Technical Report – Air Quality

Virya Energy

Yanco Delta Wind Farm
5 July 2022

Executive summary

Virya Energy is proposing to construct, operate and maintain the Yanco Delta Wind Farm (the Project). Approval is sought under Division 4.7 of Part 4 of the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act) and Part 9, Division 1 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The Project would involve the construction, operation and maintenance of a wind farm with up to 208 wind turbine generators (WTGs), a battery energy storage system (BESS) and associated electrical infrastructure. The generating capacity of the wind farm is approximately 1,500 megawatts (MW).

This air quality assessment has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) relating to air quality and will assist the Minister for Planning to make a determination on whether or not to approve the Project. This assessment provides an assessment of potential impacts of the Project on air quality and outlines proposed management measures.

Assessment methodology

This air quality assessment involved identifying the key air quality issues, characterising the existing environment, determining the existing air quality and wind patterns and undertaking a qualitative assessment based on these factors.

A detailed review of the existing environment was carried out, including an analysis of historically measured concentrations of key quality indicators from regional monitoring stations. The following conclusions were made in relation to the existing environment:

- Meteorological conditions do not vary significantly from year to year and conditions from 2016 to 2021 can be considered as representative of the long term conditions in the Project region
- Air quality conditions are strongly correlated to the climatic conditions. For example, there was a deterioration in air quality conditions between 2017 and 2019 that were heavily influenced by drought, dust storms and bush fires. These conditions were not unique to the Project region.

Existing environment

The existing air quality in the area is likely to be good due to limited population and rural environment. The wind direction is mostly from the southwest throughout the year, except for winter, when the winds are predominantly from the west and north. Sensitive receptors in line of winds are at a distance of at least two kilometres from the Project, and up to eight kilometres away.

Overview of air quality impacts

The key outcomes of the subsequent air quality assessment were as follows:

- Construction dust emissions are not expected to cause adverse air quality impacts at nearby sensitive receptors based on a qualitative assessment, considering potential dust generation, wind patterns and distances between sensitive receptors and the Project area
- There will be no significant air emissions sources during operation of the Project. Consequently, the Project is not anticipated to cause any adverse air quality impacts during the operational phase
- There are no identified cumulative impacts with other existing, approved or proposed projects.

Management measures

While the Project is not expected to cause any adverse air quality impacts, a range of routine mitigation measures will be appropriate to manage dust during construction. Management measures include use of water cart to suppress dust from haul roads and visual monitoring, as well as modifying activities during high-winds and adverse weather events.

Conclusion

Overall, with the implementation of the proposed controls and management measures, the Project construction would have a low risk of potential to adversely impact on the local air quality. During the operation of the Project, it is expected there will be negligible impact to the existing air quality.

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1. Introduction

1.1 Background

Virya Energy is proposing to construct the Yanco Delta Wind Farm (the Project). Approval is sought under Division 4.7 of Part 4 of the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act) and Part 9, Division 1 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The Project would involve the construction, operation and maintenance of a wind farm with up to 208 wind turbine generators (WTGs), a battery energy storage system (BESS) and associated electrical infrastructure. The generating capacity of the wind farm is approximately 1,500 megawatts (MW). The Project would be located within the South-West Renewable Energy Zone (REZ), 10 kilometres north-west of the town of Jerilderie, within the Murrumbidgee Council and Edward River Council Local Government Areas (LGAs) (refer to **Figure 1-1**).

The Project area is defined as the property boundaries of Project landowners (i.e., landowners that have entered into agreements with Virya Energy to have WTGs or associated infrastructure on their properties).

1.2 Project description

The Project would include the following key features:

- Up to 208 WTGs to a maximum tip height of 270 metres
- Generating capacity of approximately 1500 MW
- BESS, approximately 800 MW/800 megawatt hours (MWh) (type yet to be determined)
- Permanent ancillary infrastructure, including operation and maintenance facility, internal roads, hardstands, underground and overhead cabling, wind monitoring masts, central primary substation and up to eight collector substations
- Temporary facilities, including site compounds, laydown areas, stockpiles, gravel borrow pit(s) and concrete batch plants.

An indicative Project layout is provided in **Figure 1-2**.

