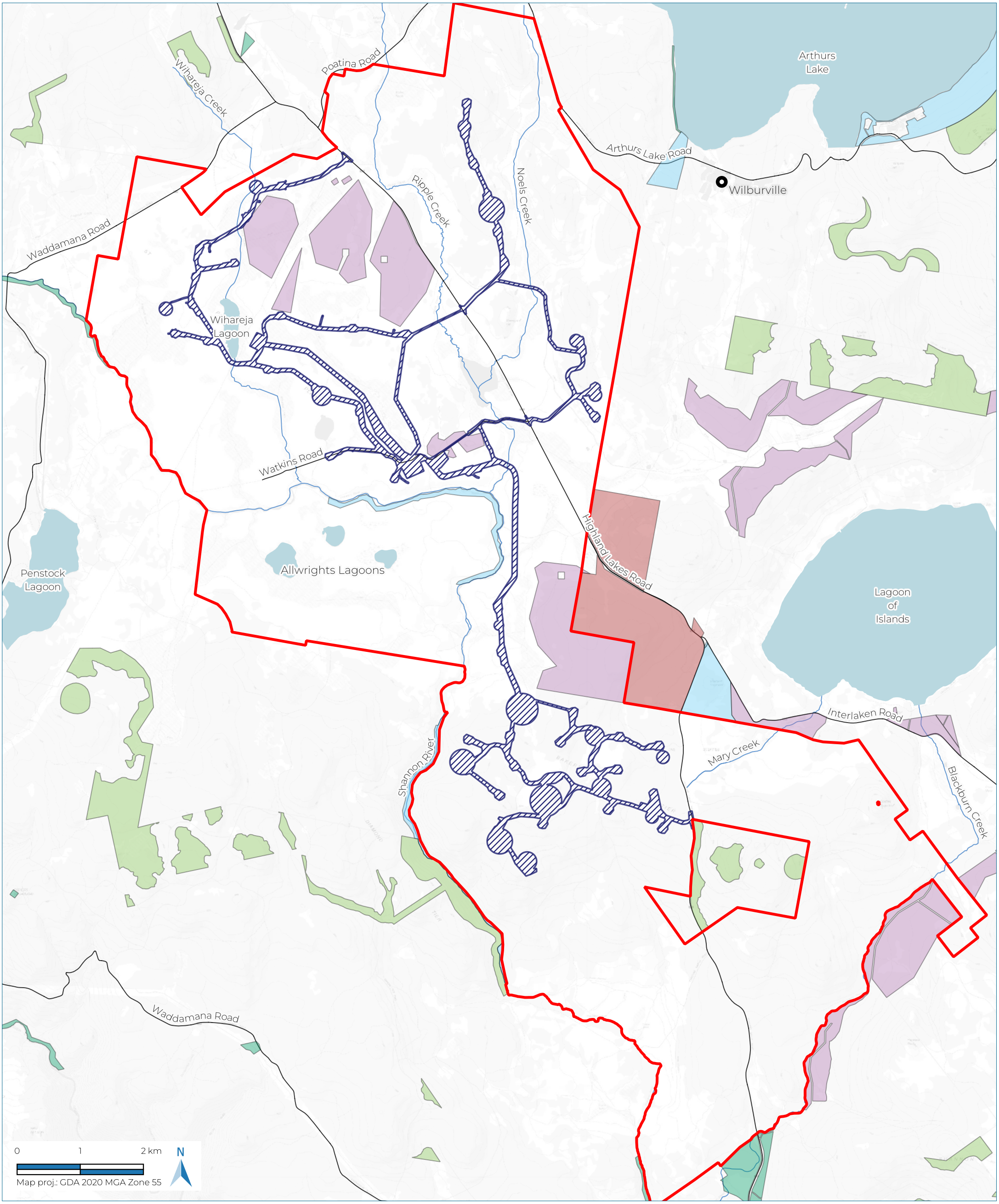
St Patricks Plains Wind Farm

Figure 5-4
Acid sulfate soils




Project site (the Land)

EXISTING INFRASTRUCTURE
- Roads
- Towns/communities

NATURAL FEATURES
- Rivers and streams
- Lakes and lagoons

PROPOSED INFRASTRUCTURE
- Construction footprint

RESERVES
- Conservation Area
- Conservation Covenant (NCA)
- Informal Reserve on Permanent Timber Production Zone Land or STT managed land
- Informal Reserve on other public land
- State Reserve

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St Patricks Plains Wind Farm

Figure 5-5
Reserves

## 5.3 Socio-economic aspects

A social and economic impact assessment was completed for the Project by SGS Economics & Planning in March 2021 and is presented in full in Appendix F (SGS, 2022). The assessment characterised the local socio-economic environment and used both quantitative and qualitative analysis techniques to predict the potential direct and indirect impacts (both positive and negative) on the local and regional socio-economic environment. While the timeframes have pushed out, the assessment remains valid.

### 5.3.1 Background

SGS undertook a review of the socio-economic profile of the Central Highlands and Southern Midlands local government areas (LGAs) to provide context to the socio-economic assessment.

