Hexham Wind Farm - Air Quality Impact Assessment

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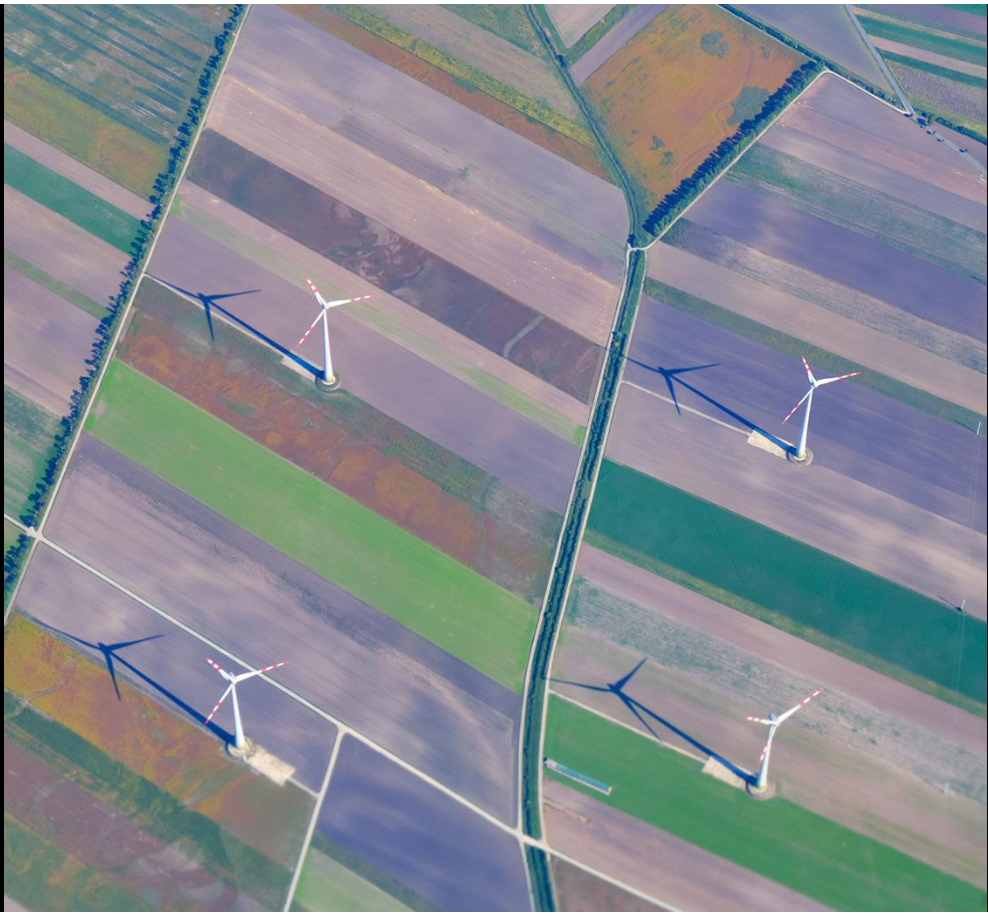
Hexham Wind Farm Pty Ltd

Hexham Wind Farm
1 September 2025



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Executive summary

Overview

Hexham Wind Farm Pty Ltd (the proponent) is seeking approval for the proposed Hexham Wind Farm (the Project), located between the townships of Hexham, Caramut, Ellerslie and Minjah in Moyne Shire in southwest Victoria.

As determined by the Minister for Planning under the *Environment Effects Act 1978*, the proponent is required to prepare an environment effects statement (EES) for the Project. This Air Quality Impact Assessment, prepared by Jacobs Group (Australia) Pty Ltd (Jacobs) on behalf of the proponent, addresses the following evaluation objective outlined in the draft scoping requirement relevant to amenity:

> *To minimise and manage adverse air quality and noise and vibration effects on residents and local communities as far as practicable during construction, operation and decommissioning having regard to applicable limits, targets or standards.*

To address this evaluation objective and its relevant aspects, the Air Quality Impact Assessment sought to:

- Characterise the existing environment by identifying relevant sensitive receptors and reviewing the geographical setting, meteorological conditions, and background air quality
- Assess the potential effects of construction, operation and decommissioning activities on air quality associated with the project
- Propose measures to manage and monitor effects on amenity values (including contingency measures for responding to unexpected impacts to amenity values) and identify likely residual effects.

Existing environment

As part of the assessment, key features of the existing environment were identified including surrounding terrain, land uses and sensitive receptors, local climate and meteorology, existing sources of emissions to air and background air quality. Terrain around the Project was determined using STRM data from NASA. Aerial imagery was used to identify the location of surrounding receptors. Meteorological and ambient air quality data collected at surrounding monitors were reviewed to characterise existing local conditions. Existing sources of emissions to air were identified using information reported to the National Pollutant Inventory (NPI) database. The following key conclusions were made in relation to the existing environment:

- The project has been designed so that a setback distance of at least 140 m is maintained from activities during construction to the nearest sensitive receptor. Recommended separation distances for activities listed in 'Publication 1949: Separation distance guidelines replacing Publication 1518: Recommended separation distances for industrial residual air emissions – guideline', (Publication 1949), (EPA, August 2024) (i.e., concrete batching and quarrying) would also be maintained.
- A review of long-term meteorology identified that sensitive receptors to the north, northeast, southwest and east may experience winds blowing in the direction from the Project most often. In summer, when long-term climate data identified that it is hottest and driest, sensitive receptors to the north and west were identified as being most likely to experience winds blowing in the direction from the Project.
- From representative data adopted from Environmental Protection Authority (EPA) station at Alphington, 90^{th} and 50^{th} percentile 24-hour averaged PM_{10} and $PM_{2.5}$ concentrations remained below the ERS air quality objectives. 99^{th} percentile concentrations (which include adverse regional events) occasionally exceeded this objective.
- Limited sources of nearby existing emissions to air were identified, with only Mortlake Power Station (including associated infrastructure) having reported to the NPI database in 2023/2024.

Impact assessment key findings and recommendations

Dust during construction was identified as the key air quality-related issue. Potential nuisance dust impacts during construction were assessed by initially conducting a review to confirm that the recommended separation distances for key activities from Publication 1949 were being adhered to. A qualitative assessment using the approach detailed in Publication 1943 was applied to determine the likelihood of dust impacts. The results of the construction dust impact assessment found that there was a 'high' risk of dust impacting sensitive receptors and that mitigation and management measures would be required. This was driven by the sensitivity of the receiving environment, being largely un-affected; and the potential for dust to be generated from the Project activities, noting the separation distances to sensitive receptors.

A series of mitigation and management measures were recommended for this phase of the Project. Consistent with the General Environmental Duty (GED), the intent of these measures was to reduce risks to human health and the environment as far as reasonably practicable. Measures included the development of an Air Quality Management Plan (AQMP) as part of a Construction Environment Management Plan (CEMP) to manage and effectively control dust emissions during construction. Controls for inclusion in the AQMP were recommended in accordance with applicable EPA publications. With the application of these controls, residual dust-related impacts were assessed as being 'moderate' (i.e., dust impacts are very unlikely and may only occur on rare occasions, e.g., when background conditions are elevated and/or during inclement weather). Resulting dust concentrations at surrounding receptors are expected to remain within the range of values already likely experienced during natural fluctuations and variations in existing background conditions (i.e., imperceptible from existing conditions).

Impacts from other air quality-related issues including exhaust emissions from associated vehicles, plant and equipment over all phases (i.e., construction, operations and decommissioning), as well as nuisance dust impacts during operations and decommissioning (including from off-site associated traffic) were also qualitatively assessed. 'Negligible' residual impacts were determined as being likely from Project exhaust emissions and from dust during operations, but controls were still recommended in-line with the GED. Regarding dust during decommissioning, residual impacts were assessed as being 'low', and it was recommended that a Decommissioning Management Plan (DcMP) detailing the proposed decommissioning works, associated environmental risks (including air quality), and planned management and mitigation measures be prepared so that impacts can be managed in the context of the legislative and policy requirements in-force at the time.

Finally, a cumulative impact assessment was completed which considered the potential for nearby sensitive receptors being affected by emissions to air from the Project, as well as other nearby projects. This review identified the potential for cumulative air quality related impacts for the following projects: Mt Fyans Wind Farm; Mortlake Turn-In Project; and Mortlake Energy Hub. Planning and co-ordination were recommended to avoid circumstances where the same sensitive receptors are jointly affected. With this planning and co-ordination, it was determined that residual cumulative impacts would be 'low' (i.e., impacts are not likely and may only occur on very rare occasions during exceptional circumstances).

Conclusion

The assessment concluded that residual air quality impacts during the Project could be minimised with appropriate mitigation and management measures so that the evaluation objective of the scoping requirements would be met.

Important note about your report

The sole purpose of this report and the associated services performed by Jacobs is to provide air quality assessment services in accordance with the scope of services set out in the contract between Jacobs and the Client, Hexham Wind Farm Pty Ltd. (Hexham Wind Farm).

In preparing this report, Jacobs has relied upon, and presumed accurate, any information (or confirmation of the absence thereof) provided by the Client and/or from other sources. Except as otherwise stated in the report, Jacobs has not attempted to verify the accuracy or completeness of any such information. If the information is subsequently determined to be false, inaccurate or incomplete then it is possible that our observations and conclusions as expressed in this report may change.

Jacobs derived the data in this report using various information sourced from Hexham Wind Farm and/or available in the public domain at the time or times outlined in this report. The passage of time, manifestation of latent conditions or impacts of future events may require further examination of the project and subsequent data analysis, and re-evaluation of the data, findings, observations and conclusions expressed in this report. Jacobs has prepared this report in accordance with the usual care and thoroughness of the consulting profession, for the sole purpose described above and by reference to applicable standards, guidelines, procedures and practices at the date of issue of this report. For the reasons outlined above, however, no other warranty or guarantee, whether expressed or implied, is made as to the data, observations and findings expressed in this report, to the extent permitted by law.

This report should be read in full, and no excerpts are to be taken as representative of the findings. No responsibility is accepted by Jacobs for use of any part of this report in any other context.

This report has been prepared on behalf of, and for the exclusive use of Hexham Wind Farm and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and Hexham Wind Farm. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this report by any third party.

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Glossary

Abbreviation	Expansion / definition
AG	Australian Government
AQIA	Air Quality Impact Assessment
AQMP	Air Quality Management Plan
BESS	Battery Energy Storage System
BoM	Bureau of Meteorology
CASANZ	Clean Air Society of Australia and New Zealand
CEMP	Construction Environmental Management Plan
CO	Carbon monoxide
DCCEEW	Department of the Climate Change, Energy, the Environment and Water
DcMP	Decommissioning Management Plan
DMP	Dust Management Plan
DTP	Department of Transport and Planning
EES	Environment Effects Statement
EP Act	Environment Protection Act (2017)
EPA	Environment Protection Authority (Victoria)
EPR	Environmental Performance Requirements
ERS	Environment Reference Standard
GED	General Environmental Duty
GWh	GigaWatt hours (1 x 10^9 Watt hours)
Ha	Hectare
HWF	Hexham Wind Farm
Jacobs	Jacobs Group (Australia) Pty Ltd
km	Kilometre
kV	Kilovolt
L/m^2/hr	Litres per metre squared per hour
m^3	Cubic metres
MNES	Matters of National Environmental Significance
MW	Megawatt
µg/m^3	Micrograms (1 x 10^{-6}) per cubic metre
NEPC	National Environment Protection Council
NO_2	Nitrogen dioxide
NOx	Nitrogen oxides (nitric oxide and nitrogen dioxide)
NPI	National Pollution Inventory
$PM_{2.5}$	Particulate matter comprising particles with aerodynamic diameters less than or equal to 2.5 microns (2.5 µm).
PM_{10}	Particulate matter comprising particles with aerodynamic diameters less than or equal to 10 microns (10 µm).

ppb	Parts per billion
RCS	Respirable crystalline silica
RH	Relative humidity
SO_2	Sulfur dioxide
SRTM	NASA Shuttle Radar Topography Mission
TSP	Total solid particulates
t/yr	Tonnes per year
UK IAQM	United Kingdom Institute of Air Quality Management
VG	Victoria Government
VOC	Volatile organic compound
WS	Wind speed
WTG	Wind turbine generator

1. Introduction

1.1 Background

Hexham Wind Farm Pty Ltd (the proponent) proposes a new wind farm (Hexham Wind Farm; the Project) at Hexham, located between the townships of Hexham, Caramut, Ellerslie and Minjah in Moyne Shire in southwest Victoria.

This Air Quality Impact Assessment (AQIA), prepared by Jacobs Group (Australia) Pty Ltd (Jacobs) on behalf of the proponent, addresses the scoping requirements issued by the Department of Transport and Planning (DTP) for the project in September 2024 that are relevant to amenity impacts as part of an Environment Effects Statement (EES), as required under the *Environment Effects Act 1978* (refer to **Section 2**). The report also supports the planning permit application for the project, as required under the *Planning and Environment Act 1987*.

The AQIA was undertaken in accordance with the Guideline for Assessing and Minimising Air Pollution in Victoria, Publication 1961 (EPA, 2022a) and associated guidelines and legislation. Under the *Environment Protection Act 2017* (EP Act), all risks to human health and environment from air pollution must be minimised so far as reasonably practicable. The guideline provides a framework to assess and control risks associated with air pollution and constitutes guidance under the EP Act.

1.2 Purpose of this report

The purpose of this report is to assess the potential air quality impacts associated with the Project and to define the Environmental Performance Requirements (EPRs) necessary to avoid and minimise environmental impacts, determine the environmental outcomes that the Project must meet, and address the EES evaluation objectives.

The specific objectives of the impact assessment are to:

- Identify local air quality values and the nature and proximity of potentially sensitive receptors.
- Provide an assessment of the likely impact of the Project on air quality values to inform approvals under relevant policy and legislation.
- Provide recommendations to further avoid or minimise impacts on identified air quality values where appropriate.

1.3 Structure of the report

The report is structured in the following way:

- **Introduction** (this section) which provides background details for the Project and outlines the purpose and structure of the AQIA
- **EES scoping requirements** (**Section 2**) where the key matters that the Project poses to the achievement of the evaluation objective are identified
- **Project description** (**Section 3**), where key details relevant to the assessment are explained including activities with the highest associated air quality-related impacts
- **Legislation, policy and guidelines** (**Section 3.4**) which lists the state, Commonwealth and other documents relevant to the assessment. This section also establishes the air quality objectives that apply
- **Methodology** (**Section 5**) where the approach applied to assess potential air quality impacts associated with the Project is explained

- **Existing conditions** (**Section 6**) which identifies background air quality conditions, existing and potential future sources of emissions to air that may lead to cumulative impacts, prevailing local meteorology and details of surrounding sensitive receptors
- **Impact assessment** (**Section 7**), where initial and residual air quality impacts during the construction, operation and decommissioning of the Project, including potential cumulative impacts from other nearby developments and projects are evaluated. Measures to mitigate or otherwise effectively manage the potential air quality impacts determined are also presented here
- **Environmental performance requirements** (**Section 8**) which describes the measures meet the EES evaluation objective and intent of the GED
- **Conclusion** (**Section 9**) where the objectives, methods, outcomes and recommendations of the assessment are presented.

2. EES scoping requirements

2.1 EES evaluation objectives

The scoping requirements (DTP, 2024) set out in detail the matters to be investigated, assessed and documented in the EES for the Project. The scoping requirements specify evaluation objectives which provide a framework to guide an integrated assessment of environmental effects of the Project, in accordance with the *Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978, Eighth edition, 2023*.

The evaluation objective relevant to the air quality assessment is set out in Section 4.4 (Amenity) of the scoping requirements:

> *To minimise and manage adverse air quality and noise and vibration effects on residents and local communities as far as practicable during construction, operation and decommissioning having regard to applicable limits, targets or standards.*

In order to meet the evaluation objective, it is necessary to understand the potential impact of the Project on air quality values, so that impacts can be appropriately avoided or mitigated. Understanding these impacts requires an impact assessment, for which the starting point is a clear understanding of the existing conditions. This report details the characterisation of the existing air quality conditions, and the subsequent impact assessment needed to assess the Project against the evaluation objective.

2.2 Assessment of specific environmental effects

The scoping requirements set out the key issues that the Project poses to the achievement of the evaluation objective, together with the values of the existing environment that are to be characterised – these are referred to as the 'existing environment'. The scoping requirements also list potential effects of the Project and identify where mitigation measures may be required.

The scoping requirements relevant to air quality are reproduced in **Table 2-1**, as well as the location(s) where these items have been addressed in this report.

Table 2-1. Air quality scoping requirements

Category	Requirement relevant to air quality	Section addressing this requirement
Key issues	Potential for adverse effects to air quality at sensitive receptors and on other sensitive land uses during construction of wind turbines, associated infrastructure and potential use of an on-site quarry	Key issues identified in **Section 3.4**
Existing environment	Characterise current local conditions in relation to air quality using data collected from existing local monitoring stations, or project-installed monitoring equipment.	Key features of the existing environment described in **Section 6**
	Identify sensitive receptors that may be subject to effects to amenity from the project including, but not limited to, all dwellings within 3 km of wind turbines, associated infrastructure and potential on-site quarry.	
Likely effects	Assess the potential effects of construction, operation and decommissioning activities on air quality in accordance with *EPA Publication 1961 Guideline for assessing and minimising air pollution in Victoria, EPA Publication 1834 Civil construction, building and*	Likely effects assessed in **Section 7**

Category	Requirement relevant to air quality	Section addressing this requirement
	demolition guide, and *EPA Publication 1823.1 Mining and quarrying – guide to preventing harm to people and the environment*.	
Design and mitigation	Describe and propose siting, design, mitigation and management measures to control emissions to air from construction activities, including measures to minimise greenhouse gas emissions.	Mitigation and management measures are provided in **Section 7** with environment performance requirements (EPRs) detailed in **Section 8**
Performance requirements	Describe proposed measures to manage and monitor effects on amenity values and identify likely residual effects, including compliance with standards and proposed trigger levels for initiating contingency measures.	
	Describe contingency measures for responding to unexpected impacts to amenity values resulting from the project during construction, operation and decommissioning.	