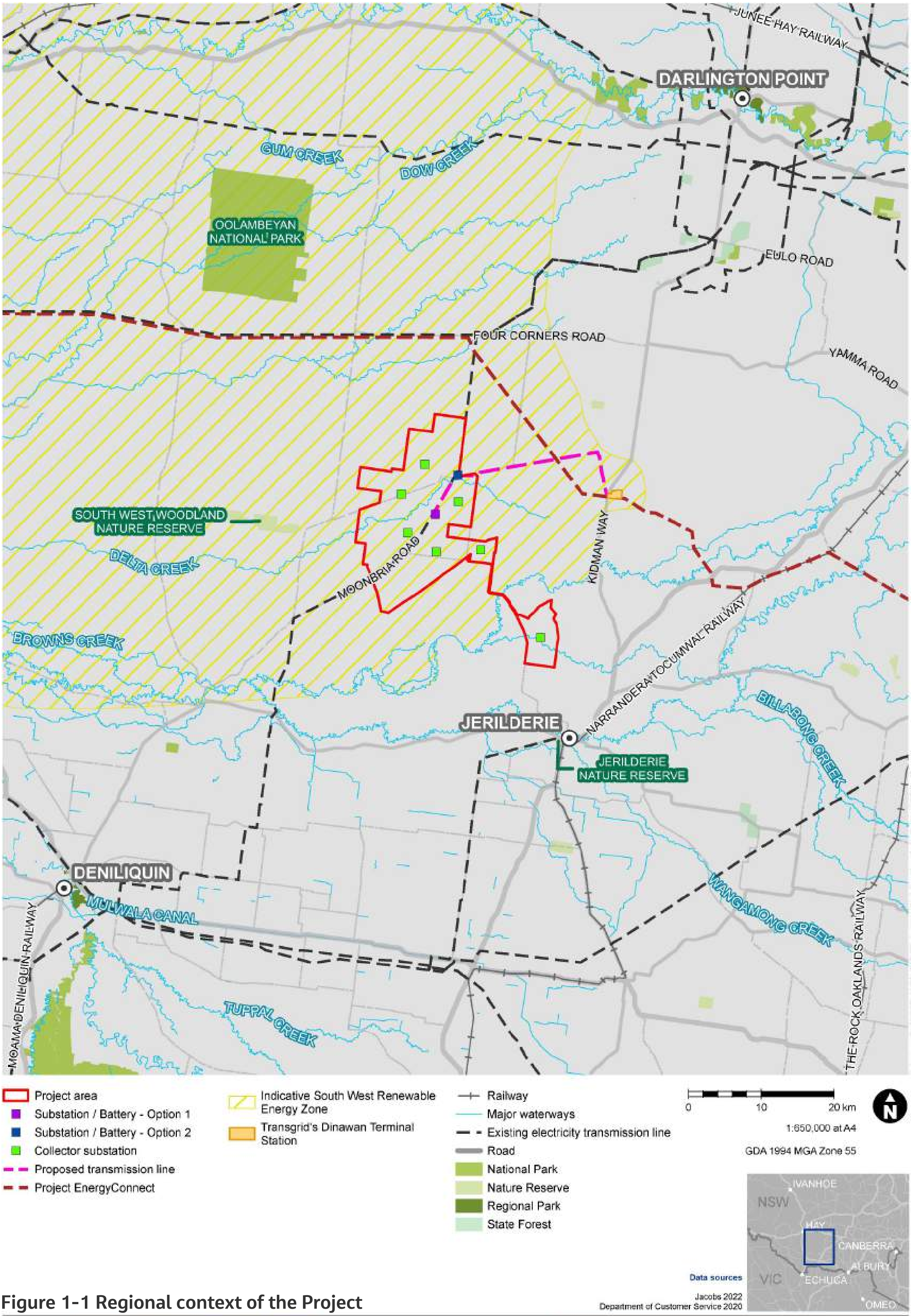

Figure 1-1 Regional context of the Project

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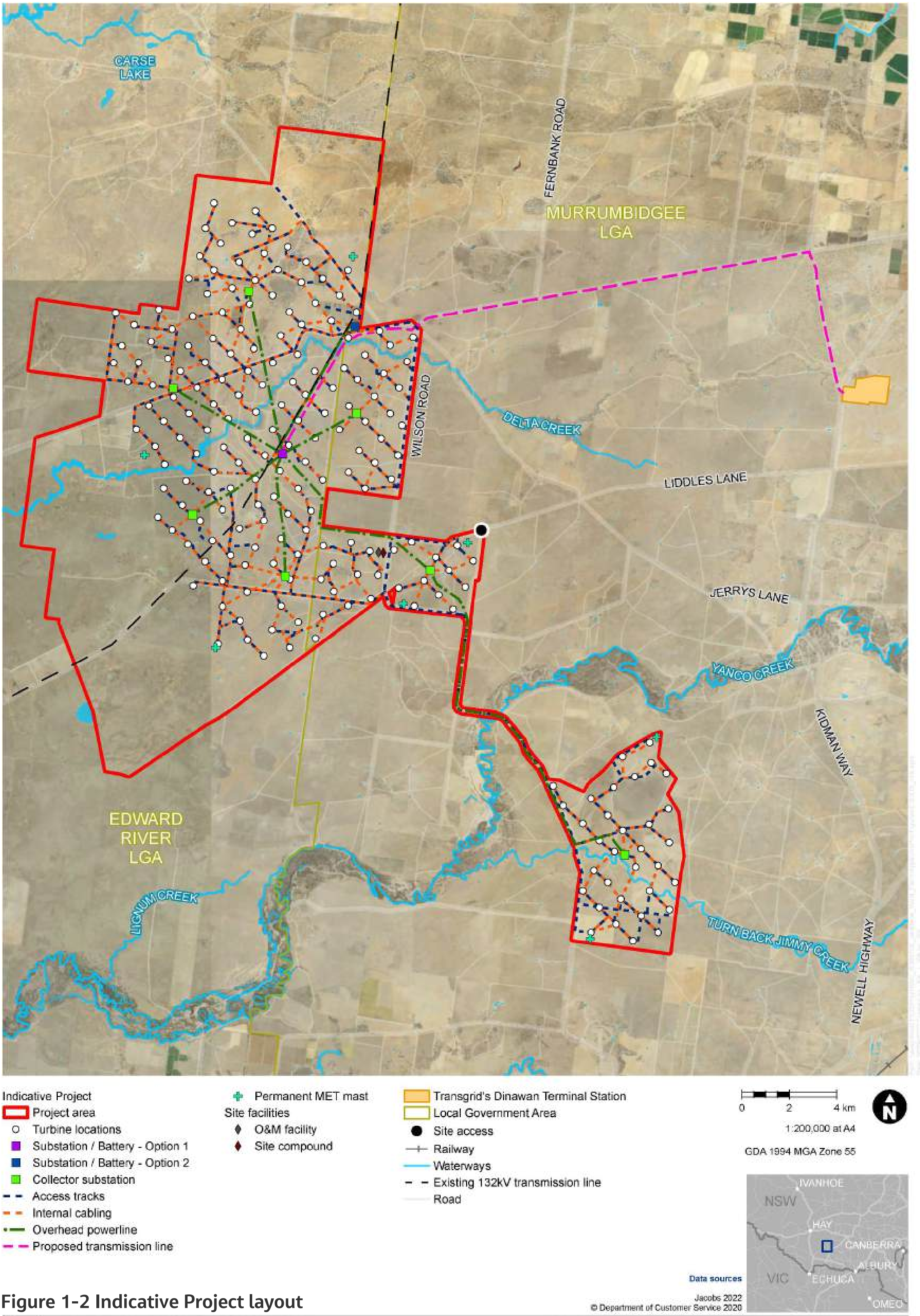

Figure 1-2 Indicative Project layout

1.3 Secretary's Environmental Assessment Requirements

This assessment forms part of the environmental impact statement (EIS) for the Project. The EIS has been prepared under Division 4.7 of the EP&A Act. This assessment has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) (SSD-41743746) relating to air quality impacts and will assist the Minister for Planning to make a determination on whether or not to approve the Project.

Table 1-1 outlines the SEARs relevant to this assessment.

Table 1-1 SEARs relevant to air quality impacts

Secretary's requirement	
Water and Soils – including	
• An assessment of risks of dust generation and propose mitigation measures designed in accordance with the Approved Methods and Guidelines for the Modelling and Assessment of Air Pollutants in New South Wales (DECC, 2005).*	Air quality risks, including those relating to dust generation, are provided in **Chapter 5**. Management measures are presented in **Chapter 7**.

* The Approved Methods and Guidelines for the Modelling and Assessment of Air Pollutants in New South Wales (DECC, 2005) was superseded in 2016. The new document: Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (2016) has been used for this assessment (refer to **Section 2.1.1**).

1.4 Structure of this report

The structure and content of this report are outlined in **Table 1-2**.

