



Wallaby Creek Wind Farm

Air Quality Assessment

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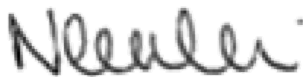
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Wallaby Creek Wind Farm

Air Quality Assessment

0671574



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ACRONYMS AND ABBREVIATIONS

Acronym	Description
AQIA	Air Quality Impact Assessment
AWS	Automatic Weather Station
BESS	Battery Energy Storage System
BoM	Bureau of Meteorology
DCCEEW	Department of Climate Change, Energy, the Environment and Water
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EPL	Environmental Protection Licence
ERM	Environmental Resources Management Australia Pty Ltd
IAQM	Institute of Air Quality Management
LGA	Local Government Area
MGA	Map Grid of Australia
MW	Megawatt
NO ₂	Nitrogen dioxide
NSW	New South Wales
O ₃	Ozone
OSOM	Oversize Overmass
PM ₁₀	Particulate matter with an aerodynamic diameter less than 10 µm
PM _{2.5}	Particulate matter with an aerodynamic diameter less than 2.5 µm
POEA	Protection of the Environment Operations Act 1997
RAV	Restricted Access Vehicles
SEARs	Secretary's Environmental Assessment Requirements
SSD	State Significant Development
TSP	Total Suspended Particulates
USEPA	United States Environmental Protection Authority
WTG	Wind Turbine Generators

EXECUTIVE SUMMARY

Acciona Energy Australia Global Pty Ltd (Acciona Energia) has proposed the development of a Wind Farm, south of Narromine in New South Wales. Environmental Resources Management Australia Pty Ltd (ERM) was appointed to undertake an Air Quality Impact Assessment (AQIA) of potential air quality impacts associated with the construction and operation of the proposed Wallaby Creek Wind Farm.

The assessment was undertaken to address the air quality requirements of the Secretary's Environmental Assessment Requirements (SEARs) and was conducted with reference to the guidance provided in the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (NSW EPA, 2022) and the United Kingdom *Guidance on the assessment of dust from demolition and construction* (IAQM, 2024).

The assessment addressed potential impacts on air quality during the construction and operational phases of the Project.

A review of the existing environment was undertaken through an evaluation of available meteorological monitoring data for the region. Meteorological data was obtained from the Bureau of Meteorology (BoM) Dubbo Airport and Trangie Research Station Automatic Weather Stations (AWS) for the period January 2020 – December 2024. The closest ambient air quality monitoring station is located at Orange, which is located approximately 115 kilometres (km) to the south-east of the Project, and as such, is not considered to be representative of the baseline air quality at the Project. However, given the relatively remote location of the Project, it is anticipated that ambient particulate concentrations would be low, with the exception of isolated events such as prescribed burning and wildfires.

Based on the available weather data, the following is noted:

- A similar wind field is recorded at both BoM weather stations with winds originating predominantly from the east (16% of the time). An additional component is also seen from the south-east (13% of the time) at Dubbo Airport AWS;
- Winds are generally moderate to fast at both stations with mean wind speeds ranging from 3.3 – 4.2 metres per second (m/s). Stronger winds are recorded at Dubbo Airport AWS compared to Trangie Research Station AWS; and
- Calm conditions occur infrequently at both stations (1.5 – 4.8% of the time).

A dust risk assessment was undertaken as per the approach outlined in the *Guidance on the assessment of dust from demolition and construction* (IAQM, 2024). The IAQM guidance is a four-step risk-based assessment of dust emissions associated with demolition, earthworks, construction activities and vehicle trackout. The main components of the risk assessment are defining the dust emission magnitudes and the surrounding area sensitivity which are combined in a risk matrix to determine the overall unmitigated risk of dust impacts.

The risk of dust impacts from earthworks, construction activities and trackout during the construction phase were assessed to be low prior to mitigation. A total of 15 associated sensitive receptors are located either within the Project area or within 250 m of the Project boundary, with none being located near any high dust generating activities such as the concrete batching plant and borrow pit or the internal unpaved access roads.

Three sensitive receptors (Dwellings 63, 72 and 102) are located along the existing Tantitha Road although only Dwelling 72 is within 50 m of the road. However, this dwelling will be acquired prior to construction and will remain unoccupied for the duration of the Project..

Dust mitigation measures proposed to be implemented during the construction phase include wet suppression of roads and hardstands, surface sprays on open, exposed soil, early rehabilitation of disturbed areas and applying speed limits on unsealed roads.

Potential odour impacts due to emissions from the wastewater treatment plant, the diesel generators and construction equipment, as well as from the disturbance of animal grazing lands were qualitatively addressed and are expected to be minimal.

During the operational period, potential sources of emission include wind-blown dust from unpaved roads and dust generated from vehicles travelling on unpaved roads during routine inspections and maintenance. However, these emissions will be negligible and will not have a significant impact on surrounding sensitive receptors.

In conclusion, the potential air quality impacts associated with the construction and operation of Wallaby Creek Wind Farm were assessed to be low and are unlikely to have a significant impact on the neighbouring sensitive receptors and surrounding environment.

1. INTRODUCTION

Environmental Resources Management Australia Pty Ltd (ERM) has prepared this assessment of potential air quality impacts associated with the construction and operation of the proposed Wallaby Creek Wind Farm ('the Project') on behalf of Acciona Energy Australia Global Pty Ltd ('Acciona Energia' or the 'Applicant'.) The Project is located 10 kilometres (km) south of Narromine in New South Wales (NSW) and will comprise up to 38 Wind Turbine Generators (WTGs) with a combined generating capacity of up to 236 Megawatts (MW).

This report details an assessment of the potential air quality impacts associated with the Project. The assessment has been conducted to address the air quality requirements of the Secretary's Environmental Assessment Requirements (SEARs). The assessment has been conducted with reference to the guidance provided in the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (NSW EPA, 2022) and the *United Kingdom Guidance on the assessment of dust from demolition and construction* (IAQM, 2024).

1.1 SCOPE OF WORKS

ERM has been commissioned to undertake the following scope of works:

- Characterisation of the existing environment including climate, meteorology and ambient air quality;
- Review of available project information including the:
 - Proposed construction activities and plant, outlining air emission sources and pollutants of interest;
 - Construction program and duration of activities with air emissions; and
 - Proximity of emission sources to sensitive receptors.
- Review of the relevant regulatory requirements and ambient air quality standards applicable to the Project;
- Assessment of the potential impacts of construction on air quality with reference to the *IAQM Guidance on the Assessment of Dust from Demolition and Construction*; and
- Recommendation of appropriate mitigation and management measures for incorporation into the statement of commitments.

1.2 SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS

This report supports an application for State Significant Development (SSD) under Part 4, Division 4.7 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) as part of the Environmental Impact Statement (EIS) for the Project (SSD-60247211). The SEARs for the Project were issued on 11 February 2025 and have been reviewed during the preparation of this assessment. This air quality assessment was conducted to address the SEARs outlined in **Table 1-1**.

TABLE 1-1 SEAR'S AIR QUALITY REQUIREMENTS

Key Issue	SEAR's Requirements	Addressed
Air Quality	An assessment of risks of dust generation and proposed mitigation measures, designed in accordance with the <i>Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales</i> (EPA, 2022) Demonstrate how the development minimises greenhouse gas emissions (reflecting the Government's goal of net zero emissions by 2050).	Chapter 5 and 6 of this report

Advice on the SEARs provided by the NSW Environment Protection Authority (EPA) included specific requirements for the air quality assessment as detailed in **Table 1-2**.

TABLE 1-2 NSW EPA AIR QUALITY REQUIREMENTS

Air – Dust generation and management of potential impacts on adjacent rural residences during the construction and operational phases of the project

The following guidance was provided for the assessment:

3. Air Issues

3.1 The EIS must demonstrate the proposal's ability to comply with the relevant regulatory framework, specifically the Protection of the Environment Operations Act 1997 (POEO Act) and the Protection of the Environment Operations (Clean Air) Regulation 2022 (Clean Air Reg). Particular consideration should be given to section 129 of the POEO Act concerning control of 'offensive odour'.

3.2 The EIS must include an Air Quality Impact Assessment (AQIA)

3.3 The AQIA must be carried out in accordance with the document, *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW 2005*

<https://www.epa.nsw.gov.au/resources/air/ammodelling05361.pdf>

3.4 The EIS must detail emission control techniques/practices that will be employed at the site and identify how the proposed control techniques/practices will meet the requirements of the POEO Act, Clean Air Reg and associated air quality limits or guideline criteria.

2. PROJECT DESCRIPTION

The Project includes the construction, operation and decommissioning of an up to 236 MW wind farm, Battery Energy Storage System (BESS), associated infrastructure, ancillary activities and site access.

The Project will comprise the following elements:

- UP to 38 WTGs with each having a hub height of 180 metres (m) and tip height of up to 271.5 m;
- BESS with dimensions of approximately 170 m² and ancillary infrastructure;
- Electrical reticulation network including:
 - One on-site substation with associated transformers, switchroom and reactive plant;
 - 132 kiloVolt (kV) overhead transmission line or 132 kV underground cable connecting the Project to the existing grid in Narromine; and
 - Internal underground and overhead electrical reticulation.
- Other infrastructure including internal access tracks and turning bays connecting Project infrastructure, hardstands, car parking, wind monitoring masts, concrete batching plants, crushing facilities, gravel / borrow pits, construction laydown areas, construction and operational compounds and security fencing;
- Ancillary activities: Source of water and materials for construction, subdivision and boundary adjustments relating to lease agreements, visual screening and associated ancillary works; and
- Access road use and upgrades.

Construction activities, including the erection of the WTGs, is expected to take two years, including commissioning. The WTGs have an expected operating life of approximately 30 years.

2.1 CONSTRUCTION PHASE

During construction, the following temporary infrastructure will be installed:

- Site construction compound and facilities including site offices, car parking and amenities;
- Concrete batching plant to supply concrete for WTG foundations and substation construction works;
- Earthworks to facilitate construction of access tracks and WTG foundations;
- Rock crushing facilities for the generation of aggregate suitable for concrete batching, and / or for access tracks and hardstand construction. Aggregates will be extracted from on-site borrow pits and / or trucked in from off-site quarries;
- Additional hardstand areas for the temporary storage of construction materials, plant and equipment;
- External water supply for use in concrete batching and construction activities;
- Transport, storage and handling of fuels, oils and other hazardous materials used during construction and operation of the wind farm; and
- Beneficial reuse of materials won from the development footprint during construction.

2.2 OPERATIONAL PHASE

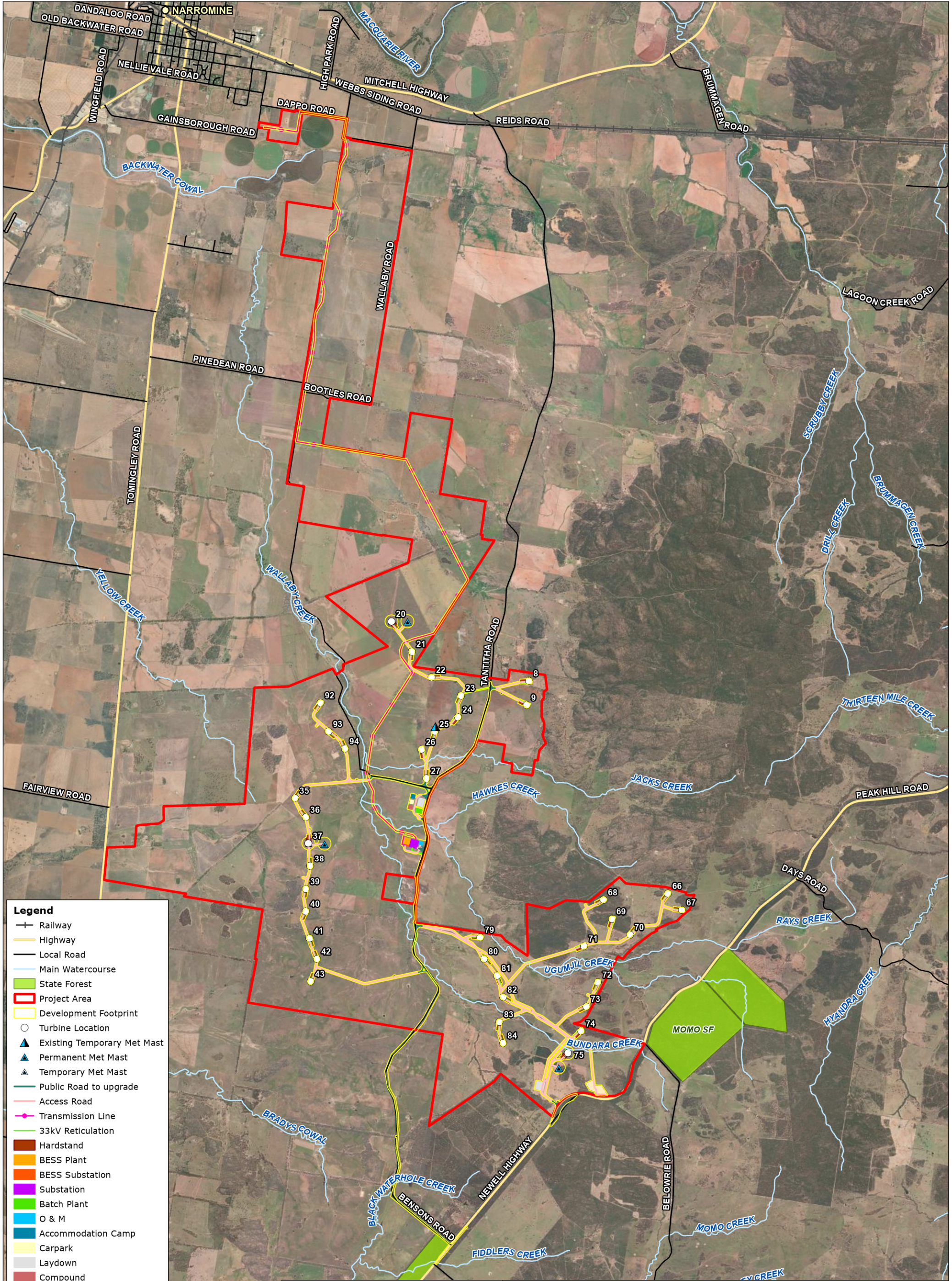
The commissioning of the Project will be staged to allow for partial commissioning of select infrastructure and equipment while the Project is still under construction. During operation, the Project will be monitored remotely although the WTGs and other equipment will require regular maintenance. Site maintenance will include maintenance of the WTGs, BESS, reticulation network, access roads, substation and transmission line.