3. Project description

3.1 Project overview

Hexham Wind Farm Pty Ltd (the proponent) is developing the proposed Hexham Wind Farm (the project) in Moyne Shire, Victoria. The project will harness strong and reliable winds to generate renewable energy through the construction and operation of up to 106 wind turbines generators and would operate for a period of at least 25 years following a two-year construction period. The wind farm would generate approximately 2,559 gigawatt hours (GWh) of renewable electricity each year. Electricity produced by the project would be fed through underground and overhead cables to a new on-site terminal station, where it would be exported to the national electricity network via the Moorabool to Heywood 500 kilovolt transmission line.

The project extends across approximately 16,000 hectares of private and public land located between the townships of Hexham, Caramut and Ellerslie in south-western Victoria. The main land use within the project site is agricultural (predominantly cattle and sheep grazing, along with some cropping). Much of the area has been cleared of native vegetation with remnant vegetation largely restricted to roadside reserves and along watercourses, with small, isolated areas on private land.

Around 151 kilometres of new access tracks, including upgrades to around 16.7 kilometres of existing access tracks within the project site, would be required to provide for construction and maintenance access from the public road network to each wind turbine and supporting infrastructure. These access tracks can also be used by emergency vehicles and by landowners for their farming operations.

Other project infrastructure would include:

- a 200 Megawatt (MW) /800 Megawatt-hour (MWh) battery energy storage system (BESS)
- an operations and maintenance (O&M) facility, consisting of site offices and amenities
- up to five meteorological masts, to be in place for the life of the project
- a main temporary construction compound, consisting of office facilities, amenities and car parking. Four additional temporary construction compounds are also planned
- up to 26 temporary staging areas.

A temporary on-site quarry is being investigated for the purposes of providing aggregate materials for access tracks and hardstand areas, and to minimise traffic movements on local roads during construction. If an on-site quarry is not deemed viable, aggregate material would be supplied from one or more nearby quarries. Potential quarries that have been investigated to supply the necessary raw materials required include Mt Shadwell Quarry, Mt Napier Quarry, Tarrone Quarry, Gillear Sand and Limestone Quarry and/or Camperdown quarries). All quarries have good access to the project site via major arterial roads.

Within 12 months of wind turbines permanently ceasing to generate electricity (assuming the turbines are not repowered), the wind farm would be decommissioned. This would include removing all above ground equipment, restoration of all areas associated with the project, unless otherwise useful to the ongoing management of the land, and post-decommissioning revegetation with pasture or crop (in consultation with and as agreed with the landowner).

3.2 Project details

Key details of the Project as relevant to construction, operation and decommissioning are listed below in **Table 3-1**.

Table 3-1. Project details (Source: Wind Prospect)

Project's main features	Details
Location	The project is approximately 15 kilometres west of Mortlake and approximately 15 kilometres north-east of Woolsthorpe in the Moyne Shire of south-west Victoria. The closest townships are Hexham, Caramut and Ellerslie, located approximately 3 kilometres north-east, 4 kilometres north-west and 3 kilometres south-west, respectively. The road network that borders and runs through the project area includes Hamilton Highway to the north, Woolsthorpe-Hexham Road and Hexham-Ballangeich Road to the east, Warrnambool-Caramut Road to the west and Gordons Lane to the south.
Setting	Agricultural is the predominant land use in the project area consisting mostly of grazing(cattle and sheep) along with some cropping. Native vegetation is largely restricted to roadside reserves with small, isolated areas on private land. Numerous indigenous scattered trees exist throughout the local area.
Landowners	14 landowner families with project infrastructure on their land.
Wind turbines and hardstand areas	Up to 106 with a maximum tip height of 260 meters, maximum rotor diameter up to 190 meters and minimum tip height of 40 meters. Maximum tower base width of between 5 and 6 metres. Blade length of up to 93 metres. Each wind turbine would have an adjacent hardstand area of around 6,500 square metres, which equates to 70 hectares for all project wind turbines.
Wind farm capacity	Around 721 MW
Annual generation	Approximately 2,559 GWh per year
Construction footprint	599.55 hectares (or around 3.7% of the project site)
Operational footprint	148.7 hectares (or around 0.9% of the project site)
Construction period	Approximately 24 months
Electrical reticulation	Approximately 119 kilometres of 33 kilovolt electricity cable laid in approximately 85 kilometres of trenches about one metre below the ground. The work area width for the excavator to operate and for stockpiling of soil would be about eight metres wide for all trenches assuming up to four cables are housed in each trench. Approximately 49.1 kilometres of overhead powerlines lines to connect wind turbines to the new on-site terminal station. The distribution voltage is expected to be 33 kilovolts. (although 132 kilovolts and 220 kilovolts are alternative options), with the overhead dual circuit distribution line consisting of either single or parallel pole line (i.e., single poles up to 26 metres high, with conductor circuits on each side). The overall linear length of the overhead cabling route would be around 22 kilometres.
On-site terminal station	Electricity generated by the project would be distributed by underground and overhead cables to the proposed new onsite terminal station located adjacent to the existing Moorabool to Heywood 500 kilovolt transmission line. On-site terminal station with a footprint of approximately 7.3 hectares in size.
Permanent met masts	Up to five permanent meteorological masts are proposed, to be in place for the life of the project.

	A single-lane access track roughly four meters in width would be constructed to provide access.
Operations and maintenance facility	An operations and maintenance facility would be located adjacent to the on-site terminal station and BESS providing office, storage, and maintenance facilities. Nominally 90 metres by 200 metres.
Staging areas and passing lanes	26 staging areas up to 300 metres x 15 metres in length. Several passing lanes of 25 metres in length.
Site access and access tracks	Approximately 134.6 kilometres of new internal access track and upgrades to approximately 16.7 kilometres of existing access track (i.e., a total of around 151.3 kilometres of access tracks). The final access tracks would be 9 metres wide (inclusive of drainage, where required) and a maximum 120 metre turning radius. The construction footprint of access tracks would be around 20 metres wide. Eleven site access points are proposed from two arterial and five local council roads, being: ▪ Up to two access points from Hamilton Highway ▪ One access point from Warrnambool-Caramut Road ▪ Four access points from Woolsthorpe-Hexham Road ▪ One access point from Keillors Road ▪ Three access points from Hexham-Ballangeich Road.
Battery Energy Storage System (BESS)	An on-site battery energy storage facility with a is proposed to be located adjacent to the on-site terminal station. A name plate capacity 200 megawatt. The BESS would consist of a series of 20-foot containerised batteries with transformers, high voltage AC (HVAC) coolers and other electrical plant. The BESS would be sited on a hardstand area of up to 3 hectares (nominally 413 metres x 67 metres).
Temporary components	A main temporary construction compound would be located within the project site and include office facilities, amenities, and car parking (8 hectares). Four additional temporary construction compounds are also planned (200m x 200m). Seven noise compliant concrete batching plants would be established to supply concrete for the wind turbine foundations, the on-site terminal station, and the BESS (around 50m x 100m each)
Temporary onsite quarry	The proposed quarry is in the western portion of the project area. The work authority area is 52.3 hectares with an approximate extraction area of 21.5 hectares, a material stockpile area of approximately 8.6 hectares and an area of approximately 0.5 hectares for amenities and light vehicle parking. The remaining area will be used for stockpiling overburden and for groundwater management infrastructure.
Life	A minimum 25-year operating life is expected, following a period of up to three years of pre-development and construction activities. Pre-development would include detailed design and early works, where permitted.
Decommissioning	Within 12 months of wind turbines permanently ceasing to generate electricity, the wind farm would be decommissioned. This would include removing all above ground equipment, restoration of all areas associated with the project, unless otherwise useful

	to the ongoing management of the land, and post-decommissioning revegetation with pasture or crop (in consultation with and as agreed with the landowner).

3.3 Summary of key project activities

3.3.1 Construction

Construction of the Project will occur over a period of approximately 24 months. The construction footprint totals approximately 599.5 ha (i.e., around 3.7% of the overall Project site). Key activities during construction will include:

- Delivery of key plant and construction vehicles.
- Construction of 12 site access points from two arterial and five local council roads.
- Construction of approximately 134.6 km of new internal access track and upgrades to approximately 16.7 km of existing access track (i.e., a total of around 151.3 km of access tracks).
- Construction of 26 temporary staging areas, up to 300 m x 15 m in length each.
- Construction of five permanent meteorological masts.
- Establishment of seven temporary concrete batch plants and temporary construction offices.
- Construction and use of an on-site temporary quarry to supply materials for the Project during construction.
- Construction of temporary construction compounds including office facilities, amenities, and car parking etc.
- Construction of up to 106 wind turbine generator (WTG) hardstand areas and footings. The WTGs will each have a temporary hardstand area of 90 m x 320 m during construction and a permanent hardstand area of approximately 6,500 m^2 at completion for each wind turbine.
- Installation of electrical reticulation comprising:
  - Approximately 119 km of 33 kV electricity cable laid in approximately 85 kilometres of trenches about one metre below the ground.
  - Approximately 49.1 km of overhead transmission lines.
- Construction of an on-site terminal station approximately 7.3 ha in size and located adjacent to the existing Moorabool to Heywood 500 kV transmission line.
- Installation of a battery energy storage system (BESS). The BESS would be sited on a hardstand area of around 3 ha area.
- Construction of permanent operation and maintenance facility which would be located adjacent to the on-site terminal station and provide office, storage, and maintenance facilities.

Towards the end of construction, the following activities will be undertaken:

- Removal of all temporary infrastructure, including the concrete batch plants, infrastructure and construction compound, from the HWF site
- Rehabilitation of disturbed areas.

3.3.2 Operations

The operations phase of the project will include the testing and commissioning of the wind farm, following by ongoing operations and maintenance of the facility for the export of electricity. The operational life of the HWF is expected to be a minimum of 25 years.

There will be a permanent office and maintenance facilities located on-site for the operational phase. Together with the other permanent features, the operational footprint totals approximately 149 ha. This is equivalent to around 0.9 % of the overall Project site.

Light vehicles and small trucks would travel from the site office and maintenance yard to individual WTGs and substation, mostly via internal roads. There may be occasional larger vehicles for the delivery of larger equipment items.

3.3.3 Decommissioning

Within 12 months of wind turbines permanently ceasing to generate electricity, the wind farm would be decommissioned. This would include removing all above ground equipment, restoration of all areas associated with the project, unless otherwise useful to the ongoing management of the land, and post-decommissioning revegetation with pasture or crop (in consultation with and as agreed with the landowner)

Alternatives to this approach which may be considered closer to the time, and depending on assessment of economic viability, include continuing the operation of the wind farm with potential refurbishment or replacement of the WTGs.

3.4 Activities relevant to this assessment

Air quality issues arise when air pollutant emissions from an industry or activity lead to a deterioration in ambient (i.e. outdoor) air quality. Details of the construction, operation and decommissioning phases of the Project described above were reviewed to identify activities which may impact local air quality.

3.4.1 Construction

During construction, the primary air quality impact is expected to be dust. The term dust refers to particulate matter in, most commonly, the form of total solid particulates (TSP), deposited dust, particulate matter with equivalent aerodynamic diameter of 10 microns or less (PM_{10}), and finer particulate matter with equivalent aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$). The Environment Reference Standard (ERS) establishes assessment indicators for PM_{10} and $PM_{2.5}$ with an objective of protecting human health.

Activities with the highest potential to generate dust during construction include:

- Excavation, loading and unloading, haulage, storage, placement and compaction of materials during the construction of temporary and permanent Project infrastructure
- Concrete batching activities at the seven temporary concrete batch plants
- Extraction, treatment (i.e., sorting, crushing and screening), and transport of materials from the on-site quarry. It is estimated that approximately 1,400,000 cubic metres (m^3) of quarried material will be handled during the construction, including approximately 540,000 m^3 of product. Around 50 blasts per year are also planned to facilitate extraction.
- Storage of stockpiled materials and temporary disturbed and exposed surfaces, including unsealed roads that are susceptible to wind erosion.

Importantly, it is anticipated that construction of each of the WTGs and associated infrastructure will occur progressively, i.e. construction will occur at different times for the various locations of the WTGs across the Project site.

As well as dust, another key air quality-related risk during construction would be exhaust emissions from the combustion of fossil fuels in construction plant and equipment. The primary pollutants associated with plant exhaust emissions include carbon monoxide (CO), oxides of nitrogen (NO_x) including nitrogen dioxide (NO_2), particulate matter (PM_{10} and $PM_{2.5}$), volatile organic compounds (VOCs) and sulfur dioxide (SO_2) (depending on fuel sulfur content).

3.4.2 Operations

Compared to construction, emissions to air during operations are expected to be limited. Key activities with the potential to generate emissions include:

- Vehicle movements along unsealed access tracks. When not properly managed, this can lead to wheel generated dust.
- Materials handling and ground disturbance including vegetation removal during maintenance activities. These activities and the associated exposes surfaces have the potential to generate of dust. Limited exhaust emissions would also be generated from associated plant and equipment.

3.4.3 Decommissioning

Activities associated with the decommissioning of the Project permanent infrastructure (described above in **Section 3.1**) at the end of their service life have the potential to generate dust emissions. Exhaust emissions from the combustion of fossil fuels in plant and equipment used during decommissioning also represents a potential impact.

3.4.4 Summary of key issues

In summary, the key air quality-related issue identified for the Project was dust during construction. This is consistent with the scoping requirements, and as such, construction dust was identified as the focus of the assessment. Other potential air quality issues identified including dust from activities during operations and decommissioning, exhaust emissions from associated vehicles, plant and equipment over all phases), and cumulative impacts from other projects also require consideration as part of the assessment.

4. Legislation, policy, guidelines and assessment objectives

4.1 Overview

This section provides an overview of key commonwealth and state legislation, policies and guidelines relevant to air quality matters for the Project. Additionally, Project assessment objectives are established.

4.2 Commonwealth legislation

Details for the following Commonwealth legislation relevant to amenity and air quality are summarised below:

- ***Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act):** The Environment Protection and Biodiversity Conservation Act 1999 provides the legal framework to protect and manage matters of national environmental significance (MNES), which include: world heritage properties; national heritage places; wetlands of international importance (Ramsar); listed threatened species and communities; listed migratory species; Commonwealth marine areas; the Great Barrier Reef Marine Park; nuclear actions; and water resources, in relation to coal seam gas and large coal mining development.

  Any project that is likely to have a significant impact on MNES, must be referred to the Commonwealth Minister for the Environment and Water via the Department of the Climate Change, Energy, the Environment and Water (DCCEEW) for a decision on whether the Project is a 'controlled action' requiring assessment and approval under the EPBC Act.

  The Project was referred to the Commonwealth Minister for the Environment, who determined that the Project is a 'controlled action' requiring assessment and approval under the EPBC Act before it can proceed.

  The Minister's referral decision (EPBC 2022/09287), issued on 31 August 2022 stipulates that the Project is a 'controlled action' due to its potential to have a significant impact on listed threatened species and communities, and migratory species, and further stipulates that the Project will be assessed under the bilateral (assessment) agreement between the Commonwealth and Victorian Governments.

  Under the Victorian Environment Effects Act 1978, the EES process is an accredited assessment process under the bilateral (assessment) agreement.

- ***National Environment Protection (Ambient Air Quality) Measu*re (NEPM(AAQ)):** Section 14 of the National Environment Protection Council Act 1994 and the equivalent provision of the corresponding Act of each participating state and territory provides for the making of measures by the National Environment Protection Council (NEPC) and the matters to which they may relate. This Measure relates to ambient air quality.

  The desired environmental outcome of the NEPM(AAQ) is ambient air quality that minimises the risk of adverse health impacts from exposure to air pollution.

  The NEPM(AAQ) requires participating jurisdictions to undertake monitoring, evaluation and reporting activities that allow communities to understand their local air quality and assist the formulation of air quality policies. It provides a focus for air quality issues and drives all jurisdictions to work towards nationally consistent monitoring techniques and reporting. The NEPM(AAQ) does not compel or direct pollution control measures.

  EPA Victoria is responsible for the regulation, monitoring, assessment and reporting of air pollution in Victoria. Pollutant concentrations measured at EPA's ambient air monitoring stations are compared against the NEPM(AAQ) standards. EPA monitors and assesses a range of indicators including CO, NO2, SO2, and particulate matter (PM_{10} and $PM_{2.5}$).

In April 2021, the NEPC approved a variation to the NEPM(AAQ) standards for O_3, NO_2 and SO_2. A variation to the NEPM(AAQ) was registered on 26 May 2021. The changes reflect the most recent evidence emerging about the health effects of air pollutants.

In the 2021 review, Ministers agreed to commence a further review of the O_3, NO_2 and SO_2standards in 2025; noting reviews of the $PM_{2.5}$ and annual PM_{10} standards are also planned. This includes reduced concentration goals for $PM_{2.5}$ that regulators should seek to achieve by 1 January 2025.

The NEPM(AAQ) is not an active piece of legislation in Victoria, as the Federal Government has no jurisdiction over environmental matters within the States. However, this assessment has anticipated EPA will review the ERS in future to align with NEPM(AAQ) where any standards in the NEPM(AAQ) are more conservative than in the ERS.

The regulatory air quality objectives adopted for the Project are informed by the NEPM(AAQ) including the 2025 goals for $PM_{2.5}$, and therefore reflect the most recent evidence emerging about the health effects of air pollutants.

EPA monitoring data collected to fulfil the EPA's obligations under the NEPM(AAQ) was used to inform the air quality impact assessment for the Project.

4.3 State legislation

State legislative requirements relevant to the Project and this assessment are summarised below:

- ***Environment Effects Act 1978*:** The Environment Effects Act 1978 (Environment Effects Act) provides for the assessment of projects that may have a significant effect on the environment by enabling the Minister administering the Act to decide that an EES should be prepared. An EES may be required where:
  - There is a likelihood of regionally or State significant adverse environmental effects
  - There is a need for an integrated assessment of social and economic effects of a project or relevant alternatives
  - Normal statutory processes would not provide a sufficiently comprehensive, integrated, and transparent assessment.

  The process under the Environment Effects Act is not an approval process in itself; rather it is an assessment process that enables statutory decision-makers to make decisions about whether a project with potentially significant environmental effects should proceed.
- ***Environment Protection Act 2017 (Environment Protection Act):*** The Environment Protection Act is a risk-based approach to preventing environmental harm and includes a GED. The GED requires people to take reasonably practicable steps to eliminate, or otherwise reduce risks of harm to human health or the environment from pollution and waste. Doing what is reasonably practicable means putting in proportionate controls to mitigate or minimise the risk of harm.