Table 1-2 Structure and content

Chapter	Description
Chapter 1 Introduction	Outlines key elements of the Project, SEARs and the structure of this report (this Chapter)
Chapter 2 Legislative and policy context	Provides an outline of the statutory context, including applicable legislation, planning policies and guidelines
Chapter 3 Assessment methodology	Provides a description of the assessment methodology for this assessment
Chapter 4 Existing environment	Provides a preliminary description of the existing environment, including existing air quality and meteorological conditions
Chapter 5 Potential air quality impacts	Presents the outcomes of the construction, operational and decommissioning impact assessments
Chapter 6 Cumulative impacts	Presents the qualitative assessment of potential cumulative construction and operational air quality impacts with other projects near the Project
Chapter 7 Environmental management measures	Provides a summary of recommended management measures based on the outcomes of this assessment
Chapter 8 Conclusions	Summarises the findings of this report
References	Provides details of external resources used

2. Legislative and policy context

2.1 Regulatory policies/relevant guidelines

2.1.1 Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (2016)

The "Approved Methods for the Modelling and Assessment of Air Pollutants in NSW" (herein, referred to as Approved Methods) (NSW Environment Protection Authority (EPA), 2016) lists the statutory methods for modelling and assessing emissions from stationary sources in the state of NSW. This document is referred to in Part 5: Air Impurities Emitted from Activities and Plant in the *Protection of the Environment (Clean Air) Regulation 2021*.

The Approved Methods document may also be referred to in conditions attached to statutory instruments, such as:

- Licences or notices issued under the *Protection of the Environment Operations Act 1997*
- Environmental assessment requirements under Part 4 of the EP&A Act.

The procedures which are detailed in the Approved Methods document undergo five-yearly reviews and updated where necessary. The Approved Methods document is the primary guideline document considered for the context of this air quality assessment.

3. Assessment methodology

Air quality issues can arise when emissions from an industry or activity leads to the deterioration of the ambient air quality. Potential air quality issues have been identified from a review of the construction and operation of the Project. This identification process has considered the types of emissions to air and proximity of these emission sources to sensitive receptors.

3.1 Study area

The Project area is approximately 33,000 hectares, and is located approximately 10 kilometres north-west of Jerilderie, within the Murrumbidgee Council and Edward River Council Local Government Areas (LGAs). The study area for this assessment consists of the Project area, as well as the nearest sensitive receptors identified in **Section 3.2.1**.

The Project area is zoned as RU1 – Primary Production under the Conargo Local Environmental Plan (LEP) 2013 and Jerilderie LEP 2012. The Project would be located on rural land with agricultural land use including for grazing, cropping and irrigated cropping. The landform is mostly flat, gently sloping up from west to east, as presented in **Figure 3-1**.

The largest population centres nearby are Wagga Wagga, about 150 kilometres east of the Project, followed by Deniliquin located 70 kilometres south-west of the Project.

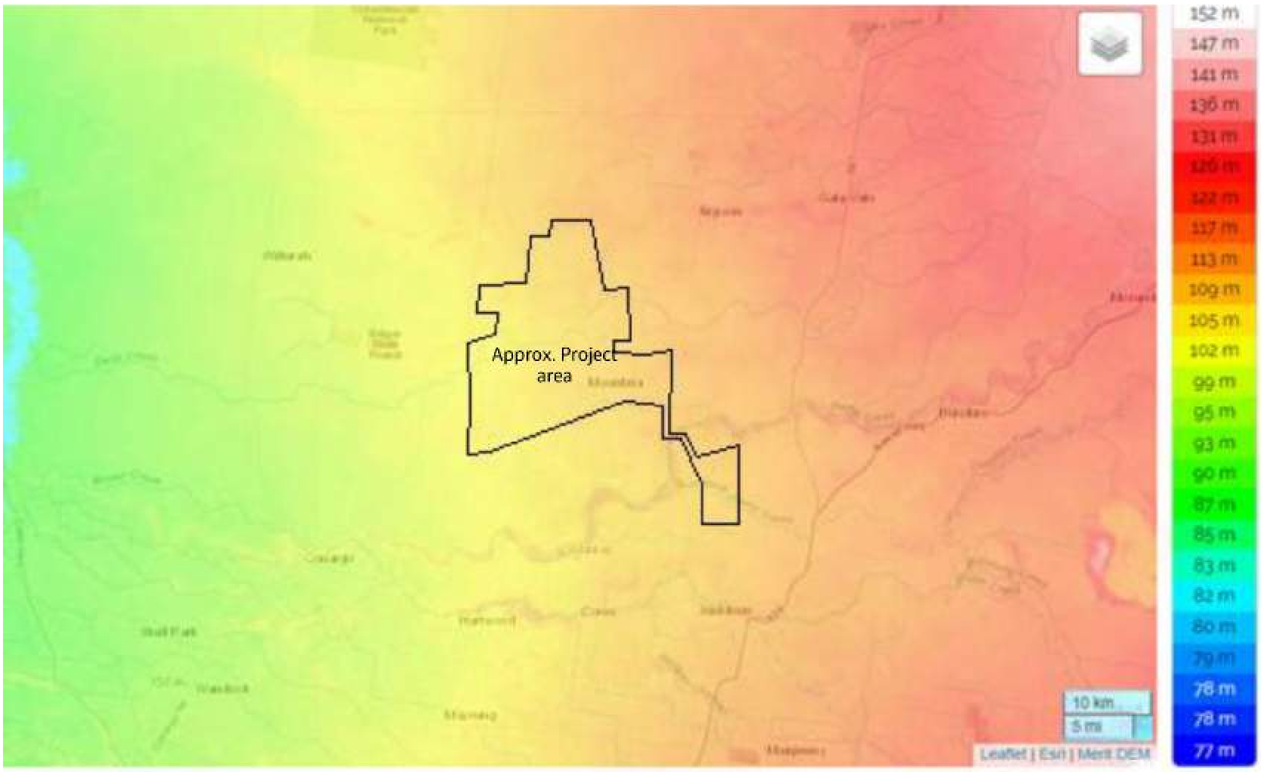

Figure 3-1 Local terrain of Project area

Source: Topographic-Map (2022)

3.2 Air quality assessment methodology

Dust emissions have the potential to cause air quality impacts if not properly managed. Based on the scale of the Project, the significance and impacts of dust from the construction of the Project have been determined from a qualitative assessment that considers:

- The proximity of construction activities to sensitive receptors (**Section 3.2.1**)
- The assessment criteria (**Section 3.2.2**)
- The existing environment **(Chapter 4**)
  - Air quality conditions (**Section 4.1**)
  - Prevailing wind conditions (**Section 4.1**).
- The nature and scale of activities (**Chapter 5**).

3.2.1 Sensitive receptors

Sensitive receptors within approximately eight kilometres from Project infrastructure (i.e. WTGs) have been considered in this assessment. Each of the 20 receptors which come within this distance have been identified as residential and are listed in **Table 3-1**. In this list:

- '**Host receptors'** refers to residential buildings within the Project area and which are located on land hosting WTGs or related infrastructure Each have signed Option to Lease agreements. Noting that one Host Landowner has a dwelling at R20
- **'Associated receptors'** refers to residential buildings not located on land within the Project area or hosting infrastructure, however the Proponent has a negotiated agreement in place with the landowner regarding Project impacts and are therefore associated with the Project
- '**Non-associated receptors'** refer to residences located outside the Project area and not associated with the Project.