2.3 DECOMMISSIONING PHASE

At the end of the expected operating life of the WTGs, three main options will be considered, including:

- Continuing the use of the site as a wind farm using the existing WTGs (subject to conditions of the equipment);
- Replacing the WTGs with technology current at that time and continuing the use of the site as a wind farm for a further term; or
- Decommissioning the Project and removing the WTGs and ancillary infrastructure in accordance with the Environmental Management Strategy which will be prepared for the Project.

The proposed layout of the Wallaby Creek Wind Farm is shown in **Figure 2-1**.



- Legend**
- Railway
 - Highway
 - Local Road
 - Main Watercourse
 - State Forest
 - Project Area
 - Development Footprint
 - Turbine Location
 - Existing Temporary Met Mast
 - Permanent Met Mast
 - Temporary Met Mast
 - Public Road to upgrade
 - Access Road
 - Transmission Line
 - 33kV Reticulation
 - Hardstand
 - BESS Plant
 - BESS Substation
 - Substation
 - Batch Plant
 - O & M
 - Accommodation Camp
 - Carpark
 - Laydown
 - Compound
 - Washdown
 - Security Hut
 - Borrow Pit (Internal)

Source:
Layout: Client Provided (Dec 2024)
Base Data: NSW DCDB/DTDB
Imagery: ESRI World Imagery

Coordinate System:
GDA 1994 MGA Zone 55
Date: 09/01/2026
Created By: MB/AM
Drawing Size: A3
0 1.5 3Km
1:80,000

F2-1 Proposed Layout of Wallaby Creek Wind Farm

Wallaby Creek Wind Farm
Air Quality Impact Assessment
Client: Acciona Energia

3. LEGISLATION AND GUIDELINES

3.1 PROTECTION OF THE ENVIRONMENT OPERATIONS ACT 1997

The POEO Act provides the legislative framework for the protection and enhancement of air quality in NSW. Its primary objectives are to reduce risks to harmless levels through pollution prevention, cleaner production, application of waste management hierarchy, continual environmental improvement and environmental monitoring.

The POEO Act contains a core list of activities that require an Environment Protection Licence (EPL). These are listed in Schedule 1 of the POEO Act and are known as 'scheduled activities'. If work is done at premises in order to enable a scheduled activity to be carried out, the work (called 'scheduled development work') must also be licensed under the POEO Act.

Section 129 of the POEO Act prohibits the emission of offensive odours from premises that are licenced for scheduled activities. The occupier of such premises must not cause or permit the emission of any offensive odour from the premises.

Recent amendments to Schedule 1 of POEO Act by the *Protection of the Environment Operations Legislation Amendment (Scheduled Activities) Regulation 2019* (the Amendment Regulation) included the listing of the activity of 'electricity works (wind farms)' as a scheduled activity if it meets specified criteria applicable to large-scale wind (**Table 3-1**). The proposed Wallaby Creek Wind Farm is classified as a large-scale wind farm and will therefore require an EPL to operate.

TABLE 3-1 SCHEDULED ACTIVITIES APPLICABLE TO WALLABY CREEK WIND FARM DURING OPERATION

Scheduled Activity	Definition	Criteria
Electricity works (wind farms)	The generation of electricity by means of wind turbines	- Is the subject of an approval under the <i>Environmental Planning and Assessment Act 1979</i>, Division 5.2, or - Is the subject of approval granted under the <i>Environmental Planning and Assessment Act 1979</i>, Part 3A, or - Is the subject of a development consent relating to State significant development by: - The Minister under the <i>Environmental Planning and Assessment Act 1979</i> Part 4; - The Independent Planning Commission as a consent authority under the <i>State Development Planning Policy (State and Regional Development) 2011</i> or was being carried out immediately before 1 December 2012 with a capacity to generate more than 30 megawatts of electrical power.

Under Schedule 1 of the POEO Act, the following activities are licenced activities and will be applicable to the Project for the duration of the construction phase (**Table 3-2**). Under the Amendment Regulation, concrete batching plants are classified as a non-scheduled activity, although they may trigger the requirement to hold a licence under other scheduled activities if the threshold is met.

TABLE 3-2 SCHEDULED ACTIVITIES APPLICABLE TO WALLABY CREEK WIND FARM DURING THE CONSTRUCTION PHASE

Scheduled Activity	Definition	Criteria
Concrete works	The production of concrete products, but does not include the production of pre-mixed concrete (concrete batching).	Capacity to produce more than 30,000 tonnes per year of concrete products.
Cement or lime handling	The handling of cement, fly ash, powdered lime (other than agricultural lime) or any other similar dry cement products, but not if the handling occurs as part of the production of pre-mixed concrete (concrete batching).	Capacity to handle more than 150 tonnes of cement or lime per day or 30,000 tonnes of cement or lime per year.
Crushing, grinding or separating	The processing of materials (including sand, gravel, rock or minerals, but not including waste of any description) by crushing, grinding or separating them into different sizes.	Capacity to process more than 150 tonnes of material per day or 30,000 tonnes of materials per year.
Extractive works	The extraction (by any method, including by excavation, dredging, blasting or tunnelling) or processing of extractive materials.	More than 30,000 tonnes of extractive material is transported in a year from premises at which extraction occurs, more than 30,000 tonnes of extractive material are taken to have been extracted in that year at the premises.

The Project involves the excavation of earthwork materials from an on-site borrow pit, which will be located in the southern region of the Project area. Materials sourced from the borrow pit will be used for structural fill, earthworks, pavement materials and potentially concrete aggregates. If required, material (gravel, aggregate and sand for concrete batching) will be obtained from existing off-site quarries. A total of approximately 224,000 tonnes of material is anticipated to be extracted (either all from on-site or a portion sourced from off-site). The material will be crushed and screened at the borrow pit with approximately 66,000 tonnes of material processed over a period of 3 – 5 months. One concrete batching plant will be operating on-site, producing a total of approximately 76,000 tonnes of concrete over a period of 4 months for the WTG and meteorological tower foundations.

Approval for the on-site borrow pit is currently being sought through a development application separate to this AQIA (and EIS) and as such, will be assessed further during the detailed design of the Project and once resource requirements have been finalised.

3.2 PROTECTION OF THE ENVIRONMENT OPERATIONS (CLEAN AIR) REGULATION 2022

The Protection of the Environment Operations (Clean Air) Regulation 2022 is a regulatory tool used together with the POEO Act and the Protection of the Environment Operations (General Regulation 2021) to reduce air pollution in NSW. It sets emission limits for various pollutants from a range of sources including activities such as construction, fuels, equipment and plants. The Clean Air Regulation regulates the certification of wood heaters, controls backyard burning of wood, rubbish and other vegetation, promotes cleaner motor vehicles and fuels, includes emission standards for industrial activities and plants and controls the storage / management of volatile organic liquids by imposing design and safety controls on equipment.

3.3 APPROVED METHODS FOR THE MODELLING AND ASSESSMENT OF AIR POLLUTANTS IN NSW

The *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (NSW EPA, 2022) (Approved Methods) prescribes the statutory methods for the modelling and assessing of air pollutants from stationary sources in NSW. The Approved Methods provides ambient impact assessment criteria for a number of pollutants for application in air quality assessments in NSW. The air quality criteria relevant to this assessment are presented in **Table 3-3**.

It is noted that the Approved Methods outline quantitative (dispersion modelling-based) approaches for assessment of potential impacts. These methods are formulated for the assessment of steady-state emission sources that occur on a continuous basis. In this respect, quantitative methods are not able to provide a meaningful assessment of short-term and / or transient operations, such as those associated with construction of the Project. Accordingly, the IAQM methodology has been referenced as discussed in the section below. The IAQM methodology has established precedence for assessment of construction impacts in NSW.

TABLE 3-3 AIR QUALITY ASSESSMENT CRITERIA

Pollutant	Averaging Period	Impact Assessment Criteria
Total Suspended Particulates (TSP)	Annual	90 µg/m ³
PM ₁₀	24 hours	50 µg/m ³
	Annual	20 µg/m ³
PM _{2.5}	24 hours	25 µg/m ³
	Annual	8 µg/m ³
Deposited dust	Annual	2 g/m ² /month (incremental)
	Annual	4 g/m ² /month (cumulative)

3.4 GUIDANCE ON THE ASSESSMENT OF DUST FROM DEMOLITION AND CONSTRUCTION (IAQM, 2024)

The *Guidance on the assessment of dust from demolition and construction* (IAQM, 2024) provides a risk-based approach to identify risks and to recommend appropriate mitigation measures to minimise these risks.

The risk of dust emissions from a construction site causing loss of amenity and / or health impacts is related to:

- the activities being undertaken (demolition, number of vehicles and plant etc);
- the duration of these activities; the size of the site;
- the meteorological conditions (wind speed, direction and rainfall);
- the proximity of receptors to the activities;
- the adequacy of the mitigation measures applied to reduce or eliminate dust; and
- the sensitivity of the receptors to dust.

The quantity of dust emitted from construction operations is related to the area of land being worked, and the level of construction activity (nature, magnitude and duration). Wind direction, wind speed and rainfall also influence whether there is likely to be a dust impact from construction. Adverse impacts can occur in any direction from a site although they are more likely to occur downwind of the prevailing wind direction and / or close to the site. Local conditions such as topography and natural barriers (e.g. woodland) can reduce airborne concentrations due to impaction.

The IAQM guidance for assessing risk involves the following steps:

- **Step 1:** Screen the need for a more detailed assessment. An assessment is required to be undertaken where sensitive receptors are located within 250 m of the boundary site and / or 50 m of the route(s) used by construction vehicles on public highways, up to 250 m from the site entrance(s). Where a more detailed assessment is not needed, it can be concluded that the level of risk is 'negligible' and any effects would not be of significance;
- **Step 2:** Assess the risk of dust impacts associated with demolition, earthworks, construction and trackout, taking into account:
 - **Step 2A:** The scale and nature of the works, which determines the potential dust emission magnitude as small, medium or large (**Table 3-4**);
 - **Step 2B:** The sensitivity of the area to dust impacts which can be defined as having a low, medium or high sensitivity (**Table 3-5**); and
 - **Step 2C:** Define the risk of dust impacts on dust soiling and human health by combining the dust emission magnitudes (small, medium or large) for demolition, earthworks, general construction and trackout (Step 2A) with the sensitivity of the area (low, medium or high) (Step 2B) (**Table 3-6 - Table 3-9**).
- **Step 3:** Determine the appropriate, site-specific mitigation to be adopted;
- **Step 4:** Examine the residual effects and determine whether or not these are significant; and
- **Step 5:** Dust assessment report.