  In addition to the GED, duties under the Environment Protection Act relevant to air quality include the duty to respond to harm (s.31) and the duty to notify of an incident (ss. 32- 33).
- ***Environment Reference Standard* (ERS):** The ERS (Victoria Government 2021) is a subordinate instrument made under the Environment Protection Act. The ERS was gazetted on 26 May 2021. The ERS identifies environmental values for Victoria in the areas of air quality, noise, water and contaminated land; and defines indicators and objectives to measure those values.

  The ERS supports the protection of the environment from pollution and waste by providing a benchmark to assess and report on environmental conditions in the whole or any part of Victoria. The ERS does not set out enforceable compliance limits; rather, risks of harm to human health and the environment from pollution and waste must be minimised as far as reasonably practicable, in accordance with the GED. The ERS works alongside the GED.

The air quality objectives defined in the ERS informed the objectives for air quality for the Project. These are listed below in **Table 4-1**.

Table 4-1. ERS air quality objectives

Environmental indicator (air pollutant)	Averaging period	ERS maximum concentration objective[3]	ERS permissible exceedances[1]
Particles as PM_{10}	1 day	50 µg/m^3	None
	1 year	20 µg/m^3	None
Particles as $PM_{2.5}$	1 day	25 µg/m^3	None
	1 year	8 µg/m^3	None
NO_2	1 hour	80 ppb	1 day/year
	1 year	15 ppb	None
CO	8 hours[2]	9.0 ppm (9000 ppb)	1 day/year
SO_2	1 hour	75 ppb	1 day/year
	1 day	20 ppb	1 day/year
Visibility reducing particles (minimum visual distance)	1 hour	20 Km	3 days/year
Odour (qualitative objective)	Not applicable	An air environment that is free from offensive odours from commercial, industrial, trade and domestic activities	Not applicable

[1] Maximum allowable exceedances of concentration standard in one calendar year.

[2] Rolling 8-hour average based on 1-hour averages.

[3] Mass concentrations for particles in ERS are referenced to gas conditions of 0°C, 101.3 kPa

EPA Victoria is likely to amend the ERS at some stage in regard to the 24-hour average $PM_{2.5}$ goal of 20 µg/m^3 and the annual average $PM_{2.5}$ goal of 7 µg/m^3. The timeframe for when such changes may come into effect is unknown, but it is likely that the change to the $PM_{2.5}$ goals would occur before or during the construction period for the Project.

4.4 Supporting guidelines

The ERS combined with 'Publication 1961: Guideline for assessing and minimising air pollution', (Publication 1961) (EPA, February 2022a) provide the basis for assessing air quality in Victoria. In addition, there are a range of EPA guidelines applicable for various industries and activities that also require consideration. These include:

- 'Publication 1834.1: Civil construction, building and demolition guide', (Publication 1834.1), (EPA, September 2023)
- 'Publication 1823.1: Mining and quarrying - guide to preventing harm to people and the environment', (Publication 1823.1), (EPA, July 2021)
- 'Publication 1949: Separation distance guidelines replacing Publication 1518: Recommended separation distances for industrial residual air emissions – guideline', (Publication 1949), (EPA, August 2024)
- 'Publication 1943: Guidance for assessing nuisance dust', (Publication 1943), (EPA, June 2022b)

- 'Publication 1806: Reducing risk in the premixed concrete industry' (Publication 1806), (EPA, December 2019a)
- 'Publication 1730: Solid storage and handling guidelines', (Publication 1730), (EPA, July 2019b)
- 'Publication 1894: Managing soil disturbance: guidance sheet', (Publication 1894), (EPA, September 2020a)
- 'Publication 1895: Managing stockpiles: guidance sheet', (Publication 1895), (EPA, July 2019c)
- 'Publication 1897: Managing truck and other vehicle movement: guidance sheet', (Publication 1897) (EPA, September 2020b).

The relevance of each of these publications to the Project is summarised in **Table 4-2** below:

Table 4-2. Relevant EPA requirements

EPA publication	Relevance to the Project
Publication 1961: Guideline for assessing and minimising air pollution	In February 2022, EPA Victoria released Publication 1961 (EPA 2021b). The guideline provides a framework to assess and control risks associated with air pollution in the form of a technical guideline for air quality practitioners and specialists. The guideline provides a tiered approach to the assessment of risks from air pollution, with three levels of assessment in order of increasing complexity that define the role of atmospheric dispersion modelling and monitoring intended by EPA Victoria within the Environment Protection Act and GED framework. Air quality assessment criteria are defined in the guideline for air pollutants for comparison with dispersion modelling results. For the Project, the relevant air quality criteria adopted are from the relevant objectives specified in the ERS. Should the ERS be updated at any point in time (for example to implement a variation to the NEPM (AAQ)), then this updated ERS objective would apply as the air quality criteria. Key elements of the guideline have been incorporated into this impact assessment, where relevant. Publication 1961 does not provide methodologies for conducting atmospheric dispersion modelling, nor for assessment of odour or nuisance dust; although Publication 1961 does refer to other guidelines that cover these issues This assessment was undertaken in general accordance with the methods outlined in these publications as well as the outcomes of stakeholder engagement (discussed further below).
Publication 1834.1: Civil construction, building and demolition guide	In November 2020, EPA published Publication 1834.1. This guide replaced EPA Publication 480: Best Practice Environmental Guidelines for Major Construction Sites (EPA Victoria 1996). Publication 1834.1 provides an overview of: ▪ Duties under the Environment Protection Act ▪ Activities that may lead to erosion and the generation of sediment and dust ▪ Potential impacts of sediment and dust ▪ Factors to consider in understanding erosion, sediment and dust generation ▪ Controls and/or mitigation measures that can be implemented to minimise the generation and transport of dust, and manage risk associated with dust emissions from activities associated with civil construction, building, and demolition.

EPA publication	Relevance to the Project
	Controls and mitigation measures from Publication 1834.1 and other relevant guidelines suitable for addressing the risks determined in the impact assessment have been applied.
Publication 1823.1: Mining and quarrying - guide to preventing harm to people and the environment	Publication 1823.1 provides guidance for businesses to manage risks of harm from pollution and waste, including dust. The guideline details a four-step process towards achieving this objective: ▪ **Step 1:** Identify any hazards from your business activities that could cause harm. ▪ **Step 2:** Assess the risk, based on the likelihood of the hazard causing harm, and the consequence of that harm. ▪ **Step 3:** Implement suitable control measures, based on what is reasonably practicable for your business, with the aim of choosing the highest level of protection and reliability. ▪ **Step 4:** Check controls regularly to make sure they are working, well maintained, effective and remain the most appropriate option. This process includes monitoring control measures and identifying any changes that may need to be made to improve their effectiveness. The guideline details common activities that can lead to the generation of dust and refers to guidance detailing ways that the emissions can be effectively managed. This guidance was considered in the identification of the risk air quality-related risks associated with the Project, and well as the recommendations for management.
Publication 1949: Separation distance guidelines replacing Publication 1518: Recommended separation distances for industrial residual air emissions – guideline	Publication 1949 provides guidance to support land use and development decisions that: ▪ Protect the community from human health and amenity risks associated with unintended offsite odour and dust generated by industry/activity ▪ Protect industry/activities from inappropriate land use and development nearby that may constrain operations. The guideline supports decision-makers to direct land use and development to the most appropriate locations based on the level of risk. It also supports planning decision-makers to prevent underuse of land adjacent to industrial land by identifying compatible land uses within a separation distance. Separation distances are intended to accommodate both routine or day-to-day emissions and unintended offsite emissions. Where there is routine or day to day emissions from a premises, there may still be unintended offsite emissions experienced at or beyond the boundary of the source premises. Separation distances are intended to allow unintended emissions to disperse, and in doing so, minimise human health and amenity risks for any nearby sensitive land uses. It is noted that unintended offsite emissions that separation distances account for do not extend to those resulting from major abnormal weather conditions, major accidents, or major equipment failure from activities. This guidance was considered as part of the mitigation-in-design of the Project.

EPA publication	Relevance to the Project
Publication 1806: Reducing risk in the premixed concrete industry	The guideline provides a practical guide to support operators of concrete batching plants to manage risk of harm to human health and the environment through good industry practice. The guide provides example of a risk-based approach to manage and assess the risks and includes a control options checklist for air quality outcomes. This guidance was considered as part of the mitigation and management measures developed for the Project.
Publication 1730: Solid storage and handling guidelines	The guideline provides information on storage and handling of solid materials, including powders, granules and pellets. Examples of practical controls to prevent spills and loss of materials to the environment are also provided. This includes dust emissions. This guidance was considered as part of the mitigation and management measures developed for the Project.
Publication 1894: Managing soil disturbance: guidance sheet	Guidance sheet describing how to eliminate or reduce the risk of harm from erosion, sediment and dust from exposed soil. This guidance was considered as part of the mitigation and management measures developed for the Project.
Publication 1895: Managing stockpiles: guidance sheet	Guidance sheet describing how to eliminate or reduce the risk of harm from erosion, sediment and dust from stockpiles. This guidance was considered as part of the mitigation and management measures developed for the Project.
Publication 1897: Managing truck and other vehicle movement: guidance sheet	Guidance sheet describing how to eliminate or reduce the risk of harm from erosion, sediment and dust from truck and other vehicle movement. This guidance was considered as part of the mitigation and management measures developed for the Project.

5. Methodology

5.1 Overview

This section of the report describes the key steps that were applied to assess the potential air quality-related impacts of the Project. These steps included:

- Determining the study area (**Section 5.2**)
- Characterising the key features of the existing environment (**Section 5.3**)
- Stakeholder engagement (**Section 5.4**)
- Assessing the potential for impacts and developing controls, monitoring and EPRs (**Section 5.5**).

5.2 Study area

The scoping requirements (DTP, 2024) require that the EES considers impacts to amenity (including nuisance air quality effects) for sensitive receptors within 3 km of the Project. This is conservative, with guidance from other risk local and international guidelines including the 'CASANZ Good Practice Guide for the Assessment and Management of Air Pollution from Road Transport Projects' (CASANZ GPG), (Clean Air Society of Australia and New Zealand [CASANZ], 2023) and the 'Guidance on the assessment of dust from demolition and construction Version 2.2' (GADDC), (United Kingdom Institute of Air Quality Management [UK IAQM], 2024) recommending distances of around 500 m or less. Still, the study area was applied consistent with the scoping requirements.

5.3 Existing environment

Key features of the existing environment as relevant to air quality include:

- Topography
- Surrounding sensitive receptors and land uses
- Local climate and meteorology
- Existing sources of emissions to air
- Background air quality.

Table 5-1 below describes how each of these aspects of the existing environment around the Project were characterised:

Table 5-1. Approaches for characterising key features of the existing environment

Feature	Source
Topography	▪ Indicative topography around the site determined from NASA Shuttle Radar Topography Mission (SRTM) 1 second (30 metre) resolution dataset
Land use and sensitive receptors	▪ Planning and Land Use Maps from VicPlan (https://mapshare.vic.gov.au/vicplan/) ▪ Sensitive receptors identified using client information and aerial imagery
Local climate and meteorology	▪ Hourly temperature, rainfall, humidity, wind speed and direction recorded collected from the Commonwealth Bureau of Meteorology's (BoM's) station operated at Mortlake Racecourse (Station no. 090176) ▪ Wind speed and direction data from on-site meteorological station

Feature	Source
Existing sources of emissions to air	▪ National Pollutant Inventory (NPI) Facilities Dataset for 2022/ 23 reporting year
Background air quality	▪ EPA annual datasets for Alphington, downloaded from Data Vic (https://www.data.vic.gov.au/).

5.4 Stakeholder engagement

Stakeholders were consulted to support the preparation of this report and to inform the development of the Project and understanding of its potential impacts. **Table 5-2** lists specific engagement activities and matters discussed and raised that occurred in relation to air quality.

Table 5-2. Stakeholder engagement undertaken for AQIA

Stakeholder	Matters discussed/raised
EPA	▪ Positioning of access tracks and other key features ▪ Controls to limit emissions from vehicle movements along exposed surfaces ▪ Application of the assessment methods, including confirmation of Level 1 assessment approach
DTP Impact Assessment Unit (IAU)	▪ Data used to characterise local climate conditions ▪ Categorisation of recommended avoidance, minimisation and mitigation measures ▪ Review of air quality management experiences from neighbouring wind farm developments.

5.5 Impact assessment

The overall method for the air quality impact assessment included:

- Identifying key issues (as described in **Section 3.4**) to be addressed in the impact assessment
- Potential air quality impacts from the Project were determined in a manner generally consistent with Publication 1961. A Level 1 assessment methodology was discussed and agreed with the EPA as part of the assessment process.

  Noting construction dust was identified as the key air quality-related issue, associated risk of impacts was initially considered using the guidance presented in 'Publication 1949: Separation distance guidelines'.

  Based on the outcomes of this review, construction nuisance dust impacts were assessed in line with Publication 1943. Initial unmitigated impact ratings were determined as summarised below in **Table 5-3**:

Table 5-3. Construction dust impact ratings (Source: EPA, 2022)

Score	Impact rating	Comment
32-36	Very high	Dust impact almost certain. Nuisance dust impacts will occur. Any interventions to reduce impacts in either the source, pathway or receiving environment are unlikely to be practical so effective mitigation is doubtful.
27-31	High	Dust impacts highly likely to occur. Significant nuisance dust to occur, and impacts are highly likely. There may be some interventions that can be

Score	Impact rating	Comment
		applied to reduce the impacts, but it is likely that significant re-engineering or redesign will be required.
22-26	Medium	Dust impacts likely. Some nuisance dust impacts to occur and without careful and considered application of mitigation measures it is likely to cause impacts. The focus should be what can be done to break the source-pathway-receiving environment chain.
17-21	Moderate	Dust impacts only likely to occur on rare occasions. Although there may be some residual nuisance dust impacts, it is possible it can be practically and effectively managed.
12-16	Low	Dust impacts are not likely and any would be minimal.
-	Negligible*	Any dust impacts are extremely unlikely to occur.

* Note: additional category added to Publication 1943 categories to account for circumstances where dust impacts would not occur

To address the initial, unmitigated impacts determined, mitigation and management measures were developed with reference to relevant guidance from:

- 'Publication 1834.1: Civil construction, building and demolition guide', (Publication 1834.1), (EPA, September 2023)
- 'Publication 1823.1: Mining and quarrying - guide to preventing harm to people and the environment', (Publication 1823.1), (EPA, July 2021)
- 'Publication 1806: Reducing risk in the premixed concrete industry' (Publication 1806), (EPA, December 2019a)
- 'Publication 1730: Solid storage and handling guidelines', (Publication 1730), (EPA, July 2019b)
- 'Publication 1894: Managing soil disturbance: guidance sheet', (Publication 1894), (EPA, September 2020a)
- 'Publication 1895: Managing stockpiles: guidance sheet', (Publication 1895), (EPA, July 2019c)
- 'Publication 1897: Managing truck and other vehicle movement: guidance sheet', (Publication 1897) (EPA, September 2020b).

- Other air quality-related impacts were qualitatively assessed consistent with Publication 1961 Level 1 requirements. Potential impacts associated with these matters with reference to the ratings below in **Table 5-4**. Based on these outcomes, mitigation and management measures were recommended, consistent with the requirements of the GED.

Table 5-4. Exhaust emissions and/or odours/airborne hazards impact assessment ratings

Impact rating	Comment
Very high	Exhaust emissions and/or odours/airborne hazards and/or non-construction dust impacts almost certain. Interventions to reduce impacts in either the source, pathway or receiving environment are unlikely to be practical so effective mitigation is doubtful.
High	Exhaust emissions and/or odours/airborne hazards and/or non-construction dust impacts highly likely to occur. Significant impacts to occur, and impacts are highly likely. There may be some interventions that can be applied to reduce the impacts, but it is likely that significant re-engineering or redesign will be required.

Impact rating	Comment
Medium	Exhaust emissions and/or odours/airborne hazards and/or non-construction dust impacts likely. Some impacts to occur and without careful and considered application of mitigation measures it is likely to cause impacts. The focus should be what can be done to break the source-pathway-receiving environment chain.
Moderate	Exhaust emissions and/or odours/airborne hazards and/or non-construction dust impacts only likely to occur on rare occasions. Although there may be some residual impacts, it is possible it can be practically and effectively managed.
Low	Exhaust emissions and/or odours/airborne hazards and/or non-construction dust impacts are not likely and are expected to be minimal.
Negligible	Exhaust emissions and/or odours/airborne hazards and/or non-construction dust impacts are extremely unlikely to occur.

- Identifying any other potential developments that could lead to cumulative impacts when considered together with the Project and assessing these effects.
- Preparing EPRs to define the minimum environmental outcomes that Project must achieve. EPRs will form the final requirements as a condition of the Project's approval and will be achieved through the implementation of measures to avoid, mitigate and manage impacts.
- Determining the residual impacts associated with the construction, operation, and decommissioning of the Project, and evaluating their significance in accordance with the criteria described above.

6. Existing Environment

Aspects of the existing environment are described in this Section. Details of surrounding topography, existing land uses and sensitive receivers, local climate and meteorology, existing sources of emissions to air and background air quality conditions are provided.

6.1 Topography

An understanding of local topography around the Project is important, in particular how it can affect meteorology at a local scale, and consequentially how emissions to air disperse and affect surrounding sensitive receptors. The Project and surrounding areas are relatively flat, with elevations varying between approximately 100 and 150 metres above sea level across the project area. Key features including site topography, sensitive receptor locations, site access roads, wind turbine locations, concrete batch plants, on-site quarry and terminal station / BESS and site offices (green) are shown in **Figure 6-1**.