Figure 3-2 presents the location of sensitive receptors in reference to the study area.

Table 3-1 Project sensitive receptors

Receptor	Classification	Nearest turbine	Nearest turbine distance (m)
R01	Host	W-008	2030.2
R02	Host	W-142	2062.4
R03	Host	W-134	2660.3
R04	Non-associated	W-153	3642.8
R05	Non-associated	W-001	4061.6
R06	Associated	W-185	4203.7
R07	Associated	W-202	4338.2
R08	Associated	W-185	4457.1
R09	Non-associated	W-205	4599.2
R10	Associated	W-202	4714.6
R11	Associated	W-046	5512.8
R12	Non-associated	W-153	5680.1
R13	Non-associated	W-177	5770.9

Receptor	Classification	Nearest turbine	Nearest turbine distance (m)
R14	Non-associated	W-177	6171.9
R15	Associated	W-202	6446.6
R16	Non-associated	W-177	6545.6
R17	Non-associated	W-177	6607.3
R18	Non-associated	W-177	7212.1
R19	Associated	W-205	7307.1
R20	Host Receiver (outside the Project area)	W-205	7535.0

Figure 3-2 Project sensitive receptors

3.2.2 Assessment criteria

Air quality is typically quantified by the concentrations of substances in the ambient air. Air pollution occurs when the concentration (or some other measure of intensity) of one or more substances known to cause health, nuisance and/or environmental effects, exceeds a certain level. With regard to human health and nuisance effects, the substances most relevant to the Project have been identified, from **Section 4.1** as particulate matter in various forms.

The EPA has developed criteria for a range of air quality indicators, including particulate matter, that are used for the assessment of specific projects. These criteria are outlined in the Approved Methods (EPA, 2016). **Table 3-2** shows the relevant EPA assessment criteria. These criteria apply to existing and potentially sensitive receptors, where the Approved Methods 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*".

Table 3-2 NSW EPA air quality assessment criteria

Air quality indicator	Averaging period	Concentration
Particulate matter (PM_{10})	24-hour	50 µg/m^3
	Annual	25 µg/m^3
Particulate matter ($PM_{2.5}$)	24-hour	25 µg/m^3
	Annual	8 µg/m^3
Particulate matter (TSP)	Annual	90 µg/m^3
Deposited dust	Annual (maximum increase)	2 g/m^2/month
	Annual (maximum total)	4 g/m^2/month

4. Existing environment

4.1 Existing air quality

The nearest air quality monitoring site in the vicinity of the Project area is in Beckwith Street, Wagga Wagga North approximately 150 kilometres east of the Project. The monitoring site is located approximately 500 metres from industrial sites to the east, north and west and is operated by the Department of Planning and Environment (DPE). The DPE also monitors air quality at Albury, on the corners of Nowland Ave and Moore Street, approximately 154 kilometres south-east of the Project.

Air quality in many parts of NSW, including the Riverina-Murray region, was adversely influenced by drought conditions between 2017 to 2019, lower than average rainfall and significant bush firebush fire activity. A deterioration in air quality conditions in recent years was not unique to the Central Tablelands and events beyond normal conditions have been identified as part of annual reviews of monitoring data.

The influence of drought conditions and bush firebush fire activity on air quality is evident in the DPE's monitoring data. **Figure 4-1** shows the rolling annual average PM_{10} concentrations from data collected at various rural and urban air quality monitoring sites since 2011. This data clearly show an increase in PM_{10} concentrations at all rural and urban locations from 2017 to 2020, reflecting the onset of drought conditions, and increased bush firebush fire activity in 2019. The rolling annual average PM_{10} concentrations decreased rapidly in 2020 as rainfall increased.

These data also show that the air quality at the Wagga Wagga North station is likely to be influenced by surrounding industrial activities, as higher annual PM_{10} levels have been recorded at the station than at busier urban centres such as Parramatta North, Wollongong and Rozelle. Therefore, air quality data from the Wagga Wagga North station has been determined to be unrepresentative of the Project environment and data from the Albury monitoring station has been used for this assessment.

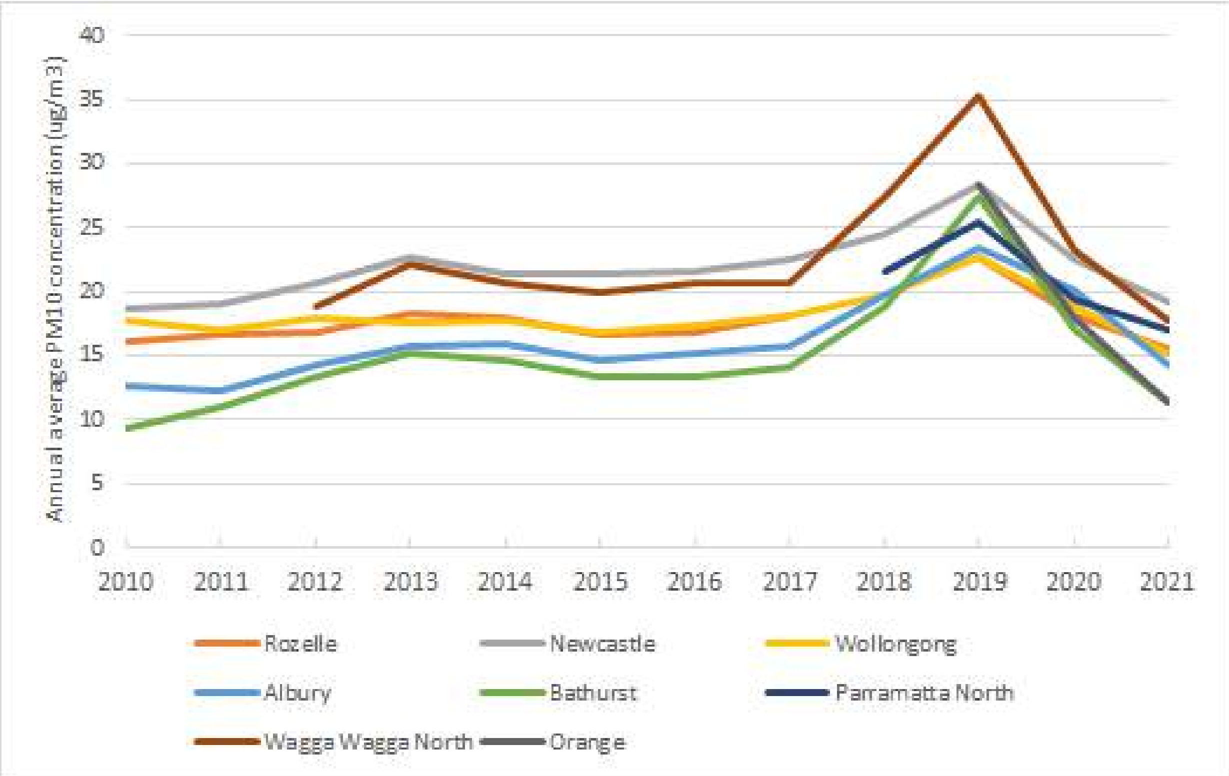

Figure 4-1 Annual average PM10 concentrations at various NSW air quality monitoring sites