TABLE 3-4 EXAMPLE DEFINITIONS FOR DUST EMISSION MAGNITUDE

Activity	Large	Medium	Small
Demolition	- Total building volume >50,000 m³ - Potentially dusty construction material e.g., concrete - On-site crushing/screening - Demolition activities >12 m above ground level	- Total building volume 12,000–75,000 m³ - Potentially dusty construction material - Demolition activities 6–12 m above ground level	- Total building volume <12,000 m³ - Construction material with low potential for dust release e.g., metal - Demolition activities <6 m above ground level - Demolition during wetter months
Earthworks	- Total site area >110,000 m² - Potential dusty soil type e.g., clay >10 heavy earth moving vehicles active at any one time - Formation of bunds >6 m in height	- Total site area 18,000 – 110,000 m² - Moderately dusty soil type e.g., silt 5–10 heavy earth moving vehicles active at any one time - Formation of bunds 3 - 6 m height	- Total site area <18,000 m² - Soil type with large grain size e.g., sand <5 heavy earth moving vehicles active at any one time - Formation of bunds <3 m in height
Construction	- Total building volume >75,000 m³ - On-site concrete batching - Sandblasting	- Total building volume 12,000–75,000 m³ - On-site concrete batching - Potentially dusty construction material e.g., concrete	- Total building volume <12,000 m³ - Construction material with low potential for dust release e.g., metal cladding or timber
Trackout	>50 Heavy Duty Vehicles (HDV) (>3.5t) outward movements in any one day - Potential dusty surface material e.g., high clay content - Unpaved road length >100 m	20–50 HDV (>3.5t) outward movements in any one day - Moderately dusty surface material e.g., high clay content - Unpaved road length 50–100 m	<20 HDV (>3.5t) outward movements in any one day - Surface material with low potential for dust release - Unpaved road length <50 m

TABLE 3-5 SENSITIVITY DEFINITIONS

Sensitivity Level	Impact	Description
High Sensitivity	Dust Soiling	- Users can reasonably expect enjoyment of a high level amenity; - The appearance, aesthetics or value of their property would be diminished by soiling; - People or property would reasonably be expected to be present continuously, or at least regularly for extended periods; and - Examples include dwellings, museums, long-term car parks,
	PM10 Health Effects	- Locations where the public is exposed over a time period relevant to the PM₁₀ criteria; and - Examples include residential properties, hospitals, schools and residential care homes.
	Ecological Effects	- Locations with an International or National designation and the designated features may be affected by dust soiling; and - Locations where there is a community of a particularly sensitive dust species.
Medium Sensitivity	Dust Soiling	- Users would expect to enjoy a reasonable level of amenity, but not the same level of amenity as their home; - The appearance, aesthetics or value of their property could be diminished by soiling; - People or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods; and - Examples include parks and places of work.
	PM10 Health Effects	- Locations where people exposed are workers and exposure is over a time period relevant to the PM₁₀ criteria; and - Examples include office and shop workers.
	Ecological Effects	- Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; and - Locations with a national designation where the features may be affected by dust deposition.
Low Sensitivity	Dust Soiling	- The enjoyment of amenity would not reasonably be expected; - Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; - There is transient exposure where people or property would reasonably be expected to be present only for limited periods; and - Examples include playing fields, farmland, footpaths, short-term car parks.
	PM10 Health Effects	- Locations where human exposure is transient; and - Examples include public footpaths, playing fields, parks and shopping streets.
	Ecological Effects	- Locations with a local designation where the features may be affected by dust deposition; and - Example is a local Nature Reserve with dust sensitive features.

TABLE 3-6 SENSITIVITY OF THE AREA TO DUST SOILING

Receptor Sensitivity	Number of Receptors	Distance from the source (m)			
		<20	<50	<100	<250
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

TABLE 3-7 SENSITIVITY OF THE AREA TO HUMAN HEALTH IMPACTS

Receptor Sensitivity	Annual Mean PM ₁₀ Concentration	Number of Receptors	Distance from the source (m)			
			<20	<50	<100	<250
High	>20 µg/m ³	>100	High	High	High	Medium
		10-100	High	High	Medium	Low
		1-10	High	Medium	Low	Low
	<20 µg/m ³	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
Medium	>20 µg/m ³	>10	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
Low	<20 µg/m ³	≥1	Low	Low	Low	Low

Note: This table has been adjusted to reflect the annual average PM₁₀ criteria of 20 µg/m³ as given in the Approved Methods

TABLE 3-8 SENSITIVITY OF THE AREA TO ECOLOGICAL IMPACTS

Receptor Sensitivity	Distance from the source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

TABLE 3-9 RISK OF DUST IMPACTS

Activity	Sensitivity of Area	Dust Emission Magnitude		
		Large	Medium	Small
Demolition	High	High Risk	Medium Risk	Medium Risk
	Medium	High Risk	Medium Risk	Low Risk
	Low	Medium Risk	Low Risk	Negligible
Earthworks and Construction	High	High Risk	Medium Risk	Low Risk
	Medium	Medium Risk	Medium Risk	Low Risk
	Low	Low Risk	Low Risk	Negligible
Trackout	High	High Risk	Medium Risk	Low Risk
	Medium	Medium Risk	Medium Risk	Low Risk
	Low	Low Risk	Low Risk	Negligible

3.5 NSW CLIMATE CHANGE POLICY FRAMEWORK

The NSW Climate Change Policy Framework (2022) aims to maximise the economic, social and environmental wellbeing of NSW in the context of a changing climate and current and emerging international and national policy settings and actions to address climate change.

The framework:

- Defines the NSW Government's role in reducing carbon emissions and adapting to the impacts of climate change;
- Sets policy directions to guide implementation of the framework;
- Commits NSW to achieving aspirational long-term objectives of net-zero emissions by 2050 and to help NSW become more resilient to a changing climate; and
- Sets out next steps for implementation.

3.6 CLIMATE CHANGE (NET ZERO FUTURE) ACT

The Climate Change (Net Zero Future) Act 2023 commits the NSW government to effective action on climate change to ensure a sustainable and fair future for the people, economy and environment of NSW. It legislates:

- Guiding principles for action to address climate change that considers the impacts, opportunities and the need for action in NSW;
- Emissions reduction targets for NSW:
 - 50% reduction on 2005 levels by 2030;
 - 70% reduction on 2005 levels by 2023; and
 - Net zero by 2050;
- An objective for NSW to be more resilient to a changing climate; and
- Establishing an independent, expert Net Zero Commission to monitor, review, report on and advise on progress towards these targets.

4. EXISTING ENVIRONMENT

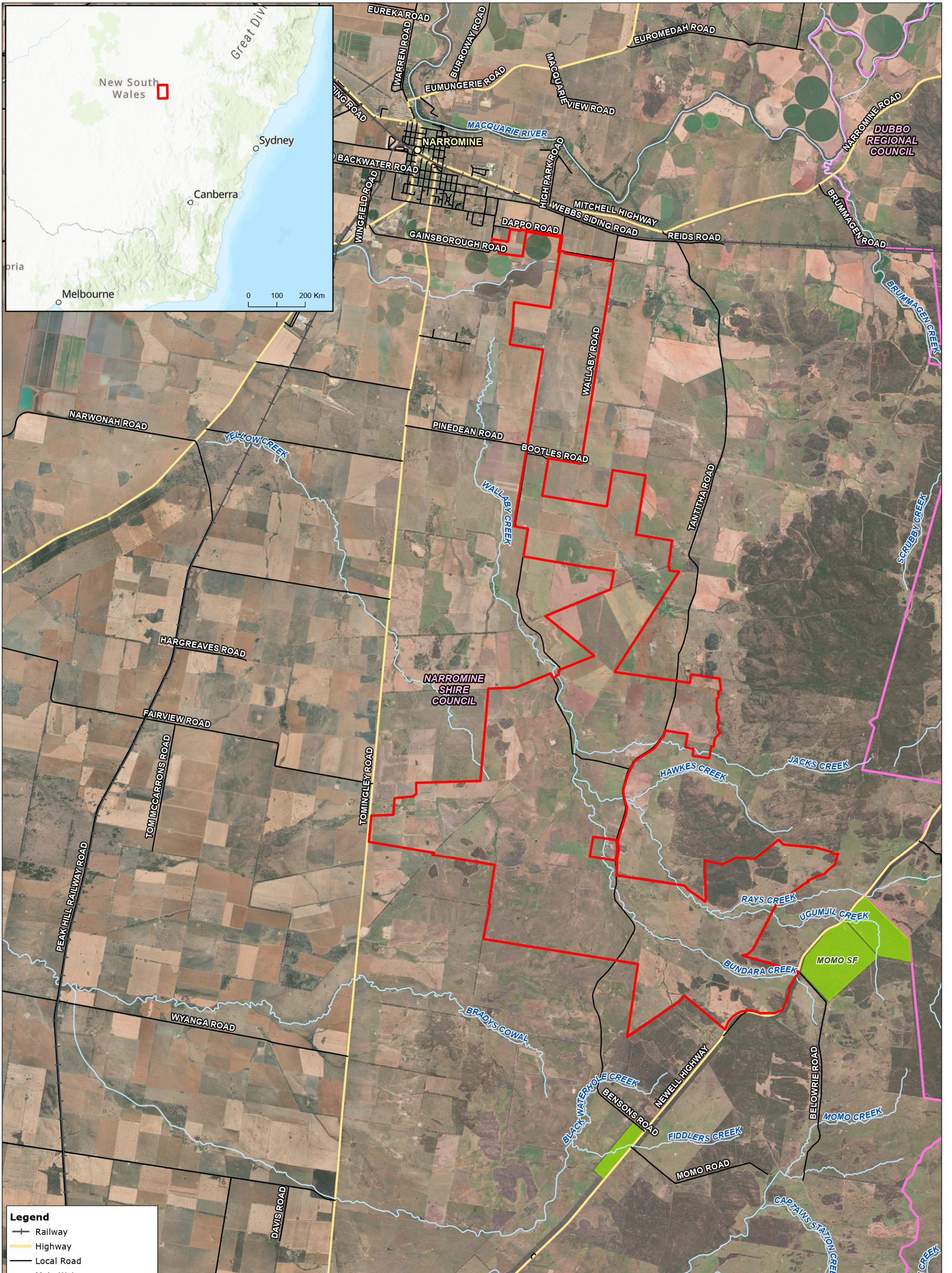
4.1 SITE LOCATION

The Project is located approximately 10 km south of Narromine and 15 km north of Tomingley in the Orana region of NSW (**Figure 4-1**) located entirely within the Narromine Shire Local Government Area (LGA). The Project area covers approximately 8,800 hectares (ha). The Project area is situated to the west of Newell Highway and to the south of the Mitchell Highway.

4.2 TOPOGRAPHY AND LAND-USE

Topography surrounding the Project area is largely consistent with elevation for the Project area ranging from approximately 260 m above sea level (to the north) to 480 m above sea level (to the south) (**Figure 4-2**).

Land-use in the area surrounding the Project is used predominantly for agriculture, forestry and fishing. Small to mid-scale pastoral and cropping occurs within the Project boundary, specifically sheep farming and broad acre cereal cropping. The Momo State Forest is located approximately 1.5 km east of the Project with Goobang National Park approximately 14.5 km to the south-east. Sappa Bulga National Park is located approximately 17 km to the north-east of the Project.



Legend

- Railway
- Highway
- Local Road
- Main Watercourse
- State Forest
- Local Government Area
- Project Area

Source:
Boundary: Client Provided (Dec 2024)
Base Data: NSW DCDB/DTDB.
Imagery: ESRI World Imagery

Coordinate System:
GDA 1994 MGA Zone 55

Date: 09/01/2026

Created By: MB / AM

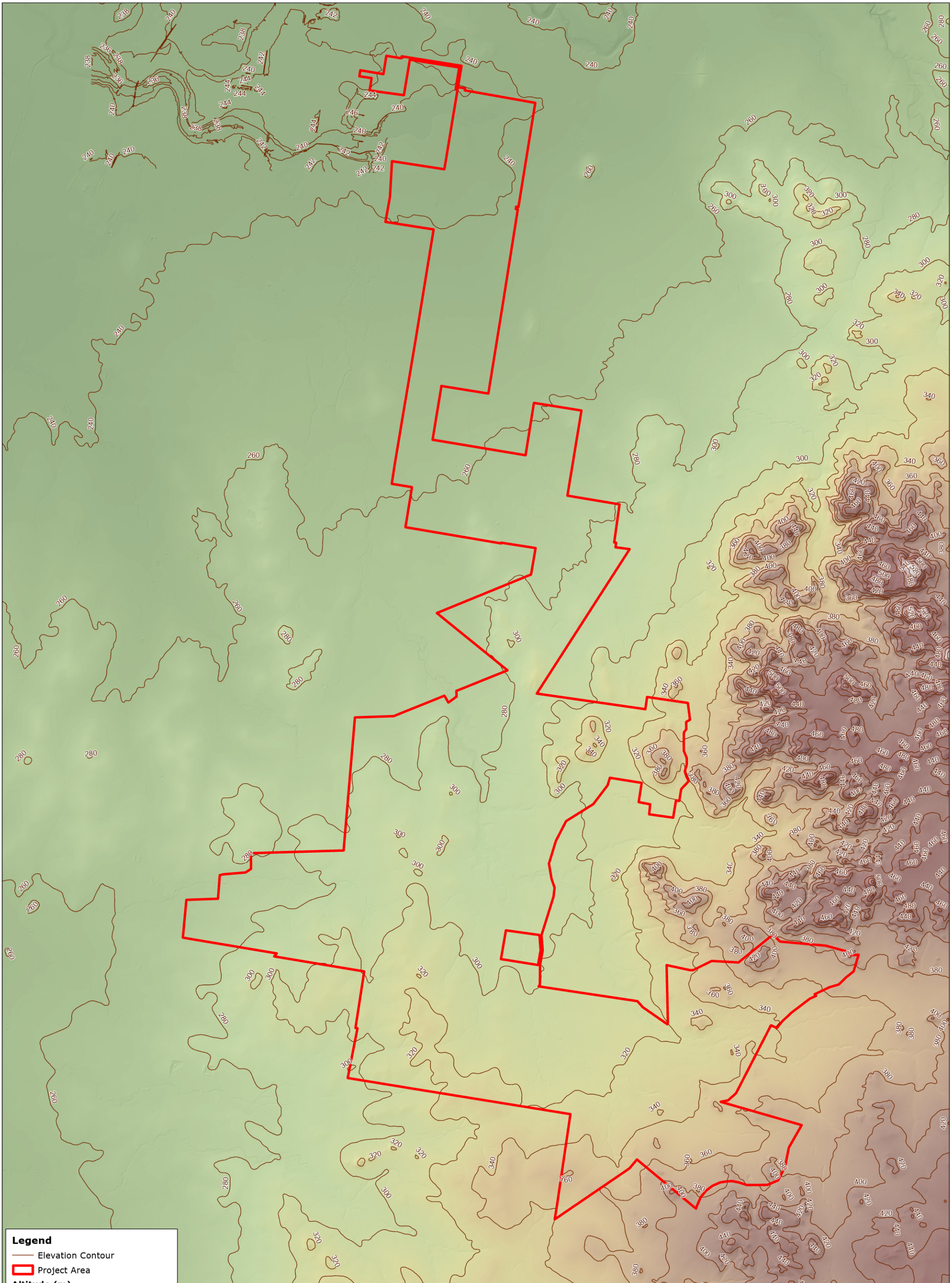
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0 2 4Km 1:100,000