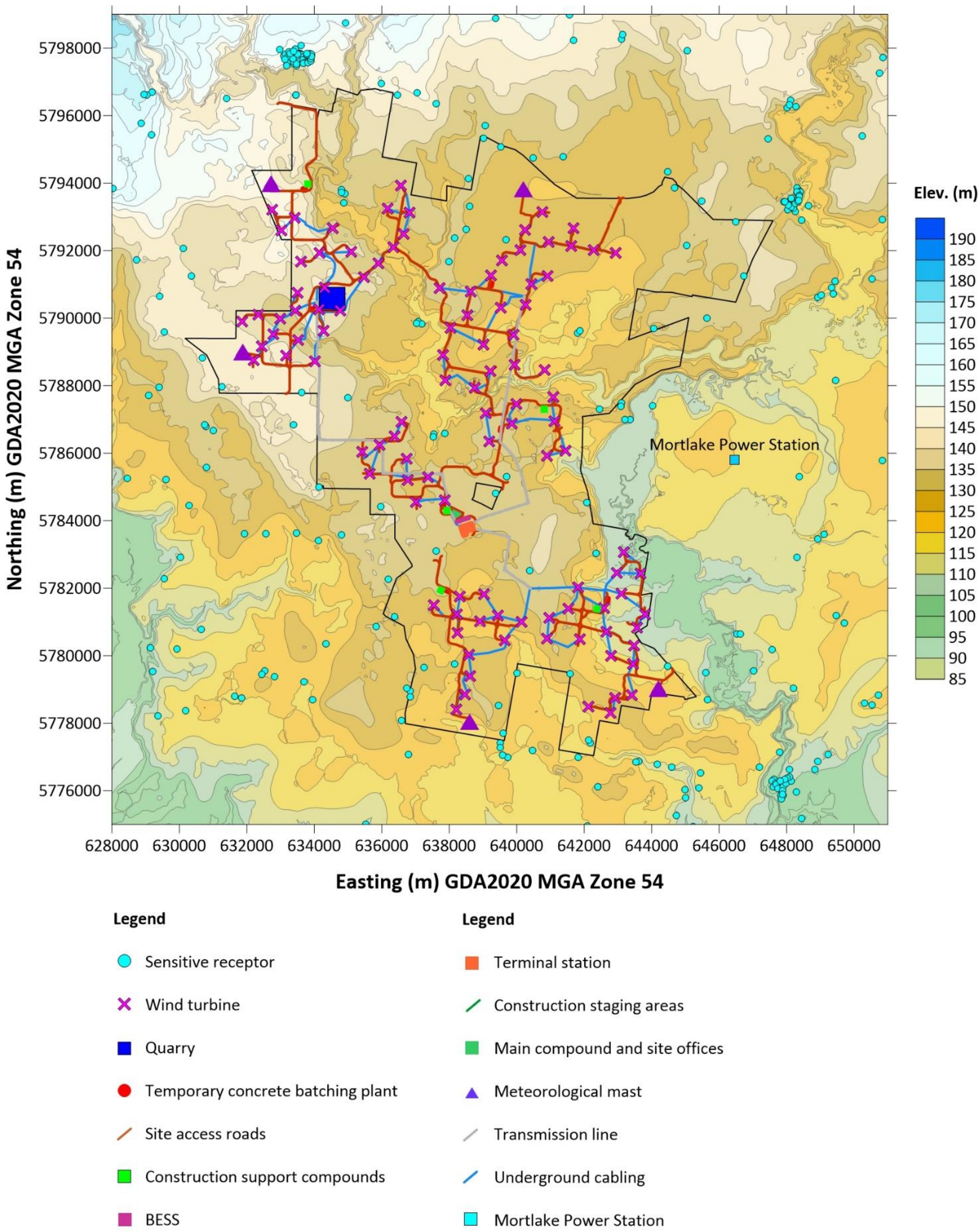


Figure 6-1. Project topography, dust sources and sensitive receptor locations

6.2 Land Use and sensitive receptors

The proposed wind farm site and surrounding area is predominantly agricultural consisting mostly of cattle and sheep grazing along with some cropping. Native vegetation is largely restricted to roadside reserves with small, isolated areas on private land. Numerous, scattered, indigenous trees exist throughout the local area.

Publication 1961 lists human sensitive receptors as including "locations such as schools, hospitals and nearby residents". The nearest sensitive receptors to the Project are displayed above in **Figure 6-1**. The minimum separation distance from different components of the Project and the identified sensitive receptors are listed in **Table 6-1**.

Table 6-1. Approximate separation distances

Activity	Estimated minimum separation distance from Project activity to nearest identified sensitive receptor (m)
Concrete batch plants	1,100
Wind turbine hardstands	800
Underground cables and overhead transmission lines	400
Access tracks	140
On-site quarry	2,300

6.2.1 Overview

For air quality assessments, meteorological conditions are crucially important for determining the direction and rate at which air pollutant emissions from a source will disperse. Typically, meteorological parameters used for modelling assessments are measured near ground-level to 10 m height and include wind speed and wind direction (typically at 10 m height), temperature, humidity, rainfall, atmospheric stability, and mixing (or boundary) layer height.

This section provides summaries of local climate and meteorological conditions representative of the site, based on observations from the nearest representative, long-term, station operated by the BoM 12 km east of the project boundary at Mortlake Racecourse.

Wind speed and wind direction monitoring data are also collected at the site at a height of 40 m above ground level, and above, using an onsite mast (location to be confirmed by the proponent). There are five permanent meteorological masts proposed for the project.

6.2.2 Climate

6.2.2.1 Temperature

Monthly means for daily minimum and maximum temperatures for BoM Mortlake Racecourse over 1991-2023 are shown in **Figure 6-2**. Mortlake Racecourse ambient temperatures are expected to be representative of the Project site.

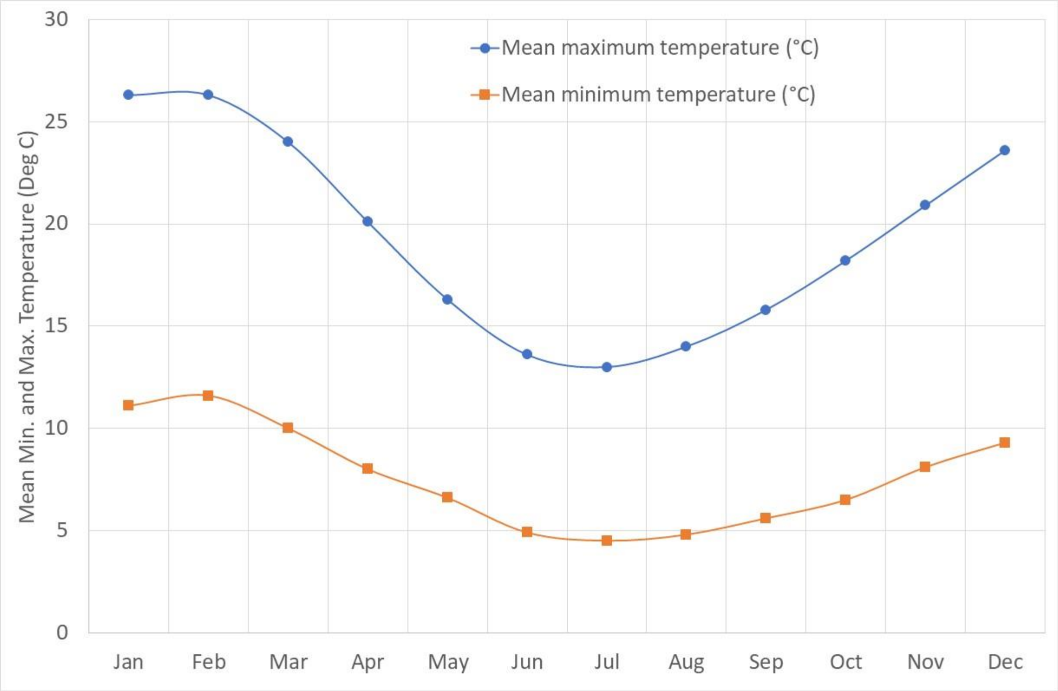


Figure 6-2. Mean minimum and mean maximum temperatures – Mortlake Racecourse 1991 – 2023 (Source: BoM, 2024)

These data confirm summer months as being hottest.

6.2.2.2 Rainfall and humidity

Mean and median monthly rainfall measured at BoM Mortlake Racecourse over 1991-2023 are shown in **Figure 6-3**.

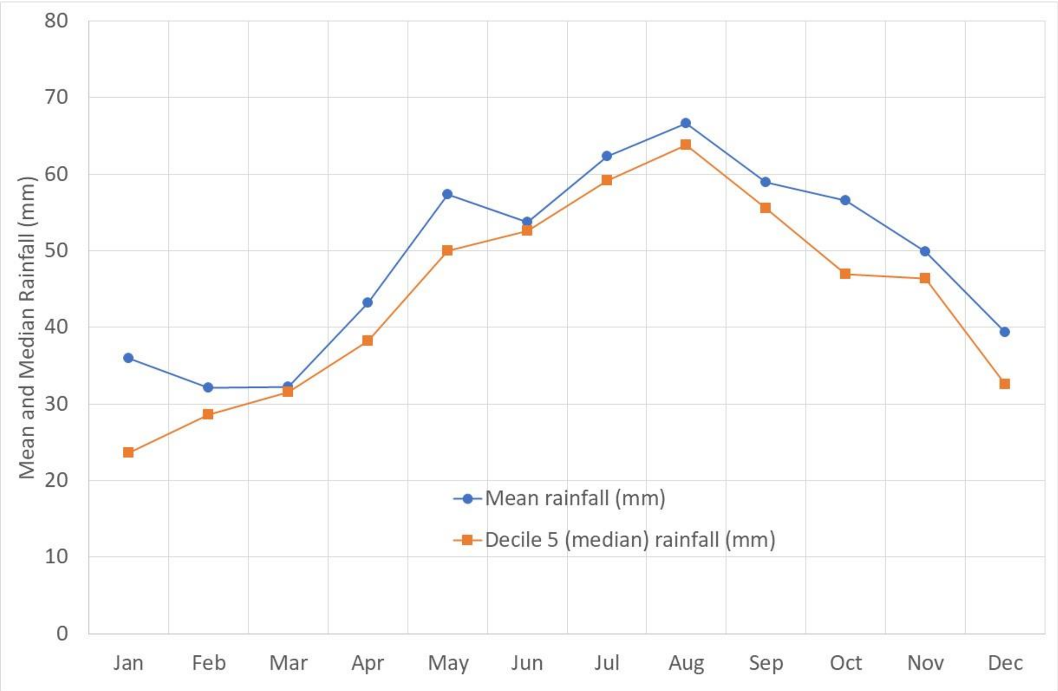


Figure 6-3. Mean and median monthly rainfall – Mortlake Racecourse 1994 – 2023 (Source: BoM, 2024)

Figure 6-3 shows the local occurrence of dry summer months. Combined with the elevated summer temperatures (**Figure 6-2**) these data confirm the risk of dust impacts being highest in summer, being hotter and drier than other times of the year.

Measured long-term morning (9am) and afternoon (3pm) monthly average humidity at the BoM Mortlake Racecourse are also displayed in **Figure 6-4**. Humidity reduces air circulation which can trap pollutants in air.

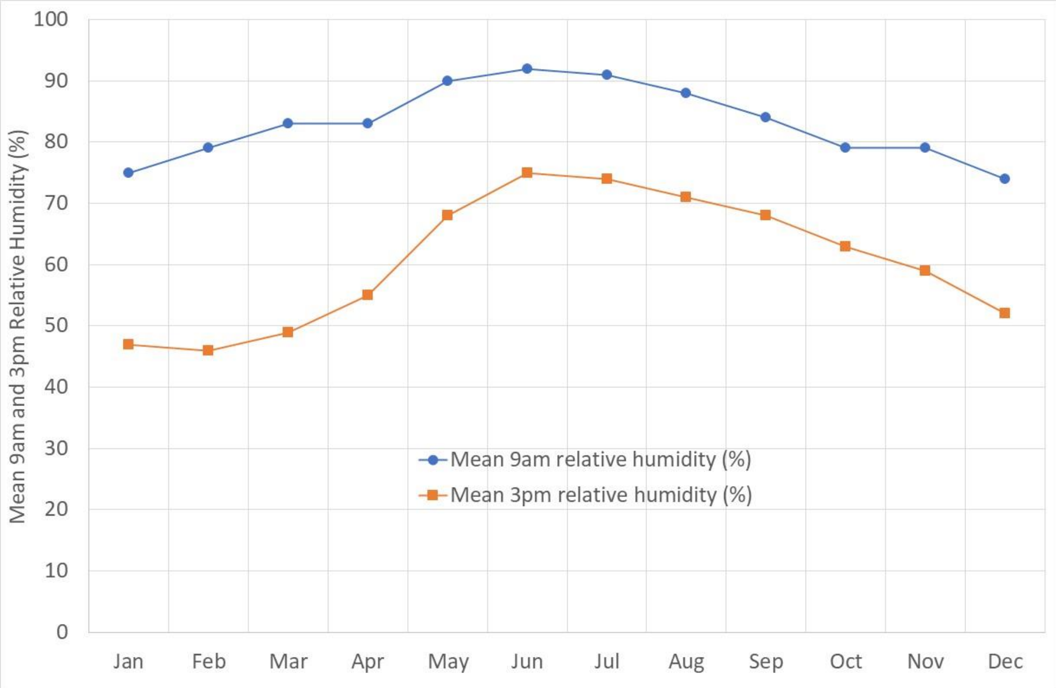


Figure 6-4. Mean 9 am and 3 pm relative humidity – Mortlake Racecourse 1991-2010 (Source: BoM, 2024)

Humidity around the Project setting was historically measured as being highest in winter months.

6.2.3 Meteorology

Monthly mean wind speed (m/s; 2003-2023) and maximum wind gusts (m/s; 2003-2023) for BoM Mortlake Racecourse are shown in **Figure 6-5**. The annual average wind speed was 3.9 m/s (2003 – 2023).

A seasonal wind rose for Mortlake Racecourse in 2022 is shown in **Figure 6-6** and shows that northerly winds are dominant in winter and milder southerly winds dominate in summer. Easterly winds are less common all year round and autumn and spring do not show any strong wind patterns. Additional wind roses are included in **Appendix A** including annual wind rose for 2012 – 2022 and seasonal wind rose for 2018 – 2021.

Meteorological data from an onsite met mast was also provided (all meteorological mast established as part of the Project are displayed above on **Figure 6-1**). A portion of this data was checked for quality and used for comparison with the BoM Mortlake Racecourse data and is also shown in **Figure 6-6**. The onsite meteorological monitoring sites collect wind speed measurements at 80 m, 60 m and 40 m and wind direction at 39 m and 76 m. The 40 m wind speed and 39 m wind direction measurements were used for the comparison, and whilst this provides a useful comparison, the data are not expected to closely align due to the differences in sensor heights, with the 40 m onsite measurements showing higher wind speeds as expected.

Acknowledging the differences in wind speeds, data from both stations expressed as wind roses below in **Figure 6-6** are similar, however the on-site data does not display the strong northerly in winter as observed at Mortlake Racecourse.

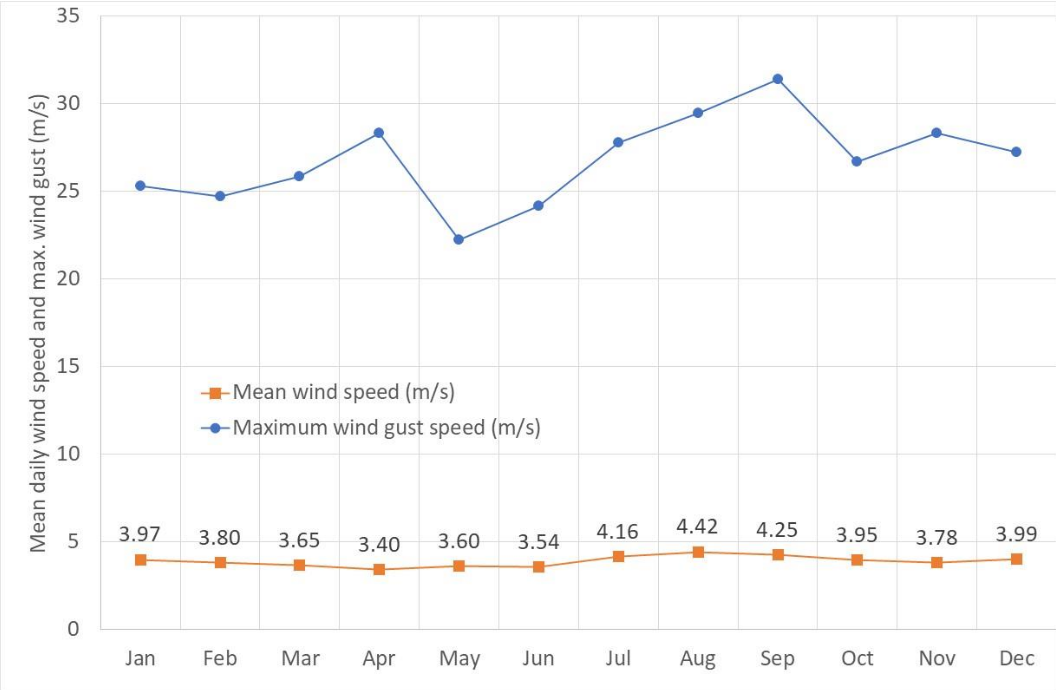
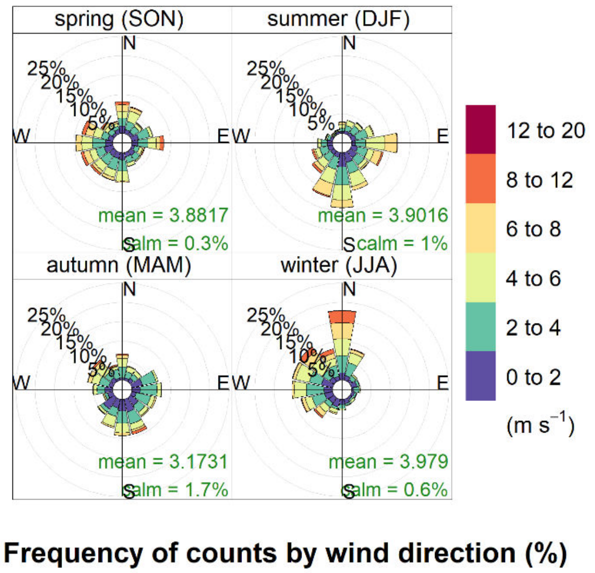
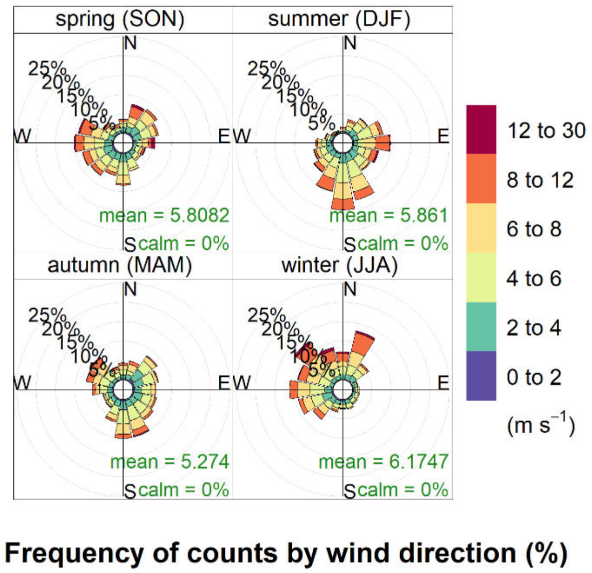


Figure 6-5. Mean wind speed and maximum wind gusts – Mortlake Racecourse 2003-2023



Mortlake Racecourse – 10 m 2022



Hexham Wind Farm – 40 m 2022

Figure 6-6. Seasonal wind rose – Mortlake Racecourse and Hexham Wind Farm 2022

Collectively, these data indicate that sensitive receptors to the north, northeast, southwest and the east may experience winds blowing in the direction from the Project most often.