4.1.1 Particulate matter (as PM_{10})

Table 4-1 summarises the measured annual average PM_{10} concentrations that have been recorded at DPE's Albury monitoring station. As noted above, drought conditions leading to an increased frequency of regional dust events and bush firebush fires had adversely influenced air quality conditions in 2018, 2019 and early into 2020. Annual average PM_{10} concentrations were below the EPA's 25 µg/m^3 assessment criterion (see **Section 3.2.2** for further detail) in all years except for 2019.

Table 4-1 Measured PM_{10} concentrations closest to the Project (Albury)

Year	Annual average PM_{10} at Albury (µg/m^3)	EPA assessment criterion (µg/m^3)
2014	15.9	25
2015	14.6	
2016	15.1	
2017	15.8	
2018	19.8	
2019	23.4	
2020	20.1	
2021	14.3	

4.1.2 Particulate matter (as $PM_{2.5}$)

Air quality criteria for $PM_{2.5}$ are usually set to protect against adverse health impacts. DPE's Albury monitoring station has recorded annual $PM_{2.5}$ since 2017, and these data are presented in **Table 4-2**.

Table 4-2 Measured $PM_{2.5}$ concentrations closest to the Project (Albury)

Year	Annual average $PM_{2.5}$ at Albury (µg/m^3)	EPA assessment criterion (µg/m^3)
2017	7.3	8
2018	7.3	
2019	10.1	
2020	11.1	
2021	7.3	

4.1.3 Particulate matter (as TSP)

Air quality criteria for TSP are usually set to protect against nuisance amenity impacts. No known monitoring of TSP is conducted near the Project. The NSW Minerals Council estimated that, for rural environments in NSW, the average PM_{10} concentrations are typically 40 per cent of the TSP concentrations (Minerals Council, 2000). More recent studies (see for example Jacobs 2018) have examined PM_{10} and TSP data and also shown that average PM_{10} concentrations are close to 40 per cent of the TSP concentrations in rural environments of NSW.

Table 4-3 shows the estimated TSP concentrations at the DPE monitoring locations based on this PM_{10} to TSP relationship. Concentrations are estimated to be much lower than the EPA assessment criterion. Even lower concentrations would be expected near the Project.

Table 4-3 Estimated TSP concentrations

Year	Annual average TSP at Albury (µg/m^3)	EPA assessment criterion (µg/m^3)
2014	39.8	90
2015	36.5	
2016	37.8	
2017	39.5	
2018	49.5	
2019	58.5	
2020	50.3	
2021	35.8	

4.1.4 Deposited dust

Air quality criteria for deposited dust are usually set to protect against nuisance amenity impacts. No known monitoring of deposited dust is conducted near the Project. Deposited dust levels have been estimated on the assumption that 90 µg/m^3 TSP can be related to 4 g/m^2/month deposited dust, from Jacobs' experience with previous dust modelling studies. **Table 4-4** shows the estimated deposited dust levels at the DPE monitoring locations based on this approach. Deposited dust levels are estimated to be much lower than the EPA assessment criterion. Even lower levels would be expected near the Project.

Table 4-4 Estimated deposited dust levels

Year	Annual average TSP at Albury (g/m^2/month)	EPA assessment criterion (g/m^2/month)
2014	1.8	4
2015	1.6	
2016	1.7	
2017	1.8	
2018	2.2	
2019	2.6	
2020	2.2	
2021	1.6	

The review of existing air quality data and environment has led to the following conclusions:

- The nearest representative air quality monitoring data was from the DPE Albury monitoring station, as the Wagga Wagga North air quality monitoring station is impacted by surrounding industrial activities
- Air quality conditions are strongly correlated to the climatic conditions. For example, there was a deterioration in air quality conditions between 2017 and 2019 that were heavily influenced by drought, dust storms and bush firebush fires. These conditions were not unique to the Project area
- Concentrations of key air quality indicators would be expected to be lower near the Project than in areas of higher population densities.

4.2 Meteorology

Meteorological conditions are important for determining the direction and rate at which emissions from a source will disperse. The Bureau of Meteorology has been conducting meteorological monitoring at Deniliquin Airport since 2010. **Figure 4-2** shows the annual wind patterns from the most recent five year period; from 2017 to 2021. It can be seen wind roses that the most common winds in the area are from the southwest or west. It is also clear from **Figure 4-2** that wind patterns were similar in all five years of data presented, suggesting that wind patterns do not vary significantly from year to year. Winds from the Project towards sensitive receptors to the northeast may occur for up to 10% to 15% of the time.

