Appendix L

Air quality

MARINUS LINK

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Air Quality Assessment of the Marinus Link – Victorian Component

Prepared for:

Tetra Tech Coffey Pty Ltd

May 2024

FINAL

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Glossary

Term	Definition
μg/m^3	micrograms per cubic metre
μm	micrometre
°C	degrees Celsius
ha	hectare
km	kilometre
kV	kilovolt
m	metre
m/s	metres per second
m^2	square metres
m^3	cubic metres
mm	millimetres
MW	Megawatt
Nomenclature	**Definition**
PM_{10}	particulate matter with a diameter less than 10 micrometres
$PM_{2.5}$	particulate matter with a diameter less than 2.5 micrometres
TSP	Total suspended particulates
Abbreviations	**Definition**
ABS	Australian Bureau of Statistics
AHD	Australian Height Datum
Air NEPM	*National Environment Protection (Ambient Air Quality) Measure*
BoM	Bureau of Meteorology
CDMP	Construction Dust Management Plan
EIS	Environmental Impact Statement
EES	Environment Effects Statement
EP Act 2017	*Environmental Protection Act 2017*
EPA Victoria	Environment Protection Authority Victoria
EPBC	*Environment Protection and Biodiversity Conservation Act 1999*
EMPC Act	*Environmental Management and Pollution Control Act 1994*
ERS	Environmental Reference Standard
GED	General Environmental Duty
HDV	Heavy Duty Vehicle
HDD	Horizontal direction drilling
HVAC	High voltage alternating current
HVDC	High voltage direct current
IAQM	Institute of Air Quality Management (UK)
IRSD	Index of Relative Socio-Economic Disadvantage
MLPL	Marinus Link Pty Ltd
MNES	Matters of National Significance
NEM	National Electricity Market
NEPC	National Environment Protection Council
NPI	National Pollutant Inventory database
NWTD	North West Transmission Developments
OEMP	Operational Environmental Management Plan
SEIFA	Socio-Economic Indexes for Areas

EXECUTIVE SUMMARY

Katestone Environmental Pty Ltd (Katestone) was commissioned by Tetra Tech Coffey Pty Ltd (Tetra Tech Coffey) to complete an air quality assessment of the Victorian component of the Marinus Link project (the project).

The project is a proposed 1500 megawatt (MW) high voltage direct current (HVDC) electricity interconnector between Heybridge in northwest Tasmania and the Latrobe Valley in Victoria. The project will provide a second link between the Tasmanian renewable energy resources and the Victorian electricity grid enabling efficient energy trade, transmission and distribution from a diverse range of generation sources to where it is most needed, and will increase energy capacity and security across the National Electricity Market (NEM).

Once operational, the operation and maintenance activities associated with the project will include routine inspections of the cable easement, periodic inspection of the subsea cable routes, maintenance of access tracks, servicing, testing and repair of subsea cables, transition station and converter stations equipment and infrastructure. The operational phase of the project is not expected to generate significant emissions to air. Decommissioning air quality impacts will be assessed prior to decommissioning in accordance with the regulations at the time and in agreement with landowners or land managers and the Environment Protection Authority Victoria (EPA Victoria). Therefore, a detailed assessment of impacts during operation and decommissioning has not been carried out.

The assessment has focused on the potential impacts of dust emissions during construction. The key activities relevant to the air quality impact assessment for the Victorian component include:

- Vegetation and topsoil/subsoil clearing and stockpiling (with associated wind erosion)
- Construction and upgrading of roads, access tracks and other temporary infrastructure
- Excavation and levelling
- Construction of a converter station at either the proposed Hazelwood or Driffield site
- Clearing and excavation associated with laying land cable
- Vegetation clearing for the shore crossing adjacent to the converter station.

A risk assessment approach has been used, based on the method detailed by the United Kingdom's Institute of Air Quality Management (IAQM).

The assessment has shown:

- For the proposed Hazelwood converter station option:
  - Without mitigation, the preliminary risk to sensitive receptors associated with the construction of the land cable is low to medium
  - Without mitigation, the preliminary risk to sensitive receptors associated with the construction of the converter station is negligible
  - Without mitigation, the preliminary risk to ecological receptors associated with the construction of the land cable is low.

- For the proposed Driffield converter station option:
    - Without mitigation, the preliminary risk to sensitive receptors associated with the construction of the land cable is low to medium
    - Without mitigation, the preliminary risk to sensitive receptors associated with the construction of the converter station is negligible
    - Without mitigation, the preliminary risk to ecological receptors associated with the construction of the land cable is low.

The initial impact of the construction activities as determined through the IAQM methodology led to the establishment of the following EPRs that utilise the dust management and mitigation measures from the IAQM, EPA Victoria guidance documents 1943, 1820 and 1834. The EPRs should be incorporated to ensure that construction activities have minimal impact on sensitive receptors.

- EPR AQ01: Develop and implement a construction dust management plan
- EPR AQ02: Develop and implement measures to manage emissions to air during operations.

With the implementation of the EPRs the residual risk is as follows:

- For the proposed Hazelwood converter station option:
    - With mitigation, the residual risk to sensitive receptors associated with the construction of the land cable is negligible to low
    - With mitigation