6.3 Existing sources of emissions to air

The Mortlake Power Station is located approximately 3 km east of the project boundary and 12km west of Mortlake. The facility is a 566 MW gas-fired peaking power station and represents less than 3% of Victoria's installed generating capacity. For the most recent published (2023/24) NPI reporting period, the plant reported emissions for particulates, and a range of gaseous pollutants, with CO and NO_x being most relevant to the project. Air pollutant emissions from gas turbine power plants are emitted vertically with high power, so tend to be well dispersed in the atmosphere. Whilst the emissions are relevant to nearby receptors, the separation distance to the project boundary of 3km or more is sufficient that impacts to air quality within the project area would be negligible. There are no other air pollutant sources in the area reporting to the NPI.

Air quality in the project area is expected to be affected primarily by emissions from fires, wind-blown dusts due to forestry and agricultural activity, vehicles on unpaved roads and wind erosion of exposed soils.

6.4 Background air quality

Although air quality is not currently monitored extensively across regional Victoria using reference methods, some campaign monitoring has been undertaken in the past e.g. EPA (2018a). For the PM_{10}, ozone and visibility data collected for Warrnambool in 2006/07, located approximately 28 km north-northeast of the Project site, air quality was impacted on isolated days due to wood fire smoke (in winter) and bushfires. However, the measured air quality parameters were comparable with other parts of Victoria.

EPA Victoria also monitors regional air quality using sensor-based systems for $PM_{2.5}$. The Regional Sensor pilot project monitors and reports on the level of smoke in up to 50 regional Victorian towns. An EPA fact sheet on particle sensors states that ‘Particle sensors are not as accurate as traditional or more sophisticated types of air monitors. Different types of sensors, and even individual sensors of the same type can perform differently. As a result, the readings from a particle sensor should only be taken as a guide, rather than a precise measurement of air pollution’ (EPA, 2019d). As such, data from the sensor network is not usually used in air quality assessments and was not used for this assessment.

6.4.1 Airborne particulate matter (i.e., PM_{10} and $PM_{2.5}$)

Historical EPA monitoring data for ambient air levels of PM_{10} and $PM_{2.5}$ from various stations are available across the Port Phillip and Latrobe Valley regions. Continuous monitoring for both PM_{10} and $PM_{2.5}$ is undertaken at Alphington, Footscray, Geelong and Traralgon stations. Of these stations, Alphington was selected to represent background air quality for the Project region. While Alphington’s air quality is influenced by urban road traffic, in general the particulate matter levels there are not as affected by local sources as strongly as they are at Footscray and Geelong and have been used to represent background air quality for regional Victorian locations in past assessments i.e. Jacobs, 2022; Jacobs, 2018. The particulate matter levels measured in the Latrobe Valley (Traralgon), would be associated with brown coal-fuelled electricity production such as open cut mining, so also were not representative for this assessment.

The long-term trends for PM_{10} and $PM_{2.5}$ for the Alphington monitoring station are provided in **Figure 6-7** and **Figure 6-8** (EPA, 2016; EPA 2021b). Major bushfires events in eastern Victoria in 2019-2020 contributed to the elevated $PM_{2.5}$ and PM_{10} levels in 2019 and 2020.

In 2018, the elevated $PM_{2.5}$ and PM_{10} levels were influenced by urban sources such as domestic wood heating on cold, still nights, land burns and wind-blown dust (EPA, 2019c).

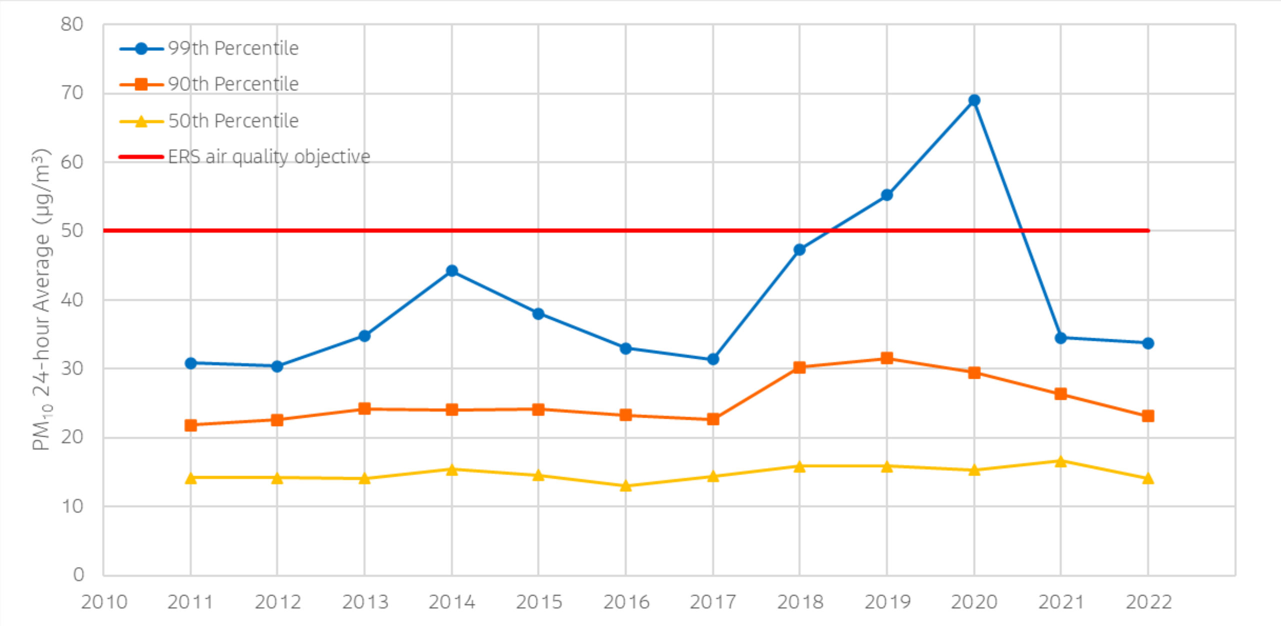


Figure 6-7. 24-hour average PM_{10} trend - Alphington 2011 - 2020

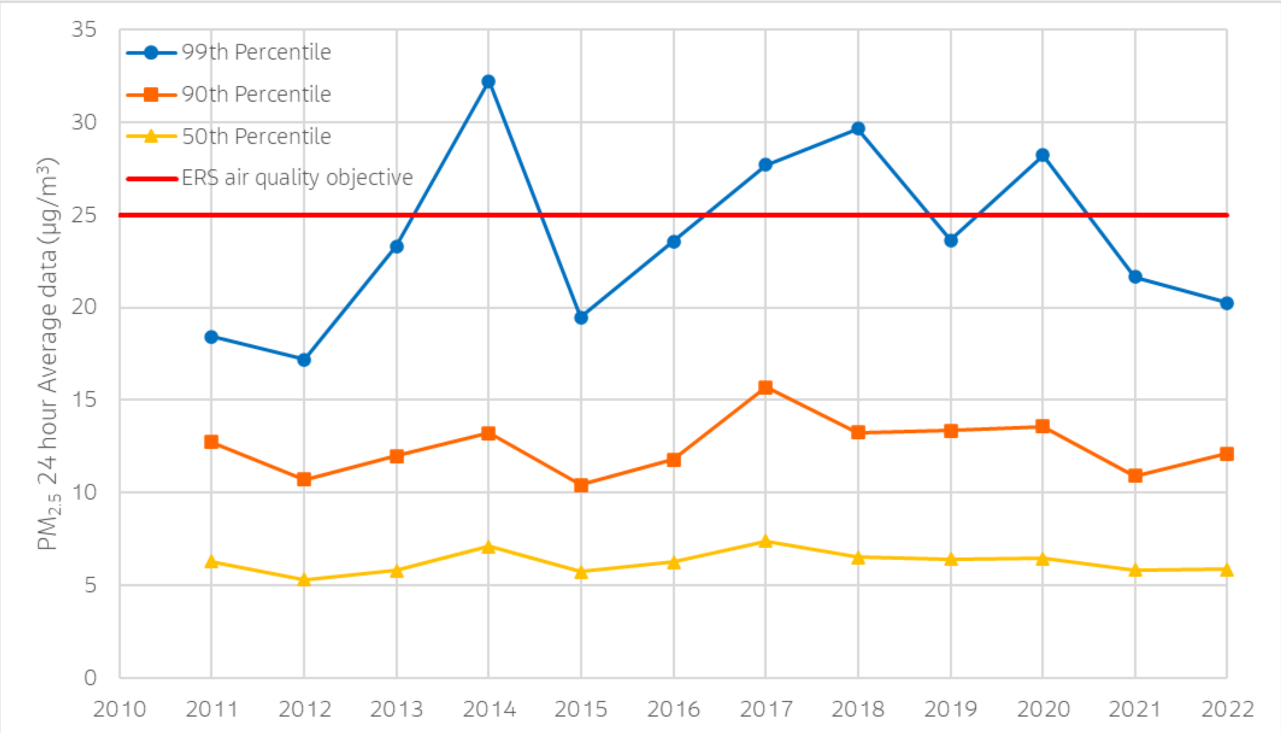


Figure 6-8. 24-hour average $PM_{2.5}$ trend - Alphington 2011 – 2020

These data indicate:

- **24-hour averaged PM_{10}:** 90th and 50th percentile 24-hour averaged PM_{10} concentrations remained below the 50 µg/m³ ERS air quality objective. 99th percentile concentrations occasionally exceeded this objective.
- **24-hour averaged $PM_{2.5}$:** 90th and 50th percentile 24-hour averaged $PM_{2.5}$ concentrations were also measured below the ERS air quality objective (25 µg/m³). 99th percentile concentrations also occasionally exceeded this objective.

These results suggest that representative particulate matter air quality conditions around the Project site are generally below ERS objectives, with some occasional exceedances likely to be attributable to wider regional events. Noting the proximity to Mortlake Power Station, it is expected that air quality across the region surrounding the proposed wind farm is better in comparison to that around Alphington (located within Melbourne-Geelong Airshed) that was adopted for the purpose of the assessment, which is subject to elevated concentrations of gaseous and particulate pollutants surrounding transport, industry and commercial/domestic activities.

6.4.2 Other Air Pollutants

Relatively low levels of gaseous pollutants such as NO_2, SO_2 and CO would be expected in the Project site locality due to various local and distant sources such as vehicle movements, domestic wood heaters, other combustion processes and long-range transport from population centres. The only major emission source reporting to the NPI for these gases is the Mortlake Power Station, located approximately 3 km from the project boundary (see **Section 6.3** above). The separation distance to significant sources of emissions and the very minor emission sources within the Project boundary mean that existing concentrations of these pollutants within the project area would be negligible.

Respirable crystalline silica (RCS) is created during activities such as cutting, grinding, and drilling of materials such as stone, rock, concrete and mortar. There are no known activities in the study area which would generate RCS dust, as such it is expected that concentrations of RCS are negligible for the project site.

7. Impact assessment

7.1 Overview

This section assesses the potential for air quality impacts associated with the Project based on the method of assessment detailed in **Section 5.5**.

7.2 Construction dust

7.2.1 Separation distance initial review

As outlined in **Section 5.5**, the initial assessment step in the assessment involved a review of set-back distances for activities published in Publication 1949. This process is displayed in **Figure 7-1**.

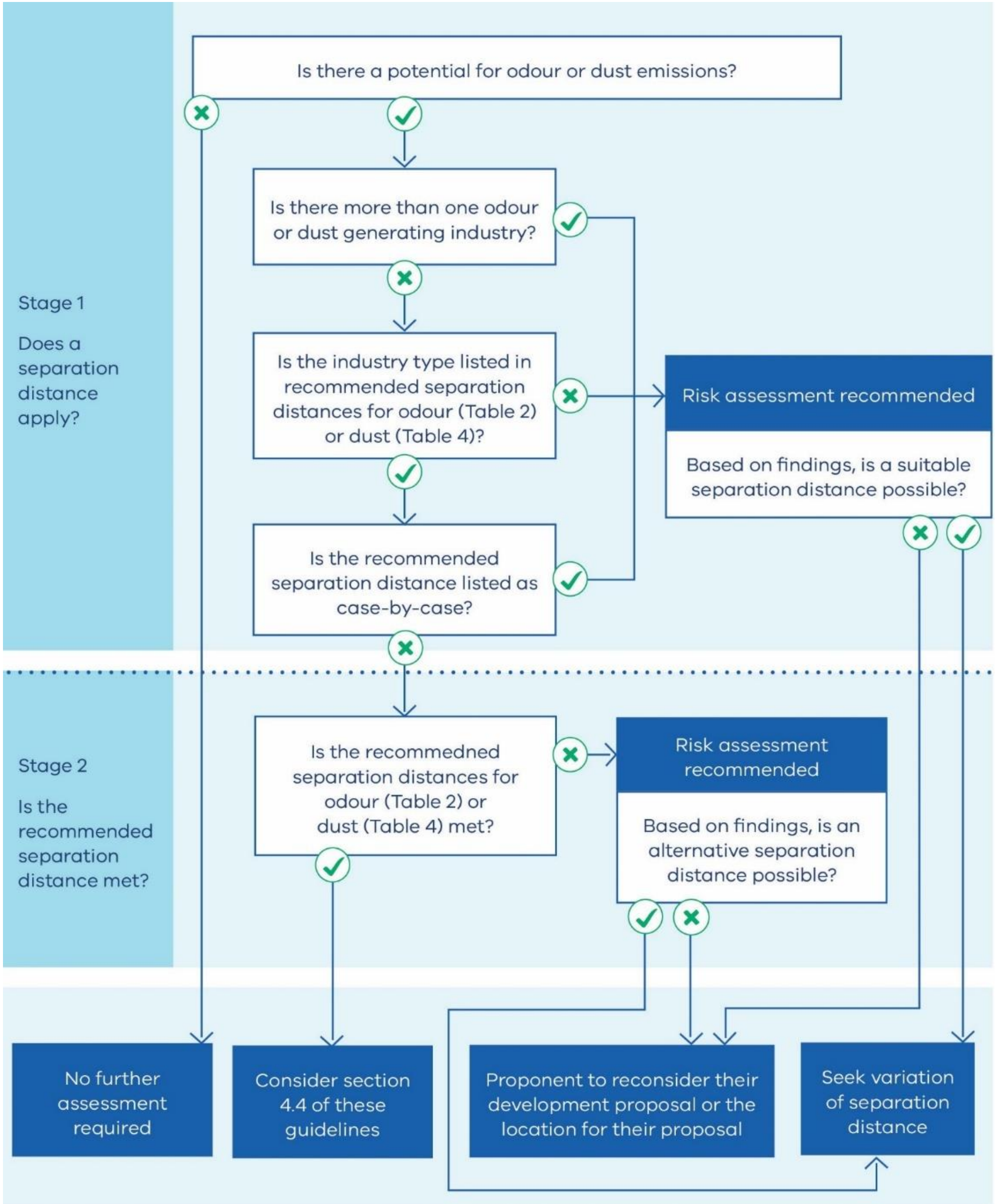


Figure 7-1. Separation distance decision-making process for odour or dust – proposed industrial use/development (Source: EPA, 2024)

Details of the Project were reviewed, and two activities were identified with published recommended sensitive receptor separation distances. These distances are reproduced below in **Table 7-1**.

Table 7-1. Publication 1949 setback distances for activities relevant to the Project (Source: EPA, 2024)

Industry type	Industry activity/definition	Scale and description	Recommended separation distance (m)	Further guidelines, references, and exceptions
Concrete plant	Production of concrete	> 5,000 t/yr	100	EPA publication 1751: Planning guidance for concrete batching
Quarry	Quarrying, crushing, screening, stockpiling and conveying of rock	Without blasting	500	EPA Publication 1961: Guideline for Assessing and Minimising Air Pollution in Victoria
		With blasting		
		With respirable crystalline silica		

Then nearest sensitive receptors in relation to these activities are listed in **Table 6-1** As listed, the nearest sensitive receptor to any of the proposed concrete batching plants is around 600 m away. This is greater than the 100m recommended setback distance list above. Similarly, regarding the on-site quarry, the nearest sensitive receptor is around 2,300 m away. This is more than four times the recommended setback distance for quarrying activities from Publication 1949. In the context of the assessment process displayed in **Figure 7-1,** it was determined that the Project includes activities wherein setback distances apply (i.e., Stage 1), and that these setback distances would be comfortably met (i.e., Stage 2). Consistent with **Figure 7-1** and sections 4.4 and 6.2 of Publication 1949, further assessment of construction dust impacts was completed using the method outlined in Publication 1943 to ensure that there are no other factors that could impact the outcomes of the review and recommended setback distance, and to inform required mitigation and management measures.

7.2.2 Nuisance dust review

7.2.2.1 Overview

Publication 1943 provides a framework for assessing nuisance dust impacts. This framework is consistent with the overarching provisions of the GED to 'eliminate or minimise the risks posed by hazards to prevent harm'. The framework assesses the risk posted by nuisance dust by considering three elements:

- **Step 1:** The hazard potential of dust sources. This is evaluated based on the size, nature of activities, type of emissions generated and level of control.
- **Step 2:** The exposure pathway between the source and receiving environment. The framework considers the separation distance, orientation, and intervening terrain and land uses features between the activity or project and the surrounding receivers.
- **Step 3:** The sensitivity of the receiving environment. This aspect considers the historical context of air quality-related issues experienced by people in the receiving environment, as well as the overall land use across this setting.

As displayed below in **Figure 7-2** these outcomes from **Steps 1**, **2** and **3** are combined to determine the overall risk of dust impacts from an activity or project (**Step 4**), with the final outcome being any residual impacts once planned mitigation and management measures are applied.