F4-1 Location of the Project

Wallaby Creek Wind Farm
Air Quality Impact Assessment
Client: Acciona Energia





Legend

- Elevation Contour
 - ▭ Project Area
- Altitude (m)**



Source:
Layout: Client Provided (Dec 2024)
Base Data: NSW DCDB/DTDB
Imagery: ESRI World Imagery

Coordinate System:
GDA 1994 MGA Zone 55
Date: 09/01/2026
Created By: MB/AM
Drawing Size: A3



F4-2 Topography Surrounding the Project

Wallaby Creek Wind Farm
Air Quality Impact Assessment
Client: Acciona Energia



4.3 SENSITIVE RECEPTORS

The Approved Methods (NS EPA, 2022) defines a sensitive receptor as:

'A location where people are likely to work or reside; this may include a dwelling, school, hospital, office or public recreational area. An air quality impact assessment should also consider the location of any known or likely future sensitive receptors'.

The Project is located near the town of Narromine (12 km to the north of the closest WTG 14). Other surrounding towns include Tomingley (15 km south of WTG 13), Trangie (45 km north-west of WTG 14) and Dubbo (30 km north-east of WTG 43).

The United Kingdom's *Guidance on the assessment of dust from demolition and construction* (IAQM, 2024) recommends a separation distance of 250 m between construction works and receptors to determine the need for further assessment of potential dust risk. As such, for the purposes of this assessment, all sensitive receptors located on-site and within 250 m of the Project boundary have been considered.

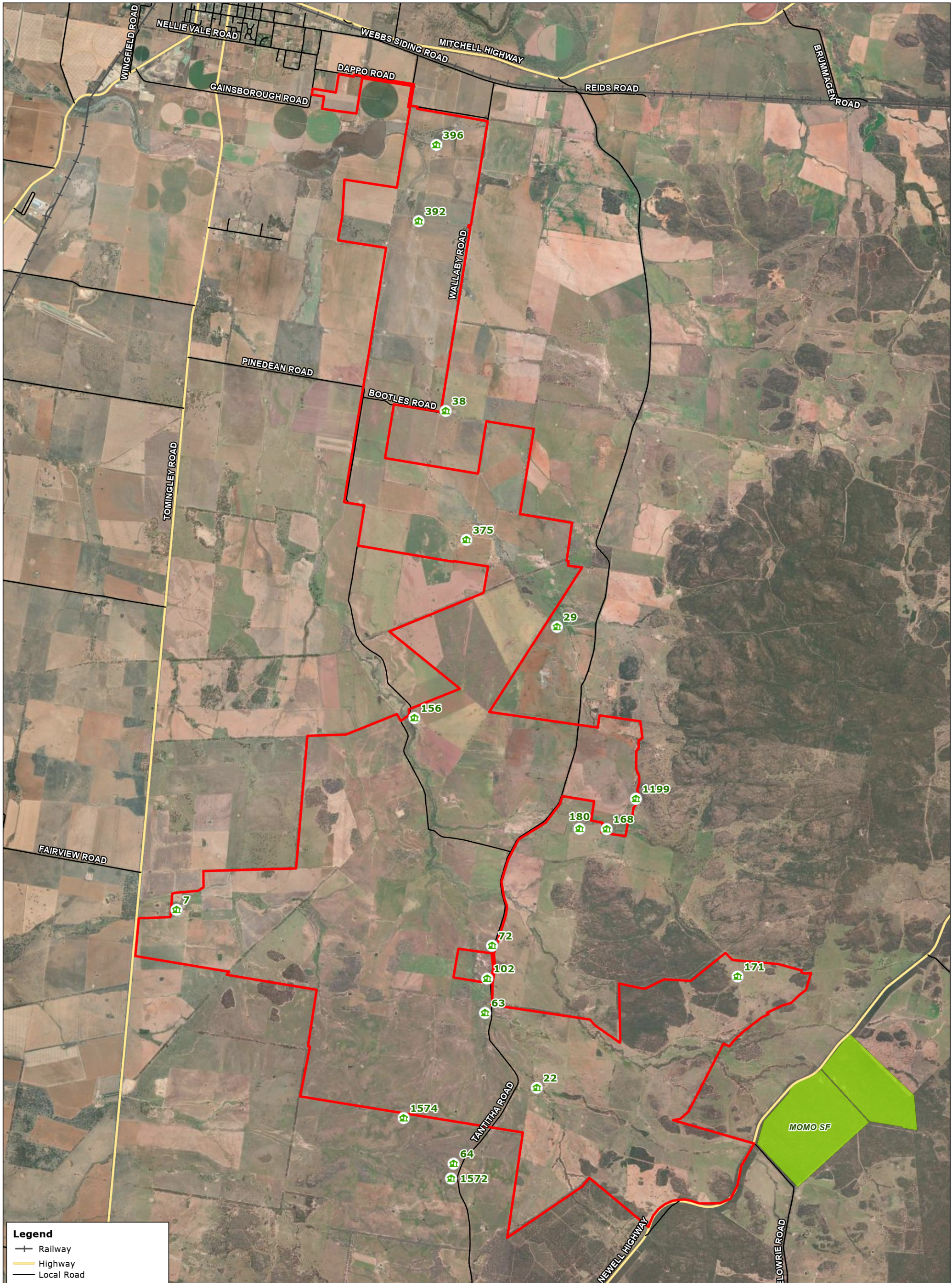
A total of 11 sensitive receptors have been identified on-site and 4 sensitive receptors have been identified within 250 m of the Project boundary (**Table 4-1** and **Figure 4-3**). None of the identified sensitive receptors are located near high dust generating activities such as the concrete batching plant, borrow pit and internal unpaved access roads.

TABLE 4-1 SENSITIVE RECEPTORS IN CLOSE PROXIMITY TO THE PROJECT

Receptor ID	Address	Receptor Type	Direction from Site	Location (MGA, Zone 55)	
				Easting (mE)	Northing (mN)
7	1973 Tomingley Road	Dwelling	Internal	616198	6413945
22	2205 Tantitha Road			623456	6410348
63	2402 Tantitha Road			622413	6411866
72 ^(a)	1902 Tantitha Road			622555	6413222
156	1076 Pinedean Road			620991	6417819
168	1505 Tantitha Road			624865	6415580
171	2653 Tantitha Road			627503	6412600
375	Off Tomingley Road			622043	6421402
392	Wallaby Road			621076	6427830
396	Unknown			621435	6429366
1199	1503 Tantitha Road			625454	6416192
29	1186 Tantitha Road		East	623863	6419655
38	166 Bootles Road			621622	6424005
102	1912 Tantitha Road			622457	6412600
1574	2432 Tantitha Road		South	620773	6409745

Note:

(a) Dwelling 72 will be acquired prior to construction and will remain unoccupied



Legend

- Railway
- Highway
- Local Road
- State Forest
- Sensitive Receptor
- Project Area

Source:
Layout: Client Provided (Dec 2024)
Base Data: NSW DCDB/DTDB
Imagery: ESRI World Imagery

Coordinate System:
GDA 1994 MGA Zone 55
Date: 09/01/2026
Created By: MB/AM
Drawing Size: A3
0 1.5 3Km
1:70,000

F4-3 Sensitive receptors on-site and within 250m of the Project Boundary

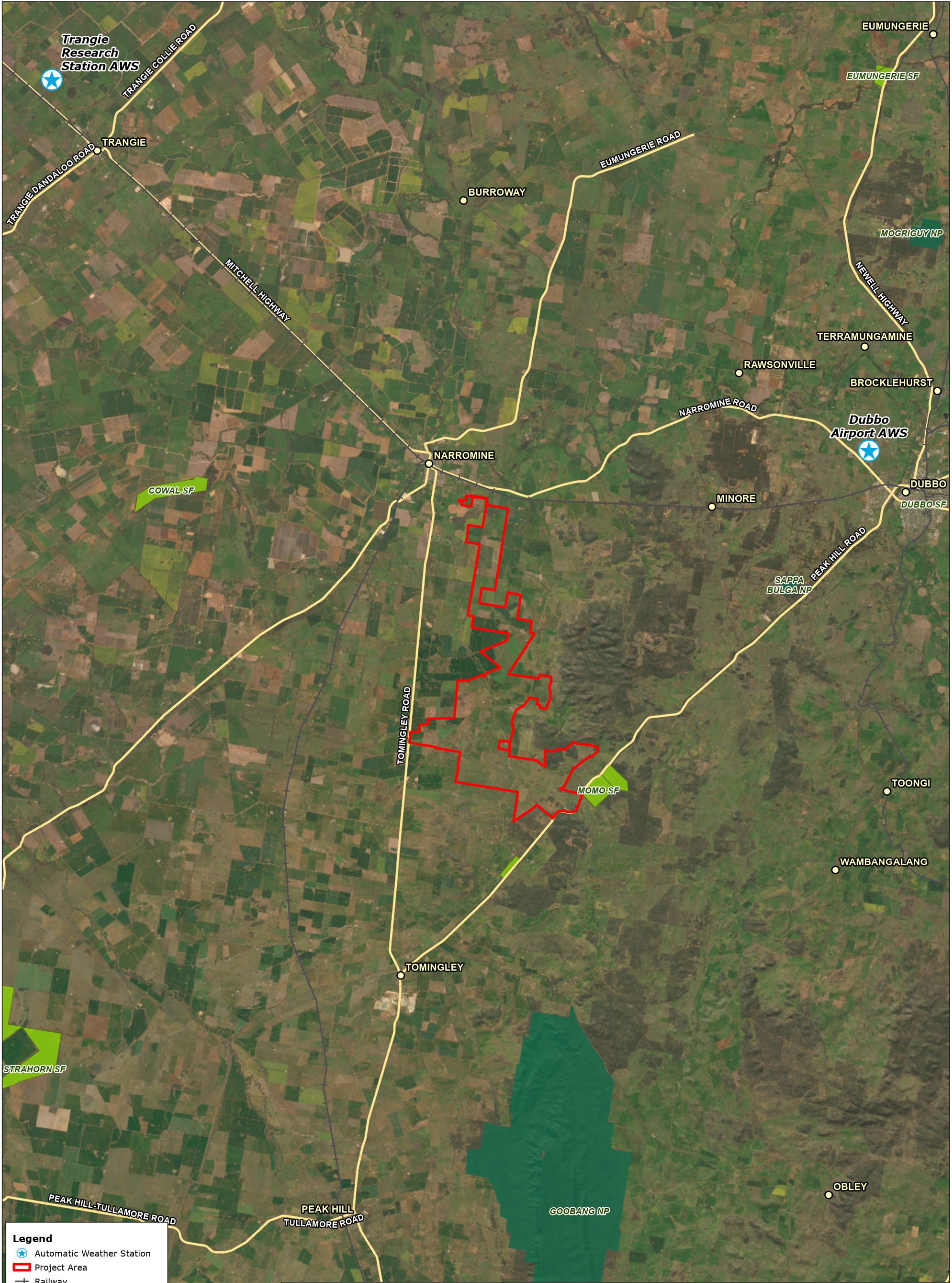
Wallaby Creek Wind Farm
Air Quality Impact Assessment
Client: Acciona Energia

ERM

4.4 LOCAL METEOROLOGY

The Bureau of Meteorology (BoM) operates a network of Automatic Weather Stations (AWS) across the country. The closest weather stations to the Project are located at Dubbo Airport AWS (ID 065070) and Trangie Research Station AWS (ID 051049). Dubbo Airport AWS is located approximately 30 km to the north-east of the Project with Trangie Research Station AWS located approximately 60 km to the north-west of the Project.

The location of these weather stations relative to the Project area is shown in **Figure 4-4**. Meteorological data was obtained from these stations for the period January 2020 – December 2024. While local, site-specific meteorological data is not available for the Project area, the wind field recorded at these stations is considered likely to be representative of the prevailing winds at the Project site. While there is a slight variation in the terrain of the Project site, the terrain to the east and north is flat and would not be expected to have a significant influence on the regional wind field.