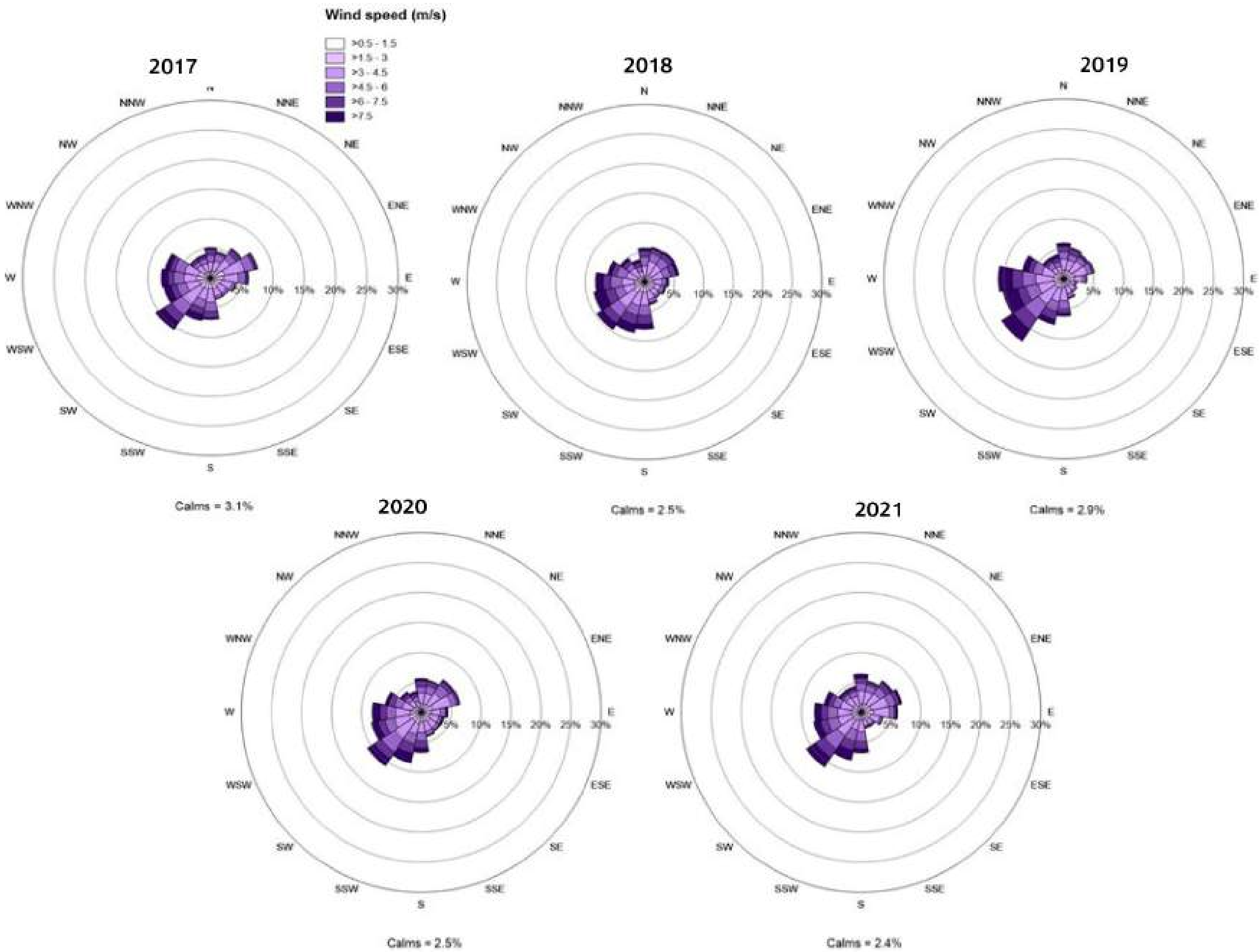

Figure 4-2 Annual wind roses from data collected from Deniliquin Airport meteorology station (2017-2021)

Figure 4-3 presents the seasonal wind patterns based on data from 2017 to 2021. The most common winds during autumn and spring are from the southwest followed by the northeast, while in summer the dominant wind is from the south and southwest and in winter, the wind is dominant from the west and north.

Overall, from the data analysed from 2017 to 2021 inclusive, winds are most dominant from the southwest and west, with winds expected from these directions 8% to 12% of the time.

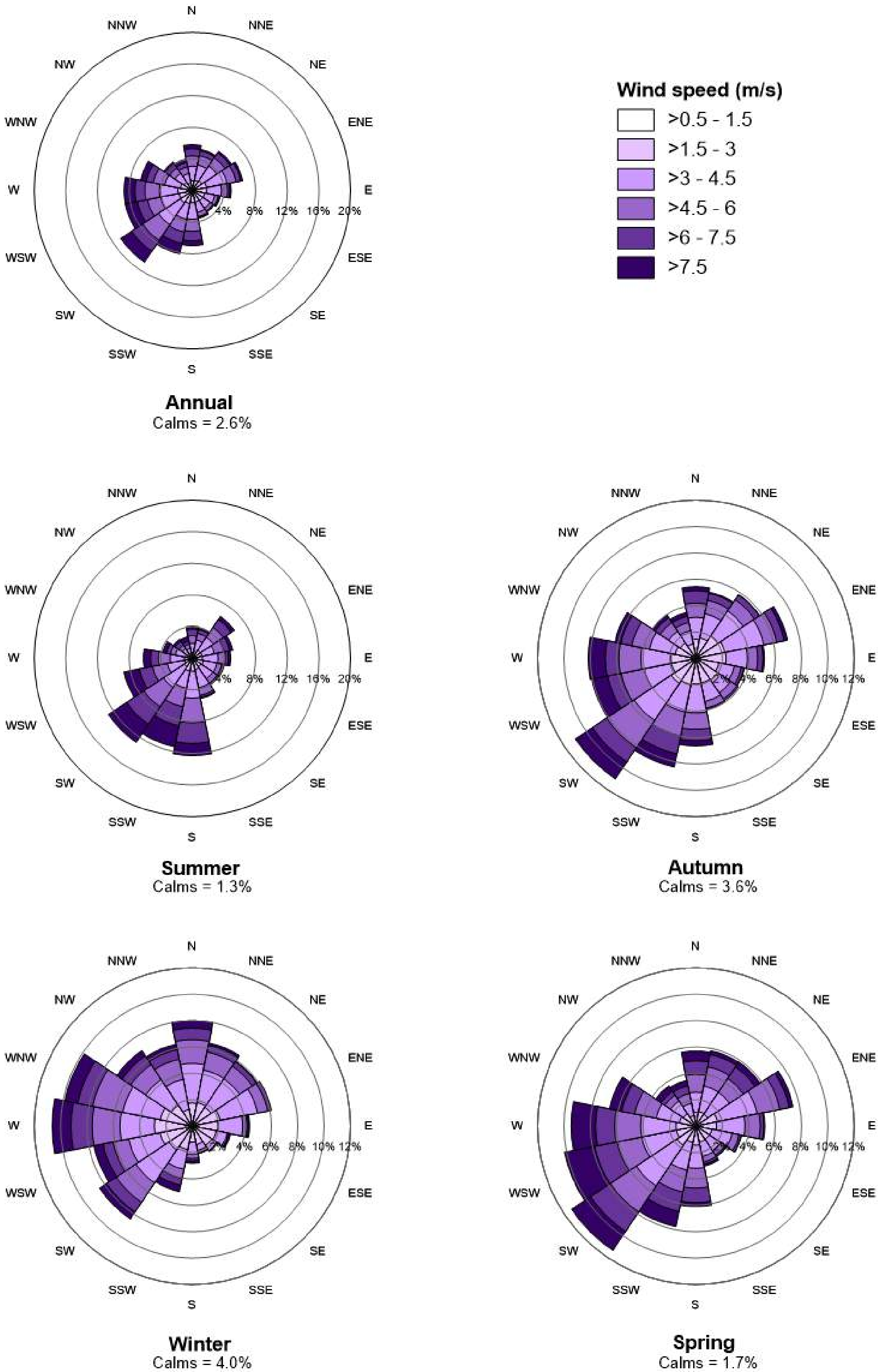

Figure 4-3 Seasonal wind roses from the Deniliquin Airport meteorological station (2017-2021)

5. Potential air quality impacts

5.1 Construction impacts

Emissions from the construction of the Project could occur from a variety of activities including material and spoil handling, material and spoil transport, excavation works, operation of the concrete batch plant and construction plant and equipment exhausts. One significant emission would likely be dust, also referred to as particulate matter. Key classifications of particulate matter include:

- Total suspended particulates (TSP)
- Particulate matter with equivalent aerodynamic diameter of 10 microns or less (PM10)
- Particulate matter with equivalent aerodynamic diameter of 2.5 microns or less (PM2.5)
- Deposited dust.