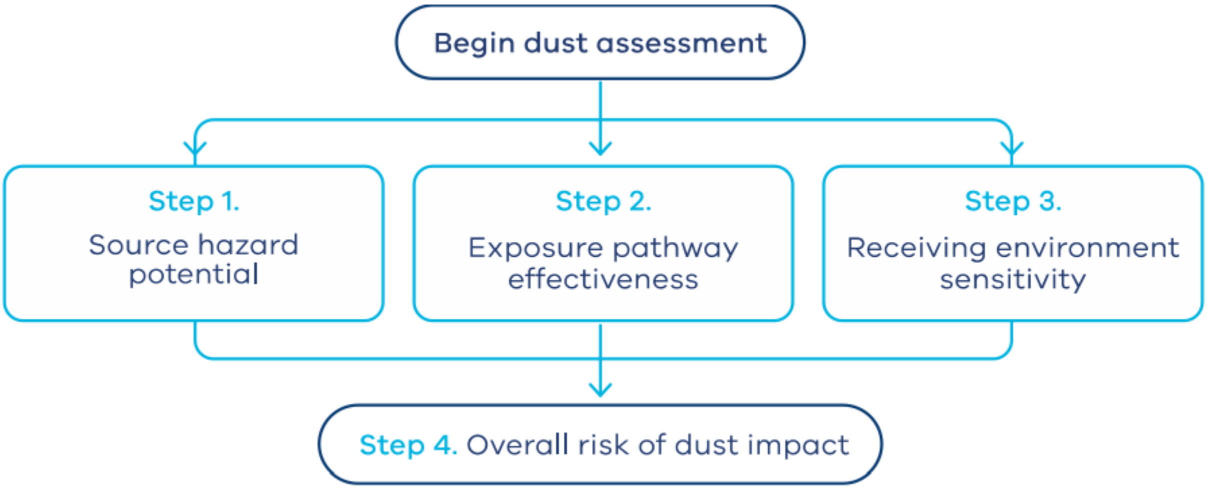


Figure 7-2. Nuisance dust risk assessment framework (Source: EPA, 2022b)

7.2.2.2 Step 1: Hazard potential of dust sources

Step 1 of the Publication 1943 nuisance dust assessment method involves evaluating the potential for an activity or source to generate nuisance dust emissions, as well as the characteristics of the dust emissions. The method considers the size of the potential dust emission sources, nature of activities to be undertaken, the type of dust emissions (relating to the material type), and the ease of control of emissions.

Details of key dust nuisance sources relevant to this step are provided in **Table 7-2**. This information was used to inform the ratings defined in columns two, three, four and five below in **Table 7-3**.

Table 7-2. Summary of nuisance dust sources

Activity	Approx. separation distance to nearest sensitive receptor (m)	Intensity (i.e. magnitude and/or scale of the works)	Comment
Construction of internal access tracks	140	345,600 m^3 aggregate	Total of around 134.6 kilometres of new access track construction.
Construction of 26 temporary laydown / staging areas	200	70,200 m^3 aggregate	2,700 m^3 or aggregate per laydown / staging area, 300 m x 15m in size.
Establishment and use of seven temporary concrete batch plants	600	-	Would be used for the duration of construction to facilitate Project construction
Construction of temporary construction compounds	1,100	-	
Establishment and use of on-site quarry	2,300	1,400,000 m^3 of material handled (including topsoil, overburden and product)	Blasting, extraction, treatment (i.e., sorting, crushing and screening), and transport of materials from the on-site quarry.

Activity	Approx. separation distance to nearest sensitive receptor (m)	Intensity (i.e. magnitude and/or scale of the works)	Comment
		Approx. 50 blasts per year anticipated	
Construction of up to 106 wind turbine generator (WTG) hardstand areas and footings	800	252,900 m^3 aggregate	Approximately 2,350 m^3 aggregate per WTG site.
Installation of electrical reticulation (i.e., underground cables and overhead transmission lines)	400	-	Comprising approximately 85 km of trenches and 49.1 km of overhead transmission lines
Construction of an on-site terminal station including BESS	1,050	288,000 m^3 aggregate	On-site terminal station, BESS and permanent/temporary site facilities etc. are located adjacent to each other.
Construction of main compound and site office including office facilities, amenities, car parking and the operations and maintenance facility, etc.	1,200		

Using the Publication 1943 dust hazard identification guidance (reproduced in **Appendix B**) and the Project details above from **Table 7-2**, the following hazard impact potential ratings were determined:

Table 7-3. Project construction nuisance dust hazard potential weightings

Score and basis	Score				
	Size of dust emitting source	Activities being undertaken	Type of dust emission	Level of control	Total
Score	3	3	2	2	**10**
Descriptor	Large: Materials usage in the order of hundreds of thousands of tonnes/m^3 per year; area sources of thousands of m^2.	High potential for dust emissions: grinding, blasting, material handling in open air, crushing, screening, haul roads for heavy vehicles, agricultural activities (ploughing fields)	Intermediate: crushed rock, beach and builders' sands, or fine stone, aggregates.	Partial Control or containment: Some areas of the site may be controlled or sealed but there are areas not addressed (e.g., haul roads or car parks). Reliance on management and housekeeping (i.e., water carts,	Sum of individual ratings

				keeping tip-faces small, wheel washes etc.).	
Basis	At least 2,300,000 t materials to be disturbed, handled, transported, placed and/or stored during the Project	Project involves various activities with a high potential to generate dust (i.e., concrete batching, quarrying, use of unsealed access tracks, temporary laydown area and compound activities, blasting and earthworks)	Variety of materials to be used during the Project each with varying dispersivity	Partial control or containment possible for some activities (e.g., concrete batching, some quarrying activities), although other sources (e.g., broader quarry and unsealed internal access roads and disturbed areas won't be able to be contained and would rely on active management controls)	As above

7.2.2.3 Step 2: Pathway effectiveness

Step 2 involves reviewing the effectiveness of the dust transmission pathway from the source to the receiving environment. The factors evaluated in determining the dust transmission pathway effectiveness include the separation distance to sensitive receptors, orientation of receptors relative to prevailing winds, terrain and intervening land use. Using the guidance from Publication 1943 (provided in **Appendix B**) and the outcomes from the review of the existing environment above in **Section 6**, the following pathway dust transmission effectiveness weightings were determined:

Table 7-4. Project construction nuisance dust pathway transmission effectiveness weightings

Score and basis	Score				
	Distance	Orientation of receivers relative to prevailing wind direction	Terrain	Intervening land use	Total
Score	1	3	2	3	**9**
Basis	▪ Receptors are hundreds of metres or kilometres	▪ High frequency (>20%) of winds from	▪ Source is on same altitude as receiving environment,	▪ Open land and cleared of obstacles	Sum of individual ratings

	from source or ▪ Separation distance has been met easily.	source to receptor or ▪ Source is upwind, winds are of high speed	generally flat land.	▪ Isolated dwellings or structures in pathway	

7.2.2.4 Step 3: Receiving environment sensitivity

Finally, Step 3 considers the context (historical and land use) within which an activity or project is to be completed. Using this guidance (reproduced in **Appendix B**) and information available for the Project the following ratings were determined:

Table 7-5. Project construction nuisance dust receiving environment sensitivity weightings

Score and basis	Score		
	Historical Context	Land use	Total
Score	2	6	**8**
Basis	No previous history, no incidents or non-compliance. Only single isolated reports. Generally, the public is unconcerned.	High general expectation of amenity: e.g. rural living zones	Sum of individual ratings

7.2.2.5 Step 4: Unmitigated construction dust impact assessment

Step 4 involves the combination of the values for hazard potential (Step 1), pathway effectiveness (Step 2) and receiving environment sensitivity (Step 3) to determine the overall potential for impacts (in the absence of mitigation). Guidance from Publication 1943 for Step 4 is reproduced below in **Table 7-6**, and is consistent with the impact assessment ratings described in **Table 5-3**.

Table 7-6. Overall dust impact review (Source: EPA, 2022a)

Score	Rating	Description
32-36	Very high	Dust impact almost certain
27-31	High	Dust impacts highly likely to occur
22-26	Medium	Dust impacts likely
17-21	Moderate	Dust impacts only likely to occur on rare occasions
12-16	Low	Dust impacts are not likely

Based on the hazard potential (Step 1), pathway effectiveness (Step 2) and receiving environment sensitivity (Step 3) scoring listed above, the potential for nuisance dust impacts during construction (if no mitigation was applied) is summarised in **Table 7-7**.

Table 7-7. Unmitigated nuisance dust impacts, construction

Impact	Score				Unmitigated impact rating
	Receiving environment sensitivity	Pathway effectiveness	Hazard potential	Total	
Unmitigated nuisance dust impact	10	9	8	27	High, dust impacts highly likely if not properly managed

Using the Publication 1943 nuisance dust assessment method, a 'high' likelihood of nuisance dust-related impacts rating was determined if emissions to air are not mitigated or otherwise effectively managed. This outcome is considered to be conservative, being driven by the expected sensitivity to changes in air quality of the receiving environment, and the nature of activities associated with the Project, such that one or more sensitive receptors would always be downwind of the Project, irrespective of the direction winds are blowing. Dust from activities would be temporal and proportionate to the scale and specific nature of works being completed at any particular location.

7.2.2.6 Mitigation and management

Under the GED, persons who engage in activities that involve air emissions are required to eliminate risks of harm to human health and the environment from those emissions so far as reasonably practicable. Where it is not reasonably practicable to eliminate such risks, they are required to reduce them so far as reasonably practicable consistent with the management hierarchy below.

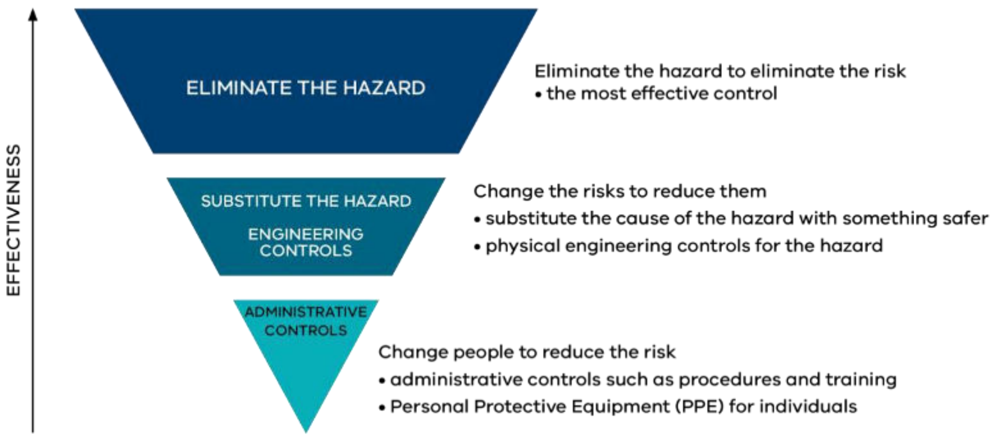


Figure 7-3. Hazard management hierarchy – (Source: EPA Publication 1695, 2018b)

Duty holders need to clearly document how the existing or proposed risk controls meet the requirement to minimise risks so far as reasonably practicable.

Imperative to the effective management of dust impacts will be the implementation of the CEMP, which will specifically address air quality emissions and mitigations. For proposed mitigations, duty holders must have regard for six considerations when making decisions on proposed risk controls:

- Eliminate first
- Likelihood of harm
- Degree of harm

- The duty holder's knowledge about the risks
- Availability and suitability of technology
- costs.

The duty holder should evaluate multiple risk control options and document the decision process.

Key dust mitigations to be incorporated in the dust management plan (DMP), a subset of the CEMP, and applicable to the Project are listed in **Table 7-8**. In the generation of the plan, the overarching approach should be to prevent the generation of dust in the first instance, i.e. in lieu of applying dust suppression measures. For example, avoiding the installation of a stockpile where possible to minimise dust generation. This is consistent with the Environment Protection Act hierarchy of control as part of the GED requirements. Where prevention is not practicable, site-specific, best practice design controls and management practices should be implemented to minimise dust. While these measures are primarily designed for the construction phase, some may also apply during decommissioning where relevant.

Table 7-8. Summary of dust mitigation measures

Dust generating activity	Dust mitigation measure	Control type
General dust controls	Ensure the area of cleared land is minimised during the drier months of the year, when potential for dust generation is at its greatest.	Minimisation
	Rehabilitate and revegetate inactive stockpiles and disturbed areas to reduce wind erosion.	Minimisation
	Use water sprays to reduce wind erosion from exposed areas, i.e. in addition to unsealed haul roads and access tracks.	Mitigation
	If additives in the water are used to increase its dust suppression properties, the chemical should have no adverse environmental impacts.	Mitigation
	Ensure that smooth surfaces are deep ripped and left rough and cloddy to reduce the wind velocity at the soil surface.	Minimisation
	Construct wind fences wherever appropriate, e.g. install shade cloth as a wind break.	Mitigation
	Suppress dust during concrete cutting and construction and demolition activities	Mitigation
Haul/access roads, material handling and transport	Use stabilised materials in high traffic areas.	Minimisation
	Implement watering of unsealed haul roads and access tracks to reduce wheel generated dust. The frequency of watering will be determined by weather conditions and the erodibility of the soil. Ideally, watering rates will be greater than 2 L/m^2/hr to maximise dust suppression.	Mitigation
	Particular attention is to be paid to minimising dust by water application at higher traffic areas, e.g. site access points, at construction/maintenance compound sites.	Mitigation
	Vehicle movements restricted to defined areas.	Avoidance
	Install signage to limit maximum on-site vehicle speeds to 20 km/hour.	Minimisation

Dust generating activity	Dust mitigation measure	Control type
	Use wheel wash facility to minimise transfer of dusts from site.	Mitigation
	Minimise drop height for unloading operations.	Minimisation
	Use water sprays for material transfer operations.	Mitigation
Management of stockpiles and batters	Minimise the number of stockpiles, and the area and the time stockpiles are exposed.	Minimisation
	Locate stockpiles where they will be least susceptible to wind erosion.	Minimisation
	Construct the stockpile with no slope greater than 2:1 (horizontal to vertical). A less steep slope may be required where the erosion risk is high.	Minimisation
	Stabilise stockpiles and batters that will remain bare for more than 28 days by covering with mulch or anchored fabrics or seeding with sterile grass.	Minimisation
	Use water sprays to suppress dust on stockpiles and batters.	Mitigation
	Finish and contour any stockpiles located on a floodplain so as to minimise loss of material in a flood or rainfall event.	Minimisation
Equipment and infrastructure	Select equipment, e.g., concrete batching plants, which have integrated best practice dust control features.	Minimisation
	Design and operation of concrete batching plants to adequately control dust emissions, as per guidelines set out in EPA publication 1806 – Reducing risk in the premixed concrete industry (EPA, 2019a).	Minimisation
	Use on-tool dust extraction and/or enclosures on equipment during construction activities such as rock breaking and drilling.	Mitigation
	Apply water sprays to crushing and screening quarrying activities as required.	Mitigation
	Minimise the area of disturbed land at any one time and rehabilitate as soon as possible.	Minimisation
Blasting	Prior to blasting, the affected areas of the site should be pre-wet to minimise dust emissions.	Minimisation
	Notify the surrounding public at least seven days prior to planned blasting activities.	Mitigation
	Apply post-blasting watering and misting as required to suppress dust	Mitigation
	Ensure that blasting: ▪ Occurs between 10 am and 4 pm ▪ Takes place when winds are not blowing in the direction of the nearest sensitive receptors (i.e. from the north, south or west), and that there are Consistent light wind speeds, being great enough to encourage movement of dust away from the nearest receptors, but light enough to minimise emission generation and transport of dust off-site	Minimisation

The DMP should also be prepared with reference to the guidance presented in Section 7.3.2 of Publication 1961 including relevant measures listed in:

- ‘Publication 1834.1: Civil construction, building and demolition guide’, (Publication 1834.1), (EPA, September 2023)
- ‘Publication 1823.1: Mining and quarrying - guide to preventing harm to people and the environment’, (Publication 1823.1), (EPA, July 2021)
- ‘Publication 1806: Reducing risk in the premixed concrete industry’ (Publication 1806), (EPA, December 2019a)
- ‘Publication 1730: Solid storage and handling guidelines’, (Publication 1730), (EPA, July 2019b)
- ‘Publication 1894: Managing soil disturbance: guidance sheet’, (Publication 1894), (EPA, September 2020a)
- ‘Publication 1895: Managing stockpiles: guidance sheet’, (Publication 1895), (EPA, July 2019c)
- ‘Publication 1897: Managing truck and other vehicle movement: guidance sheet’, (Publication 1897) (EPA, September 2020b).

In addition, the DMP would also include the following monitoring, training and processes for implementing contingency measures:

- Requirements to schedule dust generating activities by avoiding adverse weather conditions, such as during hot and dry periods, high winds and days with poor air quality
- Regular visual monitoring of dust, with results recorded in a dust management database
- Trigger actions in response to visual dust observation events including temporary cessation of dust generating activities, or implementation of additional dust mitigation methods, as required, to reduce impact to sensitive receptors
- Regular monitoring of the effectiveness of dust control measures. If dust controls are found to be ineffective, these would be reviewed (internally and / or by an external dust specialist, if required), and amended as necessary
- Any non-compliances with the ERS relevant to the project would be reported to EPA and corrective action taken where necessary
- Dust management training would be undertaken for construction workforce as part of the site-specific induction, outlining controls to be implemented during construction to manage potential air quality impacts
- Procedures for monitoring of weather e.g. wind speed, wind direction, and triggers to adjust or temporarily cease dust generating activities
- Monitoring of forecast and real time local wind parameters e.g. wind speed, wind direction, and adjustment or temporary cessation of dust generating activities, or implementation of additional dust mitigation methods, as required, to reduce impact to sensitive receptors
- Complaint investigation and response plan.

7.2.2.7 Residual impacts

This residual impact assessment applies to construction activities only, and specifically dust arising from these activities. Measures commensurate to the levels of unmitigated impact assessed were developed in-line with the GED, other relevant guidelines as listed above. Through the application of these measures, residual dust impacts during construction would be reduced to the extent reasonably practicable whereby impacts could be effectively managed. In the context of the ratings from Publication 1943, with these controls, it is expected that residual dust impacts would be reduced to ‘moderate’ (i.e., dust impacts are very unlikely and may only occur on rare occasions, e.g., when background conditions are elevated and/or during inclement weather). Resulting dust concentrations at surrounding receptors are expected to remain within the range of values already likely experienced during natural fluctuations and variations in existing background conditions (i.e., imperceptible from existing conditions).