Legend

- Automatic Weather Station
- Project Area
- Railway
- Highway
- National Park
- State Forest

Source:
Layout: Client Provided (Dec 2024)
Base Data: NSW DCDB/DTDB
Imagery: ESRI World Imagery

Coordinate System:
GDA 1994 MGA Zone 55

Date: 09/01/2026

Created By: MB/AM

Drawing Size: A3

0 4 8Km

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F4-4 Location of the BoM Automatic Weather Stations

Wallaby Creek Wind Farm
Air Quality Impact Assessment
Client: Acciona Energia



4.4.1 CLIMATE

A summary of the climate statistics recorded at Dubbo Airport AWS, the nearest BoM weather station to the Project, is given in **Table 4-2**. The local climate at Dubbo Airport AWS is characterised by:

- A mean maximum temperature of 33.6 °C in January (summer) and a mean minimum temperature of 3.1 °C in July (winter);
- Mean highest rainfall during the summer months (November – March) with 67.2 mm recorded in March; and
- A mean maximum 9am relative humidity of 86% in June and July and a mean minimum 3pm relative humidity of 30% in December.

TABLE 4-2 SUMMARY OF CLIMATE STATISTICS DUBBO AIRPORT AWS FOR THE PERIOD 1993 - 2025

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily Mean Temperature												
Maximum (°C)	33.6	32.1	29.3	24.8	20.0	16.4	15.7	17.7	21.5	25.2	28.7	31.6
Minimum (°C)	18.4	17.6	15.0	10.3	6.5	4.3	3.1	3.4	6.0	9.5	13.5	16.0
Rainfall												
Mean (mm)	60.0	46.5	67.2	39.8	38.4	48.3	43.9	37.3	41.2	49.5	62.4	60.2
Mean days of rain	5.4	4.7	5.2	3.2	4.1	5.7	5.4	4.3	4.7	5.1	5.7	4.9
Mean 9am conditions ⁽¹⁾												
Temperature (°C)	23.8	22.4	19.6	17.0	12.2	8.6	7.5	9.6	14.0	17.9	20.3	22.8
Relative humidity (%)	56	62	64	64	76	86	86	76	67	56	56	52
Wind speed (km/hr)	21.5	19.5	18.4	16.8	14.0	13.6	12.9	14.6	16.7	17.9	20.2	19.9
Mean 3pm conditions ⁽¹⁾												
Temperature (°C)	31.6	30.2	27.6	23.7	19.2	15.4	14.5	16.5	19.9	23.5	27.0	29.7
Relative humidity (%)	32	36	36	37	47	57	55	47	43	36	35	30
Wind speed (km/hr)	18.9	18.1	17.9	16.8	16.2	17.1	17.1	19.0	19.7	20.1	20.2	19.4

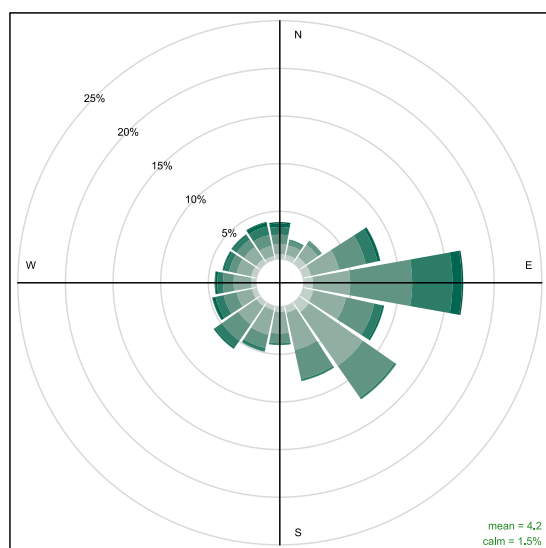
Notes:

(1) Data available for the period 1993 - 2010

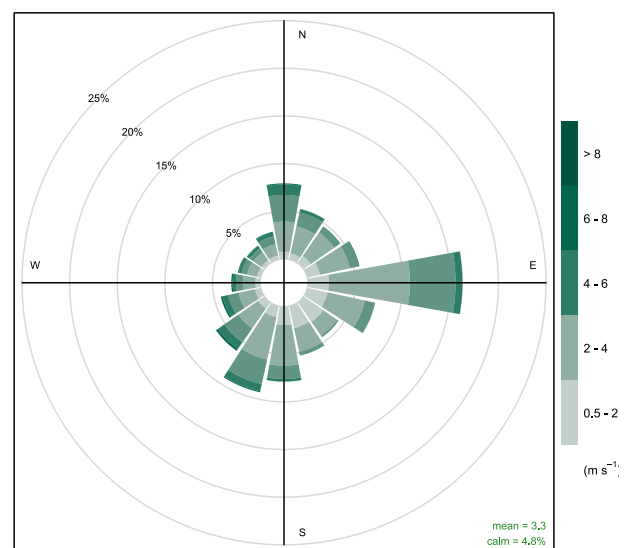
4.4.2 WIND FIELD

Annual average wind roses for Dubbo Airport and Trangie Research Station AWS for the period January 2020 – December 2024 are shown in **Figure 4-5** with diurnal and seasonal wind roses presented in Appendix A. Based on the available data, the wind field is characterised by the following:

- A similar wind field is recorded at both weather stations with winds originating predominantly from the east (16% of the time). An additional component is also seen from the south-east (13% of the time) at Dubbo Airport AWS;
- A similar diurnal signature is also seen in the wind field at both weather stations. At Dubbo Airport AWS, winds originate predominantly from the east over all time periods. An additional strong component is also seen from the south-east during the early morning (00:00 – 06:00). During the afternoon and early evening (12:00 – 18:00), a slight shift is observed with an increase in winds from the south-west. Diurnal winds at Trangie Research Station AWS also show dominant easterly winds over all time periods, with the exception of the afternoon and early evening (12:00 – 18:00) where winds shift to the south-west and south-southwest. A stronger component from the north is also seen during the day-time (06:00 – 18:00);
- Seasonally, easterly winds at Dubbo Airport AWS have the highest frequency of occurrence during the spring and summer seasons. During autumn, winds from the east and south-east are the most prevalent, with winds predominantly from the south-east during winter. At Trangie Research Station AWS, winds originate predominantly from the east during all seasons with the exception of winter which has low-frequency winds from all directions;
- Winds are generally moderate to fast at both stations with mean wind speeds ranging from 3.3 – 4.2 m / s. Stronger winds are recorded at Dubbo Airport AWS compared to Trangie Research Station AWS;
- Calm conditions, which are defined as wind speeds less than 0.5 m / s, occur infrequently at both stations (1.5 – 4.8% of the time). As would be expected, an increase in calm conditions is observed during the night-time compared to the daytime at both stations and during the cooler winter months.



Frequency of counts by wind direction (%)

Dubbo Airport AWS

Frequency of counts by wind direction (%)

Trangie Research Station AWS

FIGURE 4-5 ANNUAL AVERAGE WIND ROSE FOR DUBBO AIRPORT AND TRANGIE RESEARCH STATION AWS FOR THE PERIOD 2020 TO 2024

4.5 EXISTING AIR QUALITY SITUATION

Land-uses in the area surrounding the Project are predominantly agricultural. As such, existing sources of air pollution are likely to include dust emissions from agricultural activities and wind-blown dust from open, exposed areas. Vehicle exhaust emissions will also be generated from traffic along the public roads although these will likely be low. Prescribed burning and uncontrolled wildfires will also contribute to elevated pollutant concentrations in this area, especially during the bushfire danger season.

The NSW Department of Climate Change, Energy, Environment and Water (DCCEEW) operates a network of ambient air quality monitoring stations across the State. The nearest ambient air quality monitoring station to the Project site is located at Dubbo Airport (32° 13" 10.56" S, 148° 34' 39.72" E), approximately 30 km to the north-east of the Project. This station forms part of the rural NSW monitoring network and provides indicative concentrations of Total Suspended Particulates (TSP), PM₁₀ and PM_{2.5} using a DustTrak monitor. However, data from this station is not readily available, with the closest performance air quality monitoring station located at Orange, approximately 115 km to the south-east of the Project. As such, an assessment of the representation baseline quality situation in the Project area could not be undertaken.

Given the relatively remote location of the Project, it is anticipated that ambient particulate concentrations would be low, with the exception of isolated events such as prescribed burning and wildfires.

5. ASSESSMENT OF CONSTRUCTION IMPACTS

5.1 CONSTRUCTION TIMELINES

Construction of the Project is anticipated to commence in July 2027. All on-site construction activities as well as the erection and commissioning of the WTGs is expected to take approximately 2 years, with a peak construction period of 6 months.

Construction of the Project will occur in three main stages:

- Stage 1 – enable works including the establishment of the construction compound, laydown areas, Operations and Maintenance (O&M) facility and electrical reticulation;
- Stage 2 – construction of the wind turbines in groups, which will involve the installation of hardstands, foundations access roads, turbines and energization of the Project; and
- Stage 3 – demobilisation of the construction work force / equipment and the rehabilitation of temporary disturbance areas.

The anticipated timing of key Project milestones is outlined in **Table 5-1**.

TABLE 5-1 INDICATIVE CONSTRUCTION TIMELINE

Stage	Construction Activities	Description of works	Estimated Date of Commencement
1	Early Works	Clearing, excavations, road construction and upgrade, bench construction and early access drainage construction	April 2027
2	Construction Phase	Clearing, excavations, road and bench construction, borrow pits, WTG concrete work and civil works, general building activities	July 2027
3	Installation Phase	WTG preparation of hardstands/laydown areas and WTG installation	May 2028
4	Energisation and Commissioning	Connection of the wind farm to the electricity grid	November 2028
5	Demobilisation	Removal of all temporary infrastructure from site	December 2028

5.2 CONSTRUCTION ACTIVITIES

The total area of the land impacted by the Project (i.e., the temporary and permanent disturbance footprint) will be approximately 1,190 ha. Of this, the permanent disturbance footprint (the area which includes all the operational Project infrastructure) comprises approximately 578 ha. This includes:

- WTG foundations;
- Crane pads;
- Permanent access roads;
- Transmission line poles/towers and transmission line access roads;
- Overhead electrical reticulation;
- Meteorological masts;
- Substation, switching station, O&M and other facilities; and

- Public road upgrades.

Additionally, temporary disturbance (approximately 612 ha) will occur during construction of the Project, which will be rehabilitated once complete, including:

- Access road construction batters;
- Underground electrical cable footprint;
- Concrete batching plant;
- Construction office compound;
- Some general laydown areas;
- Transmission line temporary access roads; and
- Laydown and assembly areas adjacent to the crane hardstand and wind turbine foundation.

5.2.1 WIND TURBINE GENERATORS

Dust generating activities associated with the installation of WTG include the establishment of foundations and hardstands.

WTG foundations are excavated using mechanical equipment and controlled blasting if required. Topsoil and spoil will be stockpiled for reuse to backfill over the foundation and for vegetation rehabilitation.

A hardstand will be constructed adjacent to the base of each WTG to enable the assembly and erection of the tower, nacelle and blade components. Each hardstand will consist of gravel, which will be compacted and graded to form a rough rectangular area. The towers, nacelles and blades will be lifted off delivery trucks using mobile cranes. Larger cranes will then assist in the installation of the tower sections, nacelle and blades.

5.2.2 SITE PREPARATION

During this phase, site preparation works will include land clearing, erosion and sediment control, site levelling, construction of access roads, site drainage works, fencing, foundations, trenching and construction of hardstands, office and car parking areas.

Most of the infrastructure will be prefabricated off site and delivered to the Project area, where it will be assembled and installed. The set up of the temporary construction compound areas and ancillary facilities, the upgrade of existing internal access tracks and construction of new access roads will be the first construction activities.

Construction activities will include:

- Civil works including:
 - Upgrade of existing access roads and construction of new access roads;
 - Grading, levelling and earthworks (including the construction of hardstands for key infrastructure items);
 - Sediment and erosion control measures and water management structures;
 - Visual enhancement plantings (if required);
 - Native corridor planting (if required);
 - Creek crossings (including culverts or bridges as required); and

- Minor earthworks to facilitate installation of security fencing;
- Excavation of trenches and the laying of power and instrumentation cables;
- Installation of site compounds and concrete batching plant;
- WTGs and meteorological masts:
 - Excavation works for foundation;
 - Construction of meteorological mast footings and WTG footings; and
 - Erection and installation of met masts and WTG's towers.
- Installation of substations, switchyard, permanent compounds and associated infrastructure;
- Installation of internal electricity network (underground cables / overhead power lines);
- Testing and commissioning infrastructure; and
- Site rehabilitation and revegetation.

5.2.3 CONCRETE BATCHING PLANT

One concrete batching plant will be established within the central temporary area for a period of 4 months. The plant will process materials sourced for construction, including sand, gravel and aggregate for concrete production.

Infrastructure for the temporary concrete batching plant will include:

- Rock crushing facility;
- Cement silos;
- Stockpile areas for the storage of the aggregates, sand and other raw materials;
- Water tanks;
- Wastewater settling pit;
- Parking for truck mixers and pumps; and
- Fuel bunker and bunded area for concrete additives.