Dust (i.e., particulate matter) would be the most significant air quality issue during the construction of the Project. The amount of dust produced by the operation will depend on various factors including:

- Quantities and types of equipment used for construction works
- Quantities of materials handled
- Duration of construction works
- Proximity of the works to sensitive receptors.

The Project area is about 33,000 hectares and construction is expected to take up to 36 months. Construction activities would include the transport of materials by oversized and overmass (OSOM) vehicles and semi-trailers to the Project area (assumed from the Port of Geelong). Construction equipment on site would include excavators, loaders, dozers, trenching and underboring machines, various trucks, rollers and graders, cranes and other hand tools. It is expected that 150 to 300 people would be on site per day, depending on the stage of construction.

As there are several components of the Project (BESS, substation, turbines, cabling, transmission lines, access tracks), over a large area, it is assumed that construction plant and equipment could be across the Project area at any time, for the purposes of this air quality assessment, as a conservative approach.

Excavated spoil and topsoil would be stockpiled and then reused to backfill the foundations and for vegetation rehabilitation in the Project area. While stockpiled, there is a risk of exposed soil being transported by wind and impacting local air quality.

As determined in **Section 4.2**, prevailing winds are generally from the southwest during the year, tending to become westerlies and northerlies during the winter. Given these identified wind patterns, the sensitive receptors in **Table 5-1** have been identified to be in line from winds travelling from the Project area.

Table 5-1 Project sensitive receptors

Receiver	Classification	Nearest turbine	Direction from nearest turbine	Nearest turbine distance (m)
R01	Host	W-008	NE	2030.2
R04	Non-associated	W-153	NE	3642.8
R05	Non-associated	W-001	N	4061.6
R06	Associated	W-185	NW	4203.7
R07	Associated	W-202	S	4338.2
R09	Non-associated	W-205	S	4599.2

Receiver	Classification	Nearest turbine	Direction from nearest turbine	Nearest turbine distance (m)
R10	Associated	W-202	S	4714.6
R12	Non-associated	W-153	E	5680.1
R13	Non-associated	W-177	E	5770.9
R14	Non-associated	W-177	E	6171.9
R15	Associated	W-202	S	6446.6
R16	Non-associated	W-177	E	6545.6
R17	Non-associated	W-177	E	6607.3
R18	Non-associated	W-177	E	7212.1
R19	Associated	W-205	S	7307.1

The air quality at sensitive receptors to the northeast and east of the Project may be impacted throughout the year during construction if appropriate management plans are not implemented.

The sensitive receptors located to the south of the Project infrastructure (i.e. WTGs) may be impacted from construction during winter months than the rest of the year, due to northerly winds, as per **Section 4.2**. However, most of these 'at risk' identified sensitive receptors during winter, south of the WTGs, are located more than five kilometres away from the nearest proposed turbines (refer **Figure 3-2**). At these distances, it is likely that TSP and dust generated on site would have dispersed or settled before reaching the receptors and would, therefore, likely have no impact on air quality.

Overall, given the large Project area and the distance between sensitive receptors and the Project infrastructure, there is expected to be a minimal impact to air quality from the construction of the Project, subject to air quality management plans being implemented effectively. The recommended mitigation measures are outlined in **Chapter 7**.

5.2 Operational impacts

Emissions from the operation of the windfarm would be limited to being from the following sources:

- Emissions from exposed surfaces
- Use of Project operational equipment
- Maintenance works on Project infrastructure including access tracks, hardstands and laydown areas.

The blade tip for each WTG would be approximately 50 metres above the ground. The rotating turbines possibly could cause some downstream wake effects for some distance beyond the turbine. However, given the height of the tip of the blade from the ground, it is unlikely for these wake effects to draw up any dust from the ground during operation.

It is expected that air quality would not be impacted by these activities. In particular, sensitive receptors would not be impacted given the distance between the receptors and the proposed Project infrastructure.

5.3 Decommissioning impacts

If the Project were to be decommissioned at the end of the wind farm's operating life (30 years), it would be expected that equipment and activities similar to those during the construction stage would be required, however, over a shorter duration of time. Air quality impacts to nearby sensitive receptors would be dependent on the existing air quality at the time, the location of any new receptors around the Project area, as well as any possible shifts in local weather patterns in 30 years-time. However, it would be expected that the air quality impacts outlined in this assessment during construction would also apply to the decommissioning stage as a conservative measure, given that dust suppression techniques, material handling and air quality management may have improved by the time decommissioning work commences.

6. Cumulative impacts

Cumulative impacts have the potential to occur when impacts from a project interact or overlap with those from other projects and can potentially result in a larger overall effect (positive or negative) on the environment, businesses or local communities. Cumulative impacts may occur during construction stages when projects are constructed concurrently or consecutively. Projects constructed consecutively (or sequentially) can result in construction activities occurring over an extended period of time with little or no break in construction activities, potentially causing increased impacts and fatigue for local communities.

The extent to which another development or activity could interact with the construction of the proposal would depend on its scale, location and/or timing of construction. Generally, cumulative impacts would be expected to occur where multiple long-duration construction activities are undertaken close to, and over a similar timescale to, construction activities for the proposal, or where consecutive construction occurs in the same area.

The overall effect of cumulative benefits or impacts could be positive or negative, depending on the nature of the projects and the nearby communities and environment.

Table 6-1 presents Projects identified close to the Project area and an assessment of cumulative impacts.