7.3 Other air quality impacts

As well as dust during construction, the potential for other air quality-related impacts was identified in **Section 3.4**. Potential impacts associated with these matters, including recommended mitigation and management measures are detailed below:

- **Dust from off-site, associated transport activities:** While potential dust impacts from construction traffic along unsealed roads within the Project Area is assessed above in Section 7.2, there is also the potential for dust to be generated along the wider transport route. This risk of wheel-borne dust generation is greatest along unsealed roads with higher speed limits, and the potential for impacts is highest along these portions of the transport route that pass closest to sensitive receptors. Without mitigation, potential impacts associated with this matter are considered to be moderate (i.e., based on the ratings developed in **Table 5-4)**.

  With the application of the following measures, residual impacts associated with off-site transport dust related emissions are expected to be low:

  - Covering of loads and removing loose materials/debris before vehicles exit the site. This would minimise dust associated with the transport of construction materials.
  - Regularly inspecting unsealed roads to be used by the Project with speed limits of 60km/hr or more that pass within 100m of a sensitive receptor, and applying watering as required to minimise dust generation.

- **Dust during operations:** Limited dust may arise from maintenance activities and unsealed access tracks during operations. Impacts to sensitive receptors from dust generated during project operation are not expected. Still, the following mitigation and management measures are recommended in-line with the GED:

  - To the extent practicable, limit the extent of disturbed areas of vegetation to reduce the potential for dust arising from wind erosion effects
  - Inspect and maintain unsealed access routes
  - Review meteorological and ambient air quality conditions, and plan activities accordingly.

  With the application of these measures, applying the ratings developed in **Table 5-4**, residual operational dust impacts are expected to be ‘negligible’.

- **Dust during decommissioning:** Dust impacts during decommissioning are expected to be less than those predicted during construction. Impacts would need to be reviewed and managed in the context of the legislative and policy requirements in-force at the time. A Decommissioning Management Plan (DcMP) detailing the proposed decommissioning works, associated environmental risks (including air quality), and planned management and mitigation measures is recommended. It is expected that many of the controls listed in **Table 7-8** would be applicable and should be incorporated into the DcMP. With the application of these measures, residual dust impacts during decommissioning are expected to be ‘low’.

- **Exhaust emissions during all phases:** Trucks, vehicles, plant and used during construction, operations and decommissioning as well as the mobile generators for power supply, where needed, may discharge products of fuel combustion into the air including nitrogen oxides, carbon monoxide, sulfur dioxide, and fine particulates. Products of combustion from construction vehicles can also give rise to odour, if not well maintained. However, given the relatively minor nature of potential exhaust emissions from these sources and the separation distances to sensitive receivers, impacts from these emissions are not expected. Still, it is recommended that routine servicing and maintenance of all vehicles, plant and equipment is completed to ensure that it operates in a proper and efficient manner. Additionally, it is recommended that all vehicles, plant and equipment are switched off when not in-use. Using the guidance developed in **Table 5-4** residual impacts from plant, equipment and vehicle exhaust emissions are expected to be 'negligible'.

- **Cumulative impacts:** A cumulative impact assessment considers the impacts of a project together with the impacts of other relevant projects that may interact spatially and temporally to change the level of impact. Cumulative air quality impacts may arise from the interaction of construction, operational and decommissioning activities of the Project, and other developments, activities, land uses and projects in the area, both current and future. When considered in isolation, specific project impacts may be considered minor. These minor impacts may, however, be more substantial, when the impact of multiple projects on the same receptors are considered. Cumulative air quality impacts were considered for the following wind farm-related projects (displayed below in **Figure 7-4**) within the vicinity of the Project:
  - **Mortons Lane Wind Farm (operational):** Cumulative impacts not expected with project already operational (i.e., emissions to air expected to be limited), and being around 15 km away.
  - **Salt Creek Wind Farm (operational):** Cumulative impacts not expected with project already operational (i.e., emissions to air expected to be limited), and being around 10 km away.
  - **Dundonnell Wind Farm (operational):** Cumulative impacts not expected with project already operational (i.e., emissions to air expected to be limited), and being around 30 km away.
  - **Mt Fyans Wind Farm (proposed):** Cumulative impacts during construction possible but not likely being around 5 km away.
  - **Mortlake South Wind Farm (operational):** Cumulative impacts not expected with project already operational (i.e., emissions to air expected to be limited), and being around 15 km away.
  - **Woolsthorpe Wind Farm (approved):** Cumulative impacts during construction possible but not likely being around 15 km away.
  - **Hawkesdale Wind Farm (operational):** Cumulative impacts not expected with project already operational (i.e., emissions to air expected to be limited), and being around 15 km away.
  - **Ryan's Corner Wind Farm (approved):** Cumulative impacts not expected with project being around 45 km away.
  - **Willatook Wind Farm (proposed):** Cumulative impacts not expected with project being around 30 km away.
  - **Macarthur Wind Farm (operational):** Cumulative impacts not expected with project being around 30 km away.

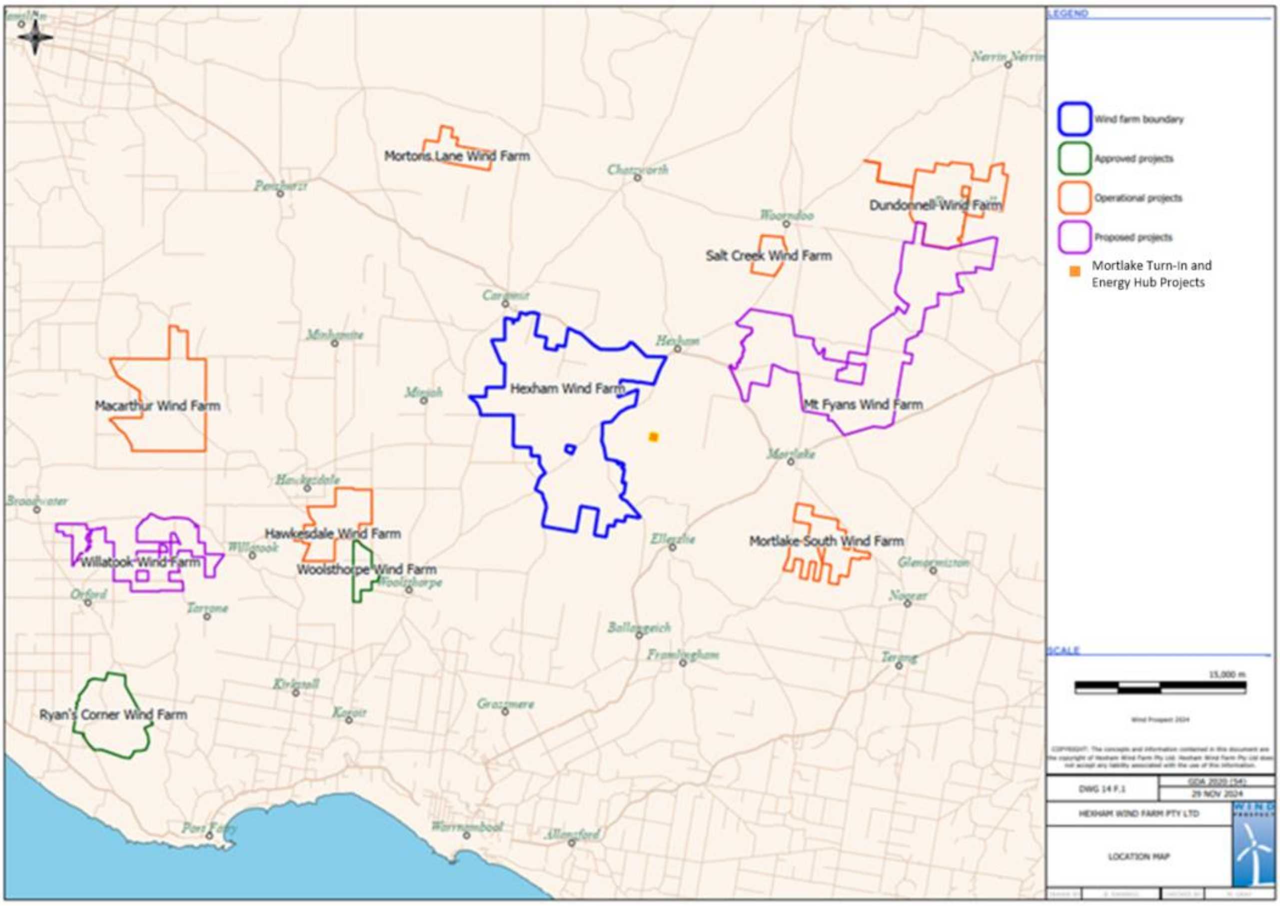


Figure 7-4. Nearby wind farm projects (Source: Wind Prospect, 2024)

Several nearby non-wind farm related developments were also identified. These projects are identified and assessed in the following bullets:

- **Mortlake Turn-In Project:** Involves upgrade of Mortlake Terminal Station at Mortlake Power Station, including the connection of a second 500 kV line to the substation by upgrading existing equipment. The Mortlake Turn-In Project is expected to be completed in 2025. Noting the temporal and spatial relationship, there is the potential for cumulative nuisance dust impacts during construction.
- **Mortlake Energy Hub:** Large-scale BESS (300 MW capacity) and solar (360 MW) project, that is expected to deliver output of up to 650 MWh. The project would be located adjacent to Mortlake Power Station and the Mortlake Turn-In Project. The proponent anticipates that the Mortlake Energy Hub will be commissioned late in 2026. As such, there may be a temporal as well as spatial relationship between the Mortlake Energy Hub and the Project, such that there is the potential for cumulative nuisance dust impacts during construction.
- **Yangery BESS:** This 120 MW BESS project is around 30 km a way and is not expected to result in cumulative air quality-related impacts.
- **Tarrone BESS:** This 200 MW BESS project is around 30 km away and is not expected to result in cumulative air quality-related impacts.

In summary, the potential for cumulative air quality related impacts were determined for the following projects: Mt Fyans Wind Farm; Mortlake Turn-In Project; and Mortlake Energy Hub. Although the cumulative residual air quality effects at surrounding sensitive receptors would depend on the timings and sequencing of the Project and these projects, co-ordination is recommended to avoid circumstances where the same sensitive receptors are jointly affected. With this planning and co-ordination, it is expected that residual cumulative impacts would be ‘low’ (i.e., impacts are not likely and may only occur on very rare occasions during exceptional circumstances).

8. Environment performance requirements

To meet the EES evaluation objective of avoiding and/or minimising air quality risks, the EPRs below are recommended:

Table 8-1. Project air quality EPRs

Impact	Project phase	Management measures	Number
Air Quality			
Dust from concrete batching plants impacts air quality	Construction	All project concrete batching plants will be designed and operated to adequately control dust emissions, as per guidelines set out in EPA Victoria Publication 1806: *Reducing risk in the premixed concrete industry.*	AQ01
Dust from quarry site (blasting) impacts air quality	Construction	A Quarry Work Plan will be developed in accordance with section 77G of the *Mineral Resources (Sustainable Development) Act 1990*. This plan will contain measures for the control of emissions of dust or other particulates, and the carriage and deposition of dust, silt and clay by vehicles existing the work authority area. These controls will be in accordance with best practice management standards including, but not limited to: • EPA Victoria Publication 1518: Recommended separation distances for industrial residual air emissions • National Environmental Protection (Ambient Air Quality) Measure. • Prior to blasting, the affected areas would be pre-wet to minimise dust emissions. Blasting would occur when winds are blowing away from the nearest sensitive receptors (i.e. from the north, south or	AQ02

		west), and are consistent enough to encourage movement of dust away from the nearest receptors, but light enough to minimise emission generation and transport of dust off-site.	
Dust from other project activities impacts air quality	Construction	A site-specific air quality management plan (sub-plan of the Construction Environmental Management Plan) will identify potential and existing dust sources and outline best practice design controls and management practices to minimise dust. These measures would include, but not be limited to: • watering of unsealed roads to reduce wheel generated dust • use of wheel wash facility to minimise transfer of dust from the project site • use of water sprays to reduce wind erosion from material stockpiles and exposed areas • minimising the number of stockpiles and the time they are exposed • locating stockpiles where they will be least susceptible to wind erosion • constructing stockpiles slopes no greater than 2:1 (horizontal to vertical) • finishing and contouring stockpiles located on a floodplain to minimise loss of material in a flood or rainfall event • use of water sprays as required for material transfer operations and	AQ03

		quarry activities (e.g., drilling rock, crushing and screening) • restricting vehicle speeds to 20 km/h near sensitive areas such as dwellings • site-specific dust control measures for dust producing activities • monitoring of forecast and real time local wind parameters (e.g., wind speed, wind direction) and adjustment of dust generating activities, as required, to reduce impact to sensitive receptors • ensure the area of cleared land is minimised during the drier months of the year, when potential for dust generation is at its greatest • ensuring that smooth surfaces are deep ripped and left rough and cloddy to reduce the wind velocity at the soil surface • constructing wind fences wherever appropriate, e.g., installing shade cloth as a wind break • stabilising stockpiles and batters that will remain bare for more than 28 days by covering with mulch or anchored fabrics or seeding with sterile grass • rehabilitation and revegetation of inactive stockpiles and disturbed areas to reduce wind erosion • selection of equipment, e.g., concrete batching plants, which have integrated best practice dust control features	

		• regular visual monitoring of dust, with results recorded in a dust management database • regular monitoring of the effectiveness of dust control measures. If dust controls are found to be ineffective, these would be reviewed (internally and/or by an external dust specialist, if required) and amended as necessary • contingency measures where dust plumes are identified during visual monitoring and/ or the project receives dust related complaints • dust management training would be undertaken for construction workforce as part of the site-specific induction, outlining controls to be implemented during construction to manage potential air quality impacts • procedures for monitoring of weather (e.g., wind speed, wind direction) and triggers to adjust dust generating activities • complaint investigation and response plan • procedures for reporting the project's performance against regulatory limits.	
	Operation	Measures to avoid and minimise dust impacts during operation, in accordance with the general environmental duty, may include but not be limited to: • Limiting the extent of cleared areas of vegetation, to the extent practicable, to reduce the potential for dust	AQ04

		arising from wind erosion effects • Inspecting and maintaining unsealed access tracks • Reviewing meteorological and ambient air quality conditions, and planning activities accordingly.	
	Decommissioning	The Decommissioning Plan would include a sub-plan for the management of dust during decommissioning works. Development of the Decommissioning Plan and engagement with statutory authorities would be undertaken and be guided by the relevant legislation of the day.	AQ05
Vehicle emissions impact air quality	Construction, operation, decommissioning	Vehicles, plant and equipment would be maintained and serviced in accordance with manufacturer specifications to ensure they operate in a proper and efficient manner. Where possible, vehicles, plant and equipment would be switched off when not in-use. Further, to prevent dust from off-site Project-related transport activities, steps are to be taken so that all loads are covered before vehicles exit site. Additionally, regular inspections are to be completed of unsealed roads to be used by the Project with speed limits of 60km/hr or more that pass within 100m of a sensitive receptor, with watering to be applied as required to minimise dust generation.	AQ06
Cumulative impacts (spatial and/or temporal) from other nearby projects	Construction, operation, decommissioning	Plan and co-ordinate project works with Mt Fyans Wind Farm, Mortlake Turn-In Project and Mortlake Energy Hub, as well as any other relevant projects so that cumulative impacts at	AQ07

		sensitive receptors are avoided to the extent possible.	

9. Conclusions

An air quality impact assessment was carried out for the proposed Hexham Wind Farm to support the EES for the Project. Consistent with the scoping requirements, the key objectives of the assessment were to:

- Characterise the existing environment by identifying and reviewing the geographical setting, meteorological conditions, and background air quality
- Assess the potential effects of construction, operation and decommissioning activities on air quality associated with the project.

As part of the assessment, key features of the existing environment were identified including surrounding terrain, land uses and sensitive receptors, local climate and meteorology, existing sources of emissions to air and background air quality. Terrain around the Project was determined using STRM data from NASA. Aerial imagery was used to identify the location of surrounding receptors. Meteorological and ambient air quality data collected at surrounding monitors were reviewed to characterise existing local conditions. Existing sources of emissions to air were identified using information reported to the NPI database. The following key conclusions were made in relation to the existing environment:

- The project has been designed so that a setback distance of at least 140 m is maintained from activities during construction to the nearest sensitive receptor. Recommended separation distances for activities listed in Publication 1949 (i.e., concrete batching and quarrying) would also be maintained.
- A review of long-term meteorology identified that sensitive receptors to the north, northeast, southwest and the east may experience winds blowing in the direction from the Project most often. In summer, when long-term climate data identified that it is hottest and driest, sensitive receptors to the north and west were identified as being most likely to experience winds blowing in the direction from the Project.
- From representative data adopted from EPA's station at Alphington, 90th and 50th percentile 24-hour averaged PM_{10} and $PM_{2.5}$ concentrations remained below the ERS air quality objectives. 99th percentile concentrations (which include adverse regional events) occasionally exceeded this objective.
- Limited sources of nearby existing emissions to air were identified, with only Mortlake Power Station (including associated infrastructure) having reported to the NPI database in 2023/24.

Dust during construction was identified as the key air quality-related issue. Potential nuisance dust impacts during construction were assessed by initially conducting a review to confirm that the recommended separation distances for key activities from Publication 1949 were being adhered to. A qualitative assessment using the approach detailed in Publication 1943 was applied to determine the likelihood of dust impacts. The results of the construction dust impact assessment found that there was a 'high' risk of dust impacting sensitive receptors and that mitigation and management measures would be required. This was driven by the sensitivity of the receiving environment, being largely unaffected; and the potential for dust to be generated from the Project activities, noting the separation distances to sensitive receptors.

A series of mitigation and management measures were recommended for this phase of the Project. Consistent with the GED, the intent of these measures was to reduce risks to human health and the environment as far as reasonably practicable. Measures included the development of a AQMP as part of a CEMP to manage and effectively control dust emissions during construction. Controls for inclusion in the CMP were recommended in accordance with applicable EPA publications. With the application of these controls, residual dust-related impacts were assessed as being 'moderate' (i.e., dust impacts are very unlikely and may only occur on rare occasions, e.g., when background conditions are elevated and/or during inclement weather). Resulting dust concentrations at surrounding receptors are expected to remain within the range of values already likely experienced during natural fluctuations and variations in existing background conditions (i.e., imperceptible from existing conditions).