The cement and the aggregates needed for concrete production will be sourced from either the on-site borrow pit or locally from neighbouring quarries as a source of raw materials for concrete production. The cement will be stored in a silo adjacent to the batching process machinery. Concrete agitator trucks will transfer the concrete from the batching plant to the WTG foundation locations.

5.2.4 BORROW PIT

One borrow pit is proposed on-site to source materials for structural fill, earthworks, pavement materials and potentially concrete aggregates. The borrow pit will be approximately 7.9 ha in size and will be located in the southern region of the Project area.

5.2.5 CONSTRUCTION EQUIPMENT AND VEHICLES

A range of equipment and machinery will be on-site during the construction phase including bulldozers, concrete agitator and pump trucks, cranes, excavators, graders, rollers, water carts and light vehicles. Construction machinery will generally remain on site for the duration of the earthworks portion of the construction and will therefore be only required to access and egress the site once for the construction works.

Heavy vehicles will transport materials and equipment to the Project site and will include long semi-trailers and B-doubles (standard vehicles) and 'truck and dogs', concrete trucks and water tankers. Restricted Access Vehicles (RAVs) will be used for delivery of oversized equipment including WTGs, large substation equipment (e.g., transformers), cranes, O&M facility and water tanks.

Construction vehicle traffic would be the greatest during the earthworks and civil construction and installation activities. Anticipated vehicle and equipment numbers during the peak construction phase are given in **Table 5-2**.

TABLE 5-2 PROPOSED VEHICLE VOLUMES DURING PEAK CONSTRUCTION

Activity	Average Vehicles Per Day	Vehicle Type
Site Establishment		
Accommodation camp pavement	1	Truck and Trailer
Delivery of plant for civil works / Accommodation camp buildings	2	Low Loader Trailer
General Construction		
Construction workforce / General deliveries	44	Light Vehicle
Waste disposal	5	Rigid Truck
Access Tracks and Laydowns		
WTG access track / spine road / laydown pavement	10	Truck and Trailer
Water for road building / dust suppression	10	Rigid Truck
Batching Plant		
Batching Plant pavement	5	Truck and Trailer
Wind Turbines		
Hardstands pavement / Foundations (cement, sand and aggregate deliveries)	12	Truck and Trailer
Water deliveries (foundations)	1	Rigid Truck
Steel deliveries (foundations)	1	Semi-Trailer
WTG Tower / Blades	3	Extendable Trailer
WTG Nacelles	1	Platform Trailer
WTG Hubs / Telehandler	1	Low Loader Trailer
Miscellaneous	1	Semi-Trailer
Escorting Light Vehicle (LV)	7	Light Vehicle
Main Cranes / Counterweight / Telehandler	3	Low Loader Trailer
Cranes	2	Oversize Overmass
Met Masts		
Met Masts	1	Semi-Trailer

Activity	Average Vehicles Per Day	Vehicle Type
Electrical and Substation		
Pavement, Earthgrid and Equipment	9	Truck and Trailer
Underground cabling drums / Buildings	2	Low Loader Trailer
Electrical / Fencing	2	Semi-Trailer
Transformers	1	18 Axle Trailer
Cranes	2	Oversize Overmass
O&M Facility		
Pavement	3	Truck and Trailer
Other	1	Semi-Trailer
Overhead Transmission Line		
Laydown pavement / Foundations (cement, sand, aggregate, and water deliveries)	10	Truck and Trailer
Steel deliveries (foundations) and tower components	3	Semi-Trailer
High voltage cable rolls	1	Low Loader Trailer
Cranes	2	Oversize Overmass
BESS Facility		
Laydown pavement / Foundations (cement, sand, aggregate, and water deliveries)	13	Truck and Trailer
Steel deliveries (foundations) / Main Power Transformers, Substation and Electrical deliveries	4	Semi-Trailer
BESS Containers / Power Conversion Systems	3	Low Loader Trailer
TOTAL	166	

5.2.6 HAULAGE ROUTES

The construction of new internal access tracks will provide ongoing access to the WGT, transmission lines and associated infrastructure. Where possible, the Project will utilise the existing access track network used for agricultural activities and the internal access track network will be aligned along the route of existing farm tracks. Approximately 74 km of new internal access roads will be constructed.

Primary access to the site during construction will be via the existing public road network. Primary access to the Project boundary will be via Benson / Tantitha Road which runs through the centre of the site and / or Newell Highway to the borrow pit and associated activities.

A 60 m wide disturbance footprint is required for the access tracks during construction. Upon operation, the access tracks will be 6.5 m wide and will comprise of unsealed gravel.

5.3 DUST IMPACTS

Emissions during construction can be associated with land clearing, drilling and blasting, ground excavation, cut and fill operations etc. Dust emissions often vary substantially on a daily basis, depending on the level of activity, the specific operations and the prevailing meteorological conditions. Significant emissions are also generated from equipment traffic and vehicles on temporary roads (USEPA, 1995).

Activities likely to generate dust during the construction phase of the Project include:

- Site preparation (e.g land clearing, construction of compounds, upgrade of existing tracks and construction of new tracks);
- Excavation of materials (e.g quarrying, borrow pits);
- Crushing and screening;
- Concrete batching;
- Wind erosion from stockpiles and open, exposed areas;
- Vehicle entrainment on paved and unpaved roads;
- Machinery operation (e.g excavators, scrapers, dozers and graders); and
- Materials handling (tipping, loading and offloading of trucks).

Construction activities will be restricted to standard daytime construction working hours, specifically, 7:00 am to 6:00 pm (Monday to Friday) and 8:00 am to 6:00 pm (Saturday). No construction activities will take place on Sundays or Public Holidays.

Dust emissions associated with the construction of the Project were evaluated using the approach outlined in the *Guidance on the assessment of dust from demolition and construction* (IAQM, 2024). The findings are presented in the section below.

5.3.1 STEP 1: SCREENING

As per the IAQM guidance, a risk assessment of the potential dust impacts from construction activities is required to be undertaken when sensitive receptors are within:

- 250 m of the boundary of the site boundary; and / or
- 50 m of the route(s) used by construction vehicles on the public highway, up to 250 m from the site entrance(s).

Eleven associated sensitive receptors are located within the site boundary with four associated sensitive receptors located within 250 m of the boundary (see **Section 4.3**). As such, further assessment of the potential dust impacts is required.

5.3.2 STEP 2A: DUST EMISSION MAGNITUDE

No significant demolition activities are proposed to take place during the construction phase. Earthworks will be required for excavating on-site material, movement of material on-site, haulage, tipping and stockpiling. Excavated material would be stockpiled and used for backfill around the WTG foundations. For the Project:

- The total disturbance area will be approximately 497 ha;

- The dominant soil types are dermosols (to the north near Narromine), chromosols and kandosols (in small pockets) with sodosols covering the majority of the proposed site. Dermosols have a loam to clay texture while chromosols and sodosols are soils with significant increase in clay content between topsoil and subsoil. Kandosols have a sandy to loamy-surface soil, grading to porous sandy-clay subsoils. All these soil types are particularly susceptible to wind erosion, especially when vegetation is removed;
- On-site concrete batching (one plant) and crushing and screening (at borrow pit) of material; and
- Unpaved internal access tracks are approximately 74 km in length.

The dust emission magnitude for demolition, earthworks, construction and trackout is given in **Table 5-3**. It is expected that the highest dust emissions are associated with earthworks and trackout.

TABLE 5-3 DUST EMISSION MAGNITUDE FOR WALLABY CREEK WIND FARM

Activity	Description	Dust Emission Magnitude
Demolition	N/A	N/A
Earthworks	Total site area >110 000 m ² (Total disturbance area of 497 ha) Potentially dusty soil type >10 heavy earth moving vehicles active at any one time	Large
Construction	On-site concrete batching (one) Crushing and screening of material Potentially dusty construction material e.g., concrete	Medium
Trackout	>50 HDV (>3.5t) outward movements in any one day Potential dusty surface material e.g., high clay content Unpaved road length >100 m	Large

5.3.3 STEP 2B: SENSITIVITY OF THE AREA

The sensitivity of the area takes into account a number of factors including:

- The specific sensitivities of receptors in the area;
- The proximity and number of those receptors;
- Local background concentrations (for PM₁₀); and
- Site-specific factors such as whether there are natural shelters, such as trees to reduce the risk of wind-blown dust.

The sensitivity of receptors to dust soiling, health effects of PM₁₀ and ecological effects is given in **Table 5-4**. For trackout, the impact declines with distance from the site and it is only necessary to consider trackout impacts up to 50 m from the edge of the road.

For the Project:

- The number of sensitive receptors located on-site and within 250 m from the site boundary is low, with a total of 15 associated receptors. Of these, none are located in close proximity to the new internal unpaved access roads. Three sensitive receptors (Dwellings 63, 72 and 102) are located along the existing Tantitha road, which will be used for Project access, although only Dwelling 72 is within 50 m of the road. However, this dwelling will be acquired prior to construction and will not be occupied for the duration of the Project;
- No receptors are located near high dust generating activities such as the concrete batching plant and borrow pit;
- Dwelling 72 is the closest sensitive receptor (approximately 400 m) to a proposed infrastructure area, which includes the BESS substation and plant, substation, O&M facilities and washdown facilities; and
- Ambient PM₁₀ concentrations are expected to be low in the area (with the exception of unexpected events such as regional bushfires).

Based on the above, impacts are predicted to be low for all construction activities.

TABLE 5-4 SENSITIVITY OF THE AREA SURROUNDING WALLABY CREEK WIND FARM

Activity	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	Low	Low	Low
Human Health	N/A	Low	Low	Low
Ecological	N/A	Low	Low	Low

5.3.4 STEP 2C: RISK OF IMPACT

The dust emission magnitude (Step 2A) is combined with the sensitivity of the area (Step 2B) to determine the risk of impacts with no mitigation measures applied. The findings of the dust risk assessment indicates that the risk of dust soiling, human health and ecological impacts is low for earthworks, construction activities and trackout for the Project (**Table 5-5**).

TABLE 5-5 DUST RISK IMPACTS FOR WALLABY CREEK WIND FARM

Activity	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	Low Risk	Low Risk	Low Risk
Human Health	N/A	Low Risk	Low Risk	Low Risk
Ecological	N/A	Low Risk	Low Risk	Low Risk

5.3.5 STEP 3: SITE-SPECIFIC MITIGATION

Site-specific mitigation measures are recommended for low, medium or high risk dust impacts. Appropriate mitigation measures for the Project are outlined in **Section 6**.

5.3.6 STEP 4: DETERMINE SIGNIFICANT EFFECTS

Once the risk of dust impacts and the appropriate dust mitigation measures have been determined, the final step is to assess whether there are significant effects arising from the construction phase. Unmitigated impacts have been assessed to be low and such, it is anticipated that, with the implementation of site-specific mitigation measures, residual dust impacts will remain low.

5.4 GASEOUS EMISSIONS

Sources of gaseous emissions during the construction phase include exhaust emissions from equipment and vehicles, on-site diesel generators and the fugitive emissions from the storage of petroleum and diesel for refuelling.

Heavy vehicles that will be frequently used during the construction phase include water trucks, cement tankers and dump trucks transporting aggregates and materials. Deliveries of large infrastructure such as the WTG components, substations and transformers, particularly on Oversize Overmass (OSOM) vehicles, will be less frequent. Light vehicles will be used to transport workers with an average of 30 trips per day (tpd) during the peak construction period.

Given the vehicle numbers, scheduling of construction activities (i.e. not all equipment would be operating in the same location at the same time) and the location of sensitive receptors relative to the emission sources, gaseous emissions are not anticipated to significantly influence local air quality during the construction phase.

5.5 ODOUR

Potential sources of odour associated with construction activities can include:

- Wastewater treatment facilities at construction compounds / accommodation camps;
- Exhaust emissions from diesel generators and construction machinery; and
- Surface coatings with significant solvent emissions.

A wastewater treatment plant is proposed to be constructed on-site for the Project accommodation camp. Diesel generators will be used on-site although detailed information on locations, numbers and capacities was not available at the time of this assessment. Some odour may be generated during land clearing / disturbance of animal grazing areas, although this is expected to be minimal. As such, odorous emissions during the construction phase of the Project are anticipated to be low.

5.6 GREENHOUSE GASES

The National Greenhouse Accounts Factors (DCCEEW, 2023), defines three scopes (Scope 1, 2 and 3) for different emission categories based on whether emissions are produced from 'direct' or 'indirect' sources:

- Scope 1: Emissions are direct emissions produced from sources within the boundary of an organisation and as a result of that organisation's activities;
- Scope 2: Emissions are indirect emissions which occur as a result of activities that generate electricity, heating, cooling or steam that is consumed by an organisation but which is generated outside that organisation's boundaries; and
- Scope 3: Emissions are indirect emissions, other than electricity, which occur outside of the boundary of an organisation, as a result of actions by the organisation.

Scope 1 emissions are minimal for wind farms as wind farms do not produce greenhouse gases during operation. There are no combustion processes involved in generating wind power and turbines do not emit greenhouse gases during electricity generation. Minor greenhouse gas emissions may result from on-site maintenance vehicles and machinery using fossil fuels and backup diesel generators (if used) during power outages or emergencies.