The population of the Central Highlands LGA at the time of the 2016 ABS Census was approximately 2,160 people, representing a decrease over the preceding 10-year period. The population is aging, with the 65+ cohort the only age group that increased in population between 2006 and 2016. The number of youth and children decreased substantially during this time. The population of the Southern Midlands LGA was approximately 6,040 at the time of the 2016 ABS Census and showed population growth in the preceding 10-year period. While the Southern Midlands LGA shows an aging population similar to Central Highlands, the working age population did grow slightly in the decade to 2016.

Socio-Economic Indexes for Areas (SEIFA) measures relative socio-economic advantage and disadvantage in regions. Using the mapped SEIFA information, SGS notes that the area of the proposed Project is mapped as being among the 20–30% most socio-economically disadvantaged areas in Australia, showing a need for economic stimulus and opportunity for the local community.

Housing affordability and rental affordability consider the housing or rental costs relative to household income. Mapping shows rental affordability in the area changed from 'affordable' in 2017 to 'unaffordable' in 2021, suggesting considerable housing stress in the region.

Considering ABS data for industry of employment by worker or resident, the dominant industries across the two LGAs in 2016 were agriculture, forestry and fishing. Workforce participation and unemployment data show that residents in the Central Highlands are facing growing unemployment, while the opposite is true for residents in the Southern Midlands.

### 5.3.2 Potential impacts

The total expenditure for the development of the Project is expected to be approximately $540 million, of which 14% or $80.5 million will be spent directly within Tasmania, 19% within Australia and 66% internationally. The high international proportion of costs are associated with the purchasing of the WTG components, which are generally only available overseas in the current market.

The assessment's quantitative analysis used a computer modelling process known as computable general equilibrium (CGE) modelling, which is considered one of the leading methodologies for assessing economic impacts from an investment such as the Project, both during construction and operation (SGS, 2022). The model outputs estimated direct and indirect economic impacts on a regional (i.e. Tasmanian) basis during construction and operation, through metrics such as gross state product (GSP) – a state equivalent of gross domestic product representing the value of all goods and services produced within the state – and full-time equivalent (FTE) jobs generated (during construction and operation). A summary of the modelling outputs is provided in Table 5-3.

Table 5-3 Computable general equilibrium (CGE) modelling outputs for the Project

| | Construction period[4] | | | Operational period (15 years modelled) |
|---|---|---|---|---|
| **Aspect** | **2023** | **2024** | **2025** | **2026 – 2040** |
| Real GSP ($m) | 10.1 | 35.3 | 19.0 | 379.1 |
| Jobs (FTE) | 50 | 180 | 74 | 43 (per year) |
| State Government revenue ($m) (e.g. from company/personal taxes) | 20.8 | 73.4 | 31.6 | 71.8 |
| Australian Government revenue ($m) (e.g. from company/personal taxes) | 6.5 | 22.1 | 9.7 | 9.6 |

In summary, the results of the CGE modelling suggest that, as a result of the Project:

- GSP in Tasmania will increase by $64.4 million over the construction period, driven by construction expenditure in materials, professional services, a construction workforce, and all associated upstream and downstream industries (e.g. accommodation, services, transport).
- Job impacts are significant with up to 200 FTE jobs created at the peak of construction and 43 FTE jobs (both direct and indirect) required annually to run the Project during the operational period, with 20 FTE required for the Project directly.
- Significant State revenue will be generated by the Project, with large inputs early in the construction phase and then a steady flow of income during the operational phase. The Australian Government will also receive benefits from the Project through company and personal taxes.

In terms of qualitative impacts considered by the assessment, there are both positive and negative socio-economic impacts that could arise from the Project.

Negative impacts considered during the construction phase include a potential skills and worker shortage in the construction industry, with other similar projects throughout Tasmania proposed during the same period. Housing affordability and availability could potentially be negatively affected both locally and regionally, and finally traffic and transport impacts could occur during construction.

These potential negative impacts are, however, somewhat offset by significant, positive economic impacts in terms of employment and money spent in the state, improved local employment opportunity, and the ability to attract new families to the highland lakes area, which has an aging population and suffers from high levels of socio-economic disadvantage (SGS, 2022).

Impacts on land values and housing demand are uncertain and will depend somewhat on the chosen construction housing, with a camp-like facility unlikely to have any impact on demand whereas rental of local housing would significantly affect the local affordability of housing. The expectation is that the actual impact will be somewhere in between these extremes, with some dedicated temporary accommodation and some leased rental accommodation. In terms of land values, the literature suggests there is unlikely to be a detrimental impact from the Project itself, as measured in other similar situations across the world (SGS, 2022).

[4] The results of the CGE modelling were calculated based on the expected construction period at the time of the SGS (2022) report generation. It is acknowledged that these dates are now not correct due to project delays; however, the general outcomes of the model are still seen as relevant to the new construction period, and it was not considered warranted to re-model for outcomes that would yield similar results.

To establish a defined benefit to the local community, the Proponent will establish a community fund to support community initiatives at a local scale. The proposal will provide $3,000 (indexed) per year per WTG installed, which equates to $141,000 annually and over $3.5 million over a 25 year period. The management and set-up of the fund will be managed by the Project with the assistance of the LGA and a community representative committee.