Impacts from other air quality-related issues including exhaust emissions from associated vehicles, plant and equipment over all phases (i.e., construction, operations and decommissioning), as well as nuisance dust impacts during operations and decommissioning were also qualitatively assessed. ‘Negligible’ residual impacts were determined as being likely from Project exhaust emissions and from dust during operations, but controls were still recommended in-line with the GED. Regarding dust during decommissioning, residual impacts were assessed as being ‘low’, and it was recommended that a DcMP detailing the proposed decommissioning works, associated environmental risks (including air quality), and planned management and mitigation measures be prepared so that impacts can be managed in the context of the legislative and policy requirements in-force at the time.

Finally, a cumulative impact assessment was completed which considered the potential for nearby sensitive receptors being affected by emissions to air from the Project, as well as other nearby projects. This review identified the potential for cumulative air quality related impacts for the following projects: Mt Fyans Wind Farm; Mortlake Turn-In Project; and Mortlake Energy Hub. Planning and co-ordination were recommended to avoid circumstances where the same sensitive receptors are jointly affected. With this planning and co-ordination, it was determined that residual cumulative impacts would be ‘low’ (i.e., impacts are not likely and may only occur on very rare occasions during exceptional circumstances).

Based on this assessment, it has been concluded that air quality impacts during the Project could be minimised with appropriate mitigation and management measures so that the evaluation objective of the scoping requirements is met.

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Appendix A. Wind Roses

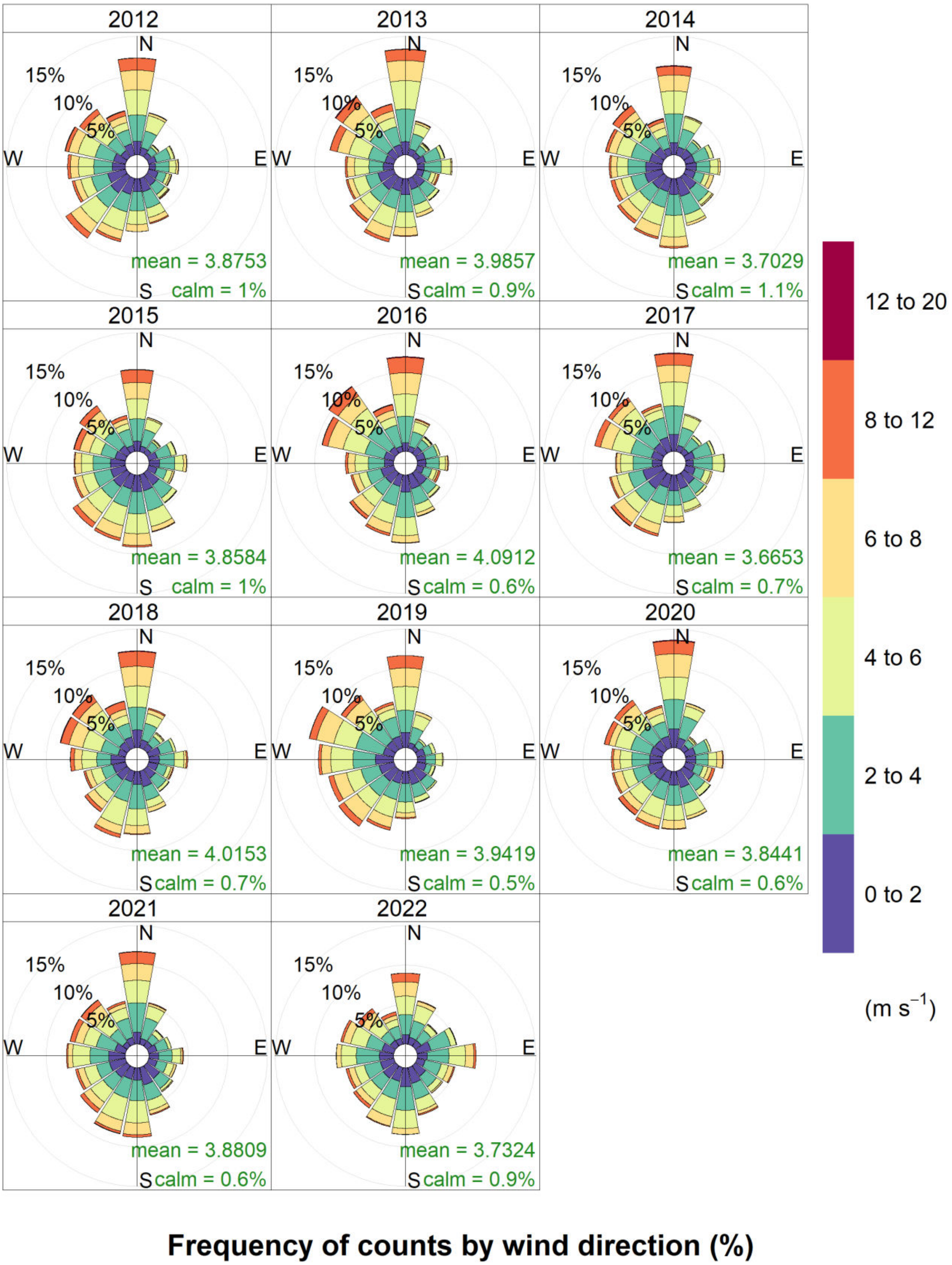

Figure A-1. Annual wind rose – Mortlake Racecourse 2012 – 2022

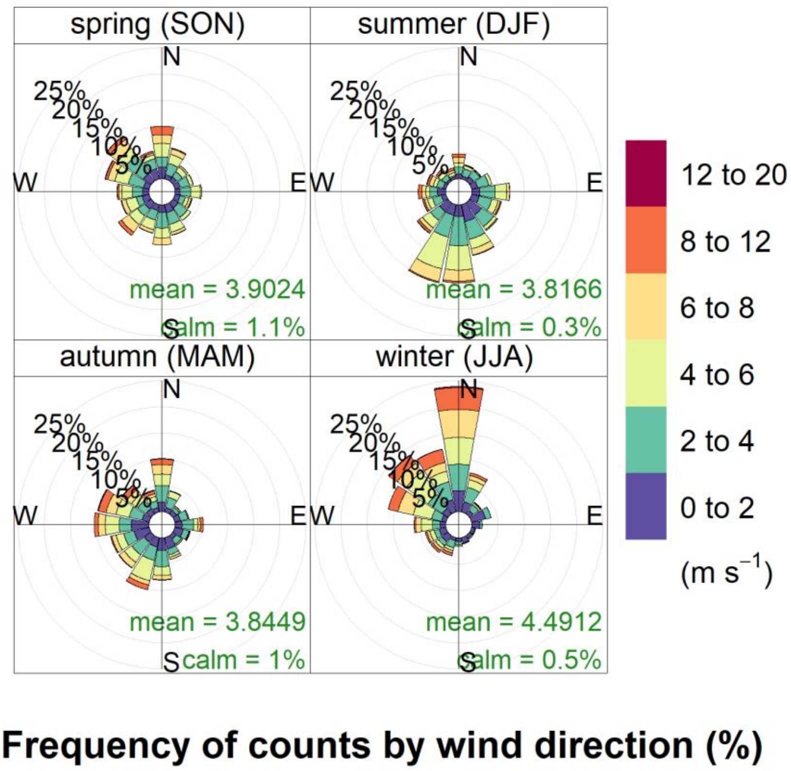

Figure A-2. Seasonal wind rose – Mortlake Racecourse 2018

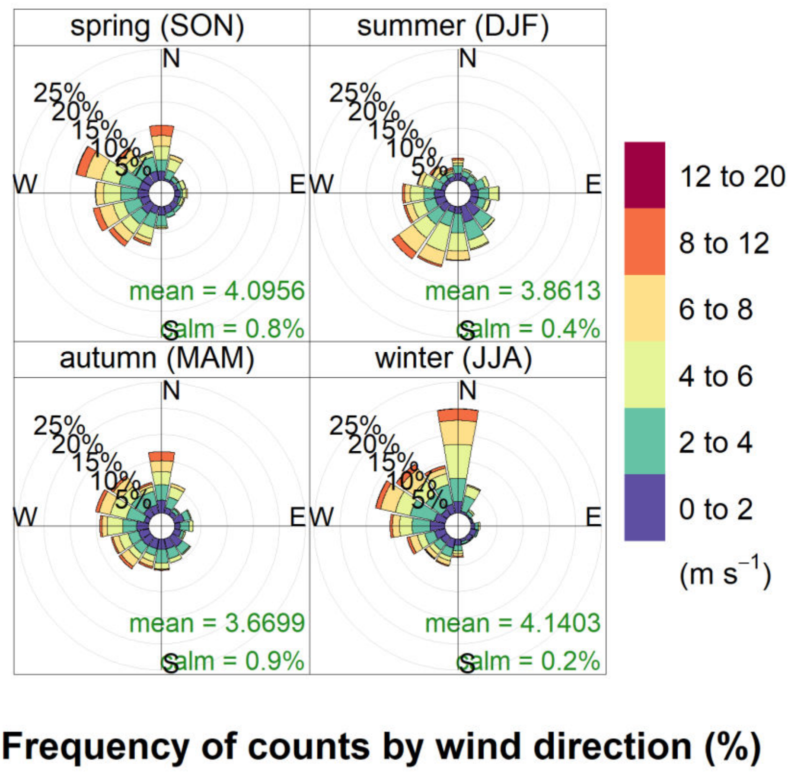

Figure A-3. Seasonal wind rose – Mortlake Racecourse 2019

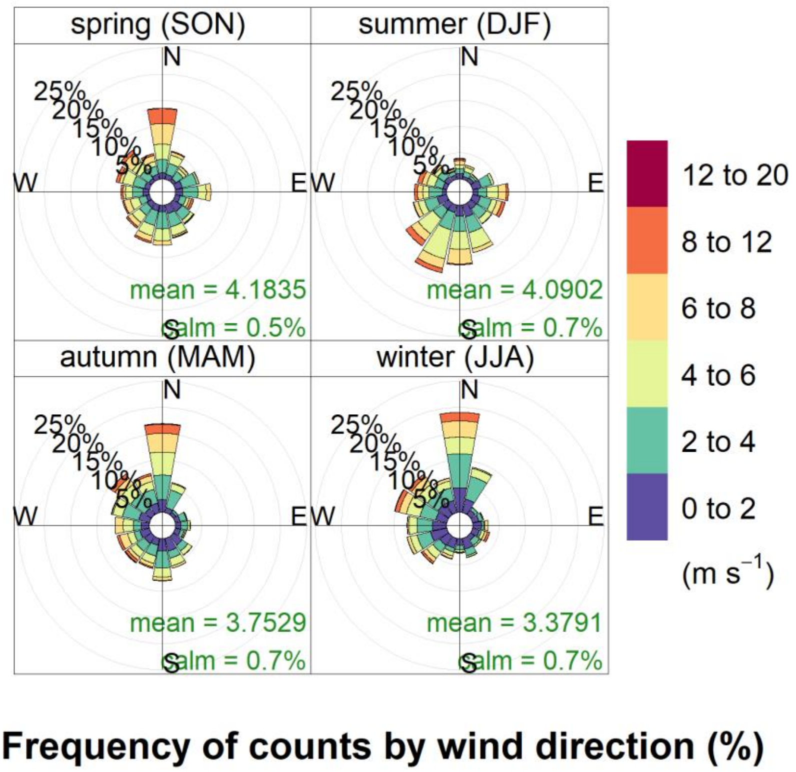

Figure A-4. Seasonal wind rose – Mortlake Racecourse 2020

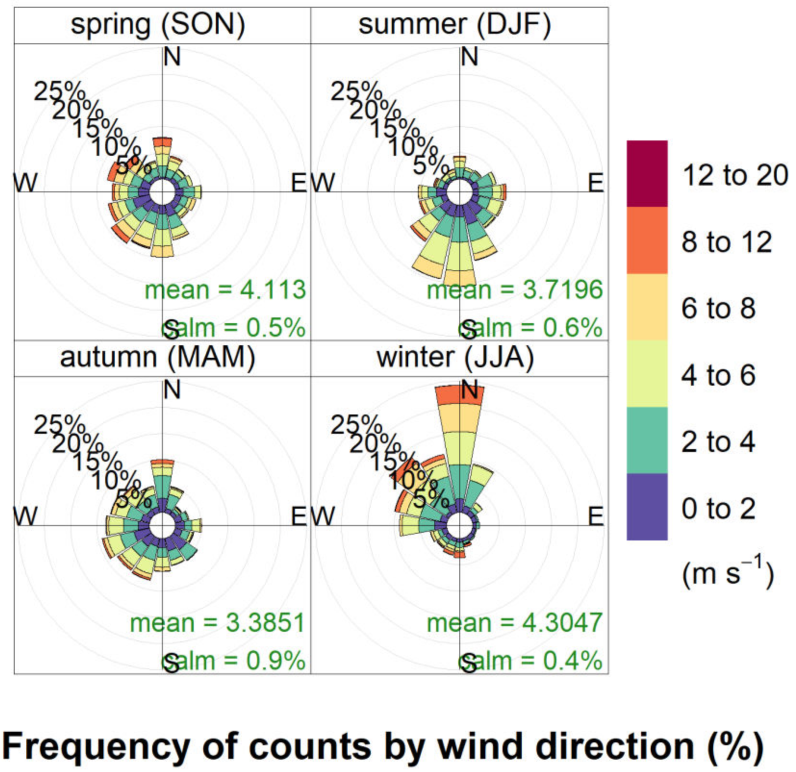

Figure A-5. Seasonal wind rose – Mortlake Racecourse 2021

Appendix B. Nuisance Dust Assessment

Table B-10-1. Nuisance Dust Assessment – Step 1

Score	Size of dust emitting source	Activities being undertaken	Type of dust emission	Level of Control
1	**Small:** materials usage in the order of hundreds of tonnes/m³ per year; area sources of tens m²	**Low potential for dust emissions:** Dust not generated by activity per-se (car yards, auto recyclers, washing and cleaning leads to sediments. Sites with exposed areas without activity (typically vacant yards, lots etc).	**Coarse:** only larger stony materials on site, very coarse sand, blue metal	**Full control or containment:** Fully sealed areas and/or highly effective, tangible measures in place leading to little or no residual dust. Releases only due to plant failure. Good housekeeping, enclosed operation with extraction and treatment equipment
2	**Medium:** materials usage in the order of thousands of tonnes/m³ per year; area sources of hundreds of m².	**Moderate potential for dust emissions:** activities on unsealed sites, i.e., container parks, or other access roads, leading to track-out onto external roads. Cement and building products manufacturing.	**Intermediate:** crushed rock, beach and builders' sands, or fine stone, aggregates.	**Partial Control or containment:** Some areas of the site may be controlled or sealed but there are areas not addressed (e.g., haul roads or car parks). Reliance on management and housekeeping (i.e., water carts, keeping tip-faces small, wheel washes etc.).
3	**Large:** Materials usage in the order of hundreds of thousands of tonnes/m3 per year; area sources of thousands of m2.	**High potential for dust emissions:** grinding, blasting, material handling in open air, crushing, screening, haul roads for heavy vehicles, agricultural activities (ploughing fields)	**Fine:** Very fine dusts that can readily become airborne (i.e., silt clay, coal dust, dried tracked out mud, gypsum, cement etc.)	**No effective control or containment:** Large exposed stockpiles or unsealed areas, specifically dry conditions, open air operation with no containment, management controls not maintained.

Table B-10-2. Nuisance Dust Assessment – Step 2

Score	Distance	Orientation of receptors relative to the prevailing wind direction	Terrain	Intervening land use
1	• Receptors are hundreds of metres or kilometres from source or • Separation distance has been met easily.	• Winds rarely (<10%) blow from source to receptor or • Source is upwind, winds are of low speed	• Source located in a valley or quarry hole, downslope from receptor or highly undulating terrain between source and receptor	• High vegetation, i.e., densely forested or, • Highly built-up or intervening zone with multiple non-sensitive uses that have no dust emissions of their own
2	• Receptors are tens or hundreds of metres from source or • Separation distance has not been met or met but only just at the threshold distances	• Even distribution of winds (10-20%) from source to receptor or • source is upwind, winds are of moderate speed • High frequency (>10%) of stable weather conditions with low dispersion.	• Source is on same altitude as receiving environment, generally flat land.	• Moderate vegetation and/or • Intervening land use zone contains other non-sensitive industry or smaller businesses.
3	• Receptors are adjacent to the source/site or • Distance well below (less than half) separation distances.	• High frequency (>20%) of winds from source to receptor or • source is upwind, winds are of high speed	• Source is upslope of receiving environment and/or located in the same valley	• Open land and cleared of obstacles and/or • Isolated dwellings or structures in pathway

Table B-10-3. Nuisance Dust Assessment – Step 3

Score	Historical context	Land use
2	**No previous history** no incidents or non-compliance. Only single isolated reports. Generally, the public is unconcerned.	**Low general expectation of amenity** • exposure can be easily avoided. • Dust doesn't have an impact in any lasting way on. appearance, aesthetics or value of property by soiling or, locations where human exposure is transient or, areas of low ecological value • E.g., footpaths, walking or bike trails, farmland (unless sensitive horticultural land,) short term car parks, roads, no nearby waterways, dry arid areas, or waste land (abandoned paddocks etc.).
4	**Some history** Occasional complaints, history of the industry causing problems elsewhere. Some concern in immediate area but not widespread.	**Moderate general expectation of amenity** • people can move on, can potentially avoid exposure. • Dust could impact on appearance, aesthetics or value of property, locations where people are occupationally exposed over a full working day but not in a home setting or, areas of moderate ecological value • E.g., enjoyment of the outdoors, recreational activities, playing sport, offices, warehouses and industrial units, playgrounds, shopping areas, longer term vehicle storage, peri-urban or outer suburban nature areas, somewhat modified water ways.
6	**Significant history** Community has had regular impacts of dust and is highly sensitised. Regular or repeated non-compliance, past enforcement activity	**High general expectation of amenity** • exposure cannot be avoided. • Dust is likely to impact on damage to property, clothes, vehicles, affects food preparation, etc. or, individuals may be exposed for over eight hours or more in a day, areas of high ecological value • E.g., residential properties with backyards and open living areas, rural living zones, hospitals, schools, prisons, accommodation, residential care homes, car parks associated with workplace or residential parking