Scope 2 emissions can arise from electricity used to power operational facilities (e.g. substations) and power consumed during commissioning or turbine start-ups. If this electricity is sourced from the grid (which uses fossil fuels), Scope 2 emissions will be incurred although this can be offset by using the renewable energy generated by the wind farm.

Scope 3 emissions are the main source of greenhouse gas emissions for wind farms, including:

- The manufacturing of materials such as steel, concrete and composite materials used in the turbine blades;
- Construction activities including site preparation and road construction;
- Transportation of materials and equipment to the site;
- Maintenance during the operational phase, including replacement parts and personnel travel; and
- Decommissioning and end-of-life disposal or recycling of turbine components.

Despite these emissions, wind farms are a clean source of energy that significantly reduces greenhouse gas emissions compared to the use of traditional fossil fuels. Various lifecycle assessment studies (Guezuraga et al., 2012; Bonou et al., 2016; Ozoemena et al., 2018; Alsaleh and Sattler, 2019) show that wind energy has one of the lowest greenhouse gas intensities per unit of electricity generated, typically between 3 to 15 grams of CO₂-equivalent per kWh, with a median of 11 – 12 gCO₂-eq/kWh (IPCC, 2014). By contrast, the median lifecycle emissions for natural gas are almost 500 gCO₂-eq/kWh with coal exceeding 800 gCO₂-eq/kWh (IPCC, 2014).

5.7 OPERATION

The WTGs have an expected operating life of approximately 30 years. During this time, routine maintenance of the landscaping, access roads as well as repairs and replacement of Project components will take place. Potential sources of emissions include wind-blown dust from unpaved roads and dust generated from vehicles travelling on unpaved roads during routine maintenance. However, such activities are anticipated to have minimal impact on the air quality of the area.

5.8 DECOMMISSIONING

If the Project is decommissioned, all above ground structures including the WTGs, transformer stations, substation, access tracks and hardstands will be removed and the land rehabilitated. Below ground infrastructure will be left in situ to avoid further disturbance and minimise clearing of re-vegetated areas.

The infrastructure will be removed to a depth of 0.5 m below the ground surface and where required, will be covered with clean fill material and topsoil prior to revegetation.

Air quality impacts during the decommissioning phase are expected to be temporary and localised in nature and can be effectively managed with common mitigation measures such as wet suppression.

6. MITIGATION MEASURES

Wind suppression and wind speed reduction are common methods used to control dust emissions during construction. General mitigation measures proposed to be implemented during the construction phase of the Project include:

- Regular water spraying of exposed surfaces, haul roads and during excavation activities;
- Staged construction to allow for early rehabilitation of disturbed areas;
- Minimising the duration of exposed soil to reduce dust and erosion risks;
- Temporary vegetation cover (e.g. grass) on batters or long-term exposed areas;
- Applying speed limits on unsealed roads to reduce dust generation;
- Use of binders / stabilisers in the wearing course to aid dust suppression; and
- Monitor the ambient air quality and adjust mitigation measures as required.

Additional mitigation measures specific to each activity during the construction phase are detailed in **Table 6-1**.

TABLE 6-1 RECOMMENDED CONTROL MEASURES FOR CONSTRUCTION

Activity	Control Measure	Mitigation Measure
Site Preparation and Earthworks	Limit Cleared Areas	• Retain as much vegetation as possible, including patches and strips to minimise dust; • In other areas where vegetation will be removed, maintain the original vegetation cover for as long as possible; • Avoid clearing the entire site at once, instead clear areas as required in stages of the construction activity; and • Stabilise disturbed areas as soon as practical.
	Timing of Works	Activities with high dust-causing potential, such as topsoil stripping, should not be carried out in sensitive areas during adverse wind conditions. When necessary, topsoil should be stripped in discrete sections, allowing buffer strips (windbreaks) between clearings.
	Earth Moving Management	Earth-moving works have the potential to generate large amounts of dust. Pre-planning of earth-moving works can reduce dust emissions by limiting the time the site is exposed. Options for dust control can include the following: • Plan earth-moving works so that they are completed just prior to the time they are needed; • Observe weather conditions and do not commence or continue earth moving works if conditions are unsuitable e.g., under conditions of strong winds; • Reduce off-site hauling via balanced cut and fill operations; and • Pre-water areas to be disturbed.
	Watering	Watering is applicable to almost every aspect of site operations, from reducing dust lift off from roads and other traffic areas and during earthworks, to controlling dust during movement of materials such as loading / offloading and transportation of materials. Dust emissions can be minimised using the following watering procedures:

Activity	Control Measure	Mitigation Measure
		- The surface should be dampened to prevent dust from becoming airborne but should not be wet to the extent of producing run-off; - Watering is more effective when undertaken prior to strong breezes; and - Use watering sprays on materials to be loaded and during loading. Other measures include chemical stabilisation or hydromulch as options.
Concrete Batching Plant	General	- Schedule batching operations during the daytime to minimise disturbance; - Store all aggregate and sand in appropriate bins to minimise dust generation; - Designate cleaning zones for trucks to prevent trackout; - Enclose or covers stockpiles, conveyers and loading/offloading points; - Wet suppression of aggregate stockpiles; - Ensure all cement silos and hoppers are fitted with dust filters and overfill protection; and - Transfer cement from storage to batching using sealed steel augers.
Crushing and Screening	Water Sprays Wind Breaks / General	- Wet suppression using water sprays during crushing and screening; - Ensure screen covers are fitted to the screening equipment; and - Install wind breaks in appropriate locations adjacent to the dust generating equipment and processes (where practical).
Stockpiles	General	- Locate stockpiles in sheltered areas. Otherwise, stockpiles should be covered; - Where stockpiles are located in open areas, limit the height and slope of the stockpiles to reduce wind pick up, orient stockpiles lengthwise into the wind so they offer the minimum cross-sectional area to prevailing winds, install wind barriers on three sides of the stockpile; - Locate stockpiles away from nearby sensitive receptors (if any); - Limit activity to the downwind side of the stockpile; - Limit drop heights and use closed conveyors where possible; and - Minimise transfer points.
Unpaved Roads / Construction Traffic	Watering / General	- Where possible, wet suppression is to be used on all unpaved roads near sensitive receptors (if any) using water trucks; - Wash/clean or use rumble pad to remove excess dirt and dust from vehicle tyres; - Ensure all loads are covered; and - Limit vehicle speeds on unpaved roads.

Activity	Control Measure	Mitigation Measure
Odour	General	• Limit use of diesel generators; • Ensure diesel generators are not located near sensitive receptors; • Air scrubbing systems to remove particulates and gas from exhaust streams; • Photoionisation systems to disinfect and remove odours; and • Activated carbon to remove Volatile Organic Compounds and other odorous pollutants.
Greenhouse Gases	General	• Regular maintenance of plant and equipment; • Ensure plant and equipment are switched off when not in use; and • Monitor the consumption of fuel and regular maintain equipment to ensure operational efficiency.

7. CONCLUSION

An AQIA for the proposed Wallaby Creek Wind Farm has been undertaken to address the air quality requirements of the SEARs. The potential impacts on air quality during the construction and operational phases of the Project were assessed.

A review of the existing environment was undertaken through an evaluation of available meteorological monitoring data for the region. Meteorological data was obtained from the BoM Dubbo Airport and Trangie Research Station AWS for the period January 2020 – December 2024. The closest performance ambient air quality monitoring station is located at Orange which is located approximately 115 km to the south-east of the Project, and as such, is not considered to be representative of the baseline air quality at the Project. However, given the relatively remote location of the Project, it is anticipated that ambient particulate concentrations would be low, with the exception of isolated events such as prescribed burning and wild fires.

Based on the available weather data, the following is noted:

- A similar wind field is recorded at both weather stations with winds originating predominantly from the east (16% of the time). An additional component is also seen from the south-east (13% of the time) at Dubbo Airport AWS;
- Winds are generally moderate to fast at both stations with mean wind speeds ranging from 3.3 – 4.2 m / s. Stronger winds are recorded at Dubbo Airport AWS compared to Trangie Research Station; and
- Calm conditions occur infrequently at both stations (1.5 – 4.8% of the time).

Dust emissions associated with the construction of the Project were evaluated using the approach outlined in the *Guidance on the assessment of dust from demolition and construction* (IAQM, 2024). The risk of dust impacts from earthworks, construction activities and trackout during the construction phase were assessed to be low prior to mitigation. A total of 15 sensitive receptors are located within the Project boundary and within 250 m of the Project boundary, with none located near any high dust generating activities, such as the concrete batching plant and borrow pit or the internal unpaved access roads. Three sensitive receptors (Dwellings 63, 72 and 102) are located along the existing Tantitha road although only Dwelling 72 is within 50 m of the road. This will be acquired prior to construction and will remain unoccupied for the duration of the Project.

Dust mitigation measures proposed to be implemented during the construction phase include wet suppression of roads and hardstands, surface sprays on open, exposed soil, early rehabilitation of disturbed areas and applying speed limits on unsealed roads.

Potential odour impacts due to emissions from the wastewater treatment plant, the diesel generators and construction equipment as well as from the disturbance of animal grazing lands were qualitatively addressed and is expected to be minimal.

During the operational period, potential sources of emission include wind-blown dust from unpaved roads and dust generated from vehicles travelling on unpaved roads during routine inspections and maintenance. However, these emissions will be negligible and will not have a significant impact on surrounding sensitive receptors.

In conclusion, the potential air quality impacts associated with the construction and operation of Wallaby Creek Wind Farm were assessed to be low and are unlikely to have a significant impact on the neighbouring sensitive receptors and surrounding environment.