Table 6-1 Cumulative impact assessment – nearby Projects

Project	Brief project description	Assessment
Riverina and Darlington Point BESS, Darlington Point (Approved)	Construction and operation of a combined 150MW / 300MWh three independent but co-located BESS projects.	As per the EIS (Arup, 2018), air quality is not expected to be impacted by the construction or operation of the Project. This is due to no extensive cut and fill earthworks proposed and the management of construction vehicles and dust management through the CEMP.
Micro Solar Farm, Coleambally (Approved)	Construction and operation of a 5MW micro solar farm and associated infrastructure, located within the Coleambally Irrigation Area.	The highest risk of air quality impacts from this project according to the Statement of Environmental Effects (MJM, 2018) is dust generation during construction and decommissioning but are manageable through standard air quality management practices. It is stated that detrimental air quality impacts are not expected during operation. Therefore, cumulative impacts are highly unlikely.
Baldon Wind Farm (Planning)	Construction, operation and maintenance of a wind farm with up to 162 WTGs, BESS and associated infrastructure.	As per the Project scoping report (Goldwind Australia & Lacour Energy, 2022), the Baldon Wind Farm is proposed to be located approximately 120 km west of the Project. Given this distance, it is unlikely there would be any cumulative affects if the Baldon Wind Farm construction program is carried out concurrently with the construction of the Project, especially if appropriate dust suppression and air quality management plans are implemented.

Project	Brief project description	Assessment
Keri Keri Solar Farm (Planning)	Solar farm with a maximum installed capacity of 500MW$_p$ (MW-peak) and an alternating current capacity of up to 400 MW$_n$ (MW- nominal). The project will also include ancillary infrastructure.	As per the scoping report (ERM, 2022), there are no impacts expected from the project, with dust management likely to contain dust emissions during construction. The development of the Project should be monitored once more detail is available
Keri Keri Wind Farm (Planning)	Construction, operation and maintenance of a wind farm with up to 176 WTGs, BESS (up to 200 MW/800 MWh) and associated infrastructure.	Similar to the solar farm, the scoping report (ERM, 2022) concludes that there are likely to be minimal air quality impacts from construction and no impacts expected from the operation of the Project. The development of the Project should be monitored once more detail is available.
Project EnergyConnect (Approved)	Construction and operation of a high voltage interconnector between NSW and SA. The transmission project's eastern section includes new transmission lines between Wagga Wagga and Buronga, with a new Dinawan Terminal Station to be located next to Kidman Way about 55 kilometres south of Darlington Point.	The highest risk of air quality impacts from the Project as per the Air Quality Impact Assessment (WSP, 2021) will be close to the Dinawan Terminal Station construction compound, substation and accommodation, and possible dust along the high voltage interconnector corridor during construction. Due to the distance to sensitive receptors, no cumulative impacts would be expected with this Project.
Coleambally BESS, Coleambally (Planning)	Construction and operation of a 100MW / 200-400 MWh BESS including ancillary infrastructure in Coleambally, NSW. The BESS footprint would be about four hectares and is located near Kidman Way with proposed transmission connection to the Transgrid Coleambally substation.	The Colleambally BESS scoping report (NGH Consulting, 2021) does not consider air quality, as it is not included in the SEARs. It is assumed that the relatively small scale project would not result in any changes to the local air quality.
Woodland BESS, Darlington Point (Planning)	Construction and operation of a 200MW / 800MWh BESS located about 10 kilometres south of Darlington Point. This project is located next to the Darlington Point Solar Farm.	During construction, the scoping report (Pitt & Sherry, 202) indicates that, traffic movements, the slashing of grassland, and minor vegetation removal may result in minor increases in emissions and dust, and that there would be no emissions from operation. There would be likely be no cumulative impacts to sensitive receptors, given the distance of the BESS to the Project.
Dinawan Energy Hub (Announced)	The Dinawan Energy Hub (DEH) Project would involve the construction and operation of a hybrid wind, solar and battery storage project, with capacity up to 2.5GW, to be located between Coleambally and Jerilderie, west of the Kidman Way. The energy hub would connect to Project EnergyConnect.	Scoping Report or EIS yet to be developed. The proposed site boundary would border the Project to the north and the east. Construction scheduling would need to be determined for whether any cumulative impacts are likely, however, given the distances of receptors and assumed implementation of standard dust suppression practice, there are unlikely to be cumulative air quality impacts.

Project	Brief project description	Assessment
Victoria to NSW Interconnector West (Announced)	The VNI West project is a proposed new interconnector between Victoria and NSW including a series of high voltage transmission lines and terminal stations that would link the regions of Murray River, western Victoria, and southwest NSW. The WNI West transmission route is indicated to link the Dinawan Terminal Station to Kerang, Bendigo and Ballarat, where the Western Victoria Transmission Network Project would be constructed.	Initial plans are for the transmission lines to run south of the Dinawan Terminal Station (Transgrid, 2021). The development of the final route should be monitored to assess the cumulative air quality risks.
Bullawah Wind Farm (Announced)	Construction, operation and maintenance of a wind farm with up to 170 WTGs (up to 300m tip height), BESS and associated infrastructure. The project will have a capacity of 1000MW.	The proposed Bullawah Wind Farm is 55km southeast of Hay, with the exact site area yet to be determined. Given the distances of receptors, to the Project, standard practices are likely to be sufficient in managing cumulative air quality impacts from construction. It would still be recommended for construction scheduling to be reviewed once further details are available.

7. Environmental management measures

The following management measures detailed in **Table 7-1** have been developed to specifically manage potential air quality impacts which have been predicted during construction and operation of the Project.

Measures to cover haulage loads leaving the Project area and measures to reduce the extent of exposed areas are detailed in the Traffic and transport technical report and Surface water quality and groundwater technical report for the Project.

Table 7-1 Air quality environmental management measures

Impact	Reference	Environmental management measure	Responsibility	Timing
Dust	AQ01	Air quality management measures will be included in the CEMP for the Project, and would include but not be limited to: • Clearly marking haul routes • Watering and maintenance of haul routes • Vehicle speed restrictions • Prompt clean-up of any material spillage.	Contractor	Prior to construction
	AQ02	Weather will be monitored to minimise activities during adverse dust conditions e.g., during hot and windy conditions	Contractor	Construction, decommissioning

8. Conclusion

The potential air quality impacts of the construction and operation of the Project have been reviewed. This involved consideration of the proximity to sensitive receptors, existing air quality conditions, prevailing winds and the nature and scale of the operation.

The existing air quality in the area is likely to be good due to limited population and rural environment. The wind direction is mostly from the southwest throughout the year, except for winter, when the winds are predominantly from the west and north. Sensitive receptors in line of winds are at a distance of at least two kilometres from the Project, and up to eight kilometres away. However, it is unlikely that sensitive receptors more than five kilometres from Project infrastructure would be impacted from particulates from construction, due to dispersion.

Standard construction activities to supress dust during construction will be implemented. This would include use of water cart to suppress dust from haul roads and visual monitoring, as well as modifying activities during high-winds and adverse weather events.

The Project construction would have a low risk of potential to adversely impact on the local air quality.

During the operation of the Project, it is expected there will be negligible impact to the existing air quality. Standard practices such as watering haulage routes and minimising operational maintenance activities during unfavourable (windy) conditions will be applied.

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