8. LIMITATIONS

1. This report is based solely on the scope of work described in 0671574 WCWF Air Q and PSI CO16_070525 and performed by Environmental Resources Management Australia Pty Ltd (ERM) for Acciona Energy Australia Global Pty Ltd (the Client). The Scope of Work was governed by a contract between ERM and the Client (Contract).
2. No limitation, qualification or caveat set out below is intended to derogate from the rights and obligations of ERM and the Client under the Contract.
3. The findings of this report are solely based on, and the information provided in this report is strictly limited to that required by, the Scope of Work. Except to the extent stated otherwise, in preparing this report ERM has not considered any question, nor provides any information beyond that required by the Scope of Work.
4. This report was prepared in July 2025 and is based on conditions encountered and information reviewed at the time of preparation. The report does not, and cannot, take into account changes in law, factual circumstances, applicable regulatory instruments or any other future matter. ERM does not, and will not, provide any on-going advice on the impact of any future matters unless it has agreed with the Client to amend the Scope of Work or has entered into a new engagement to provide a further report.
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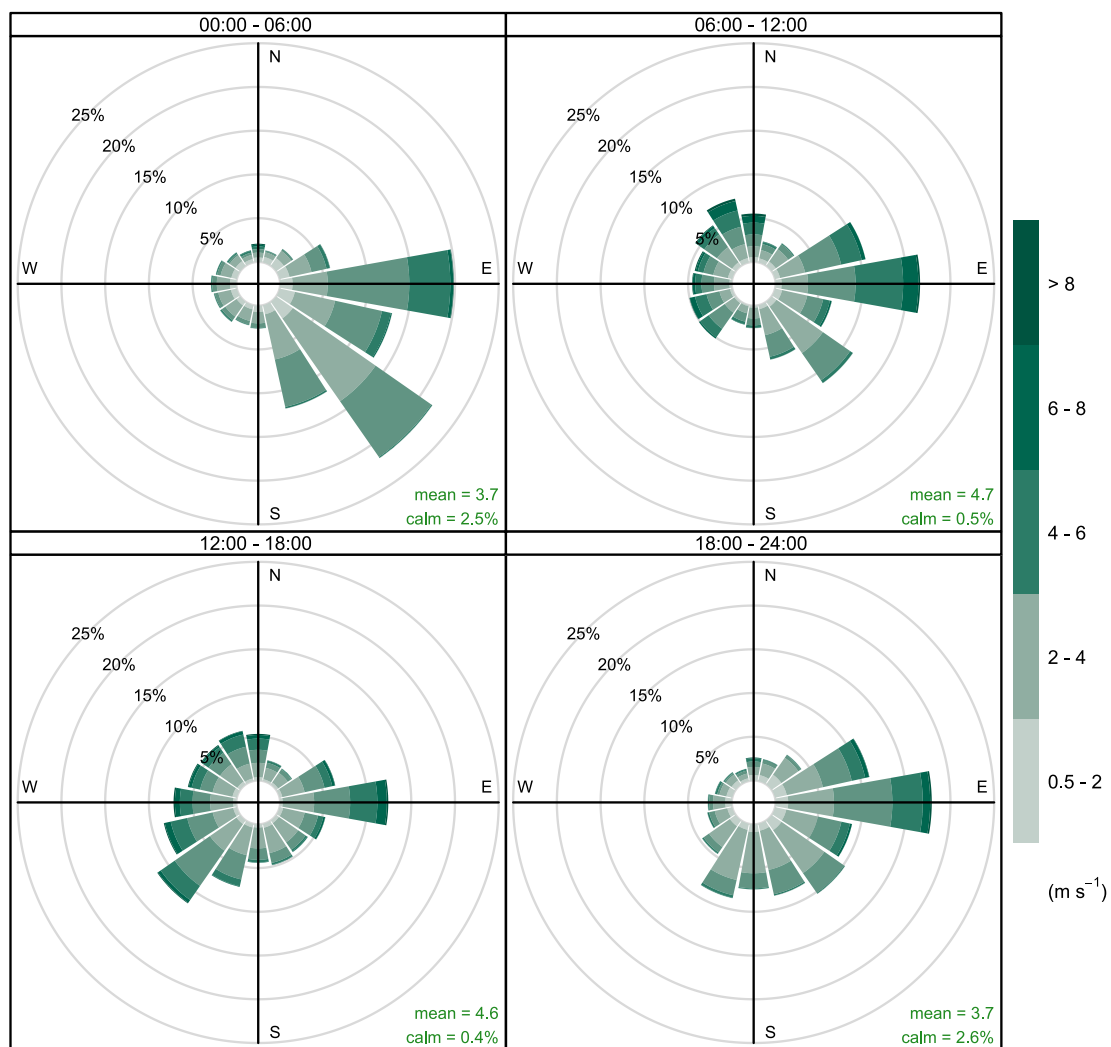
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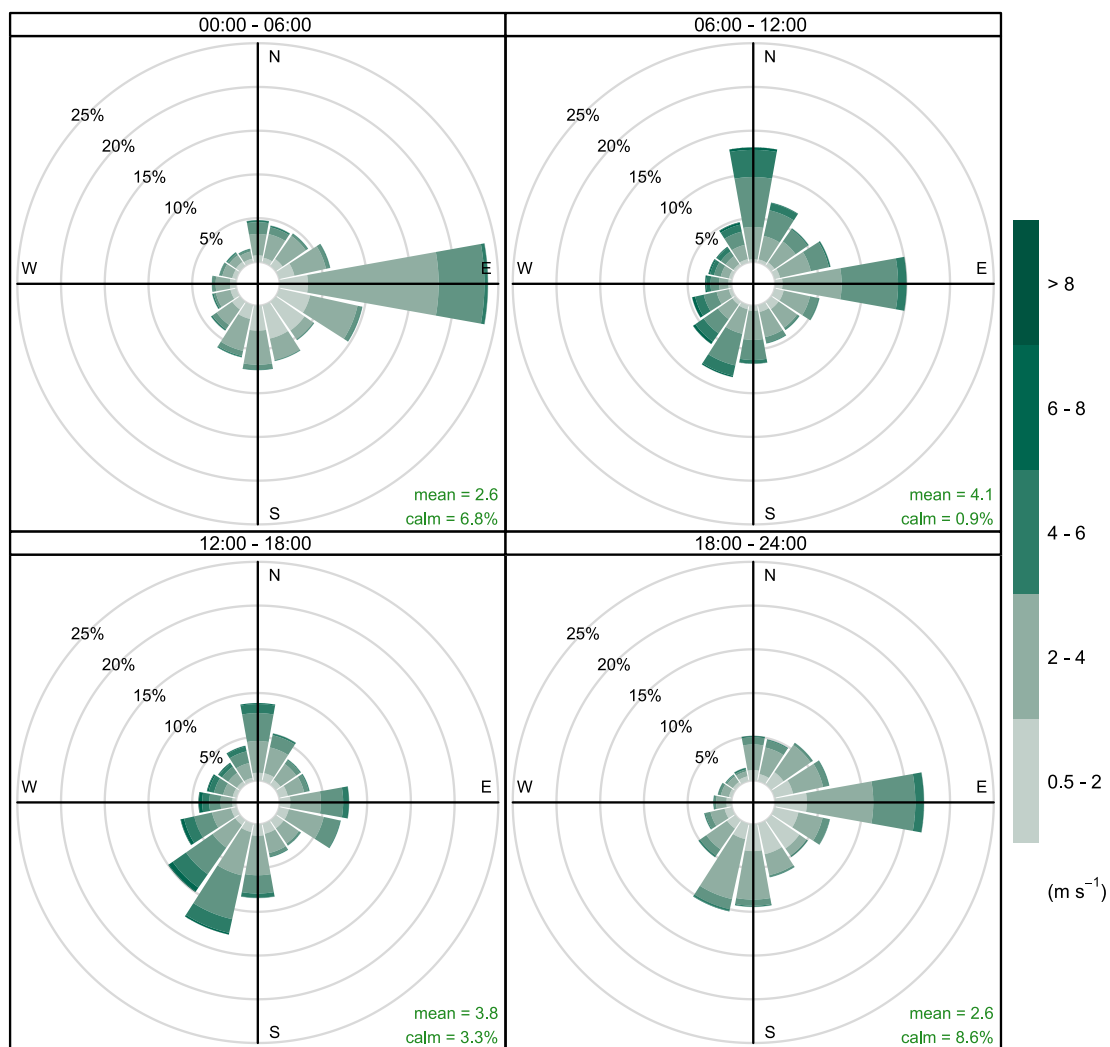


APPENDIX A WIND ROSES



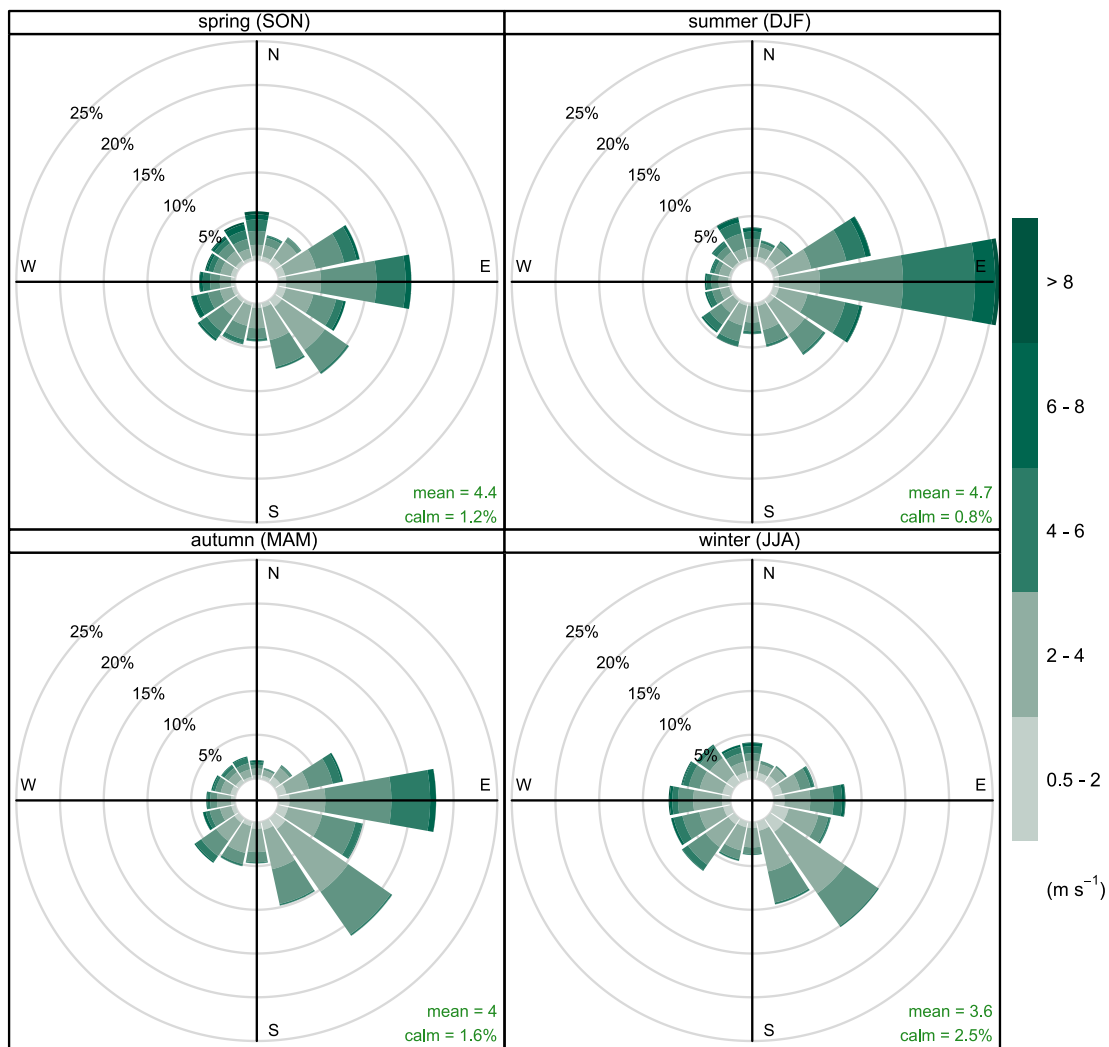
Frequency of counts by wind direction (%)

FIGURE A-1 DIURNAL WIND ROSES FOR DUBBO AIRPORT AWS FOR THE PERIOD 2020 – 2024



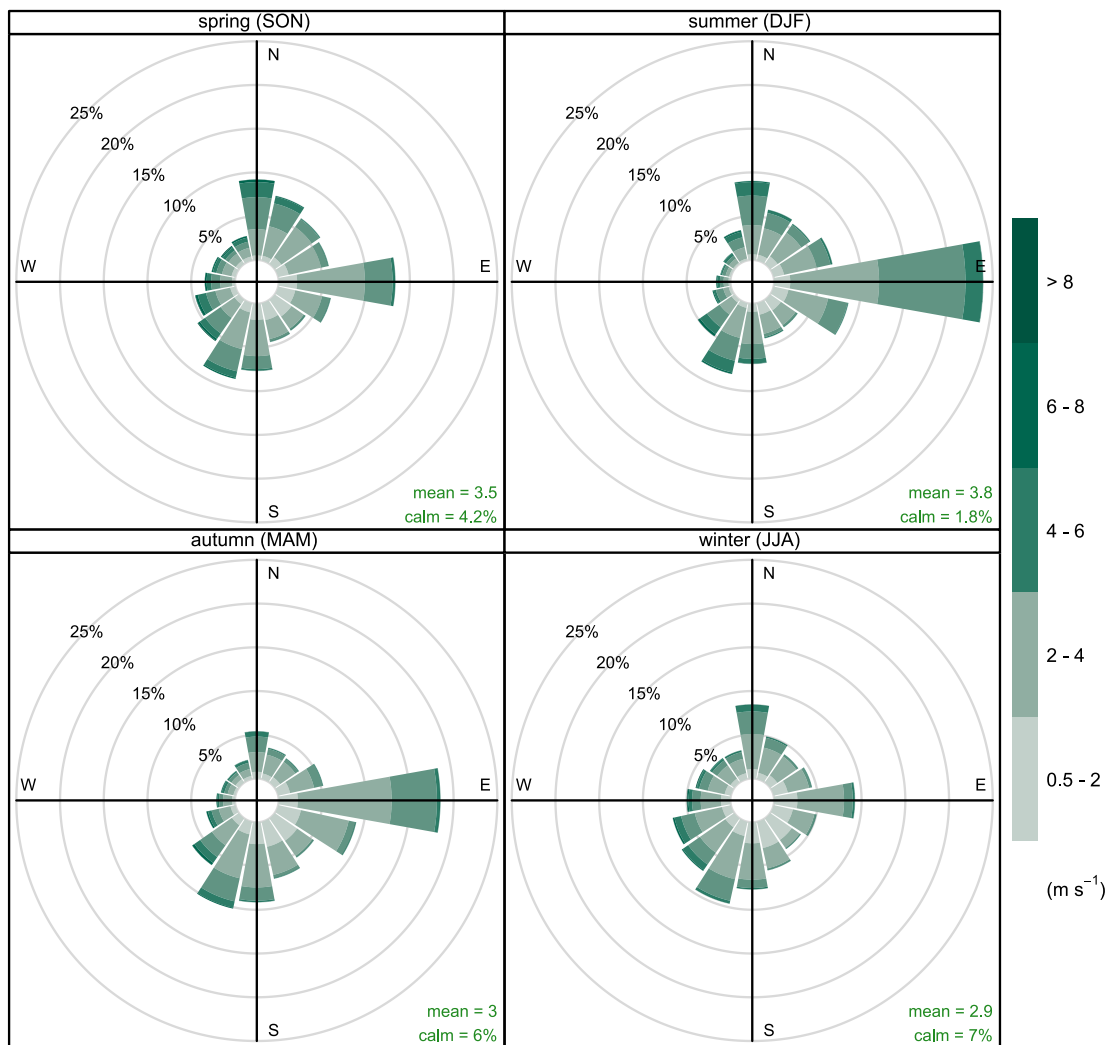
Frequency of counts by wind direction (%)

FIGURE A-2 DIURNAL WIND ROSES FOR TRANGIE RESEARCH STATION AWS FOR THE PERIOD 2020 TO 2024



Frequency of counts by wind direction (%)

FIGURE A-3 SEASONAL WIND ROSES FOR DUBBO AIRPORT AWS FOR THE PERIOD 2020 TO 2024



Frequency of counts by wind direction (%)

FIGURE A-4 SEASONAL WIND ROSES FOR TRANGIE RESEARCH STATION AWS FOR THE PERIOD 2020 TO 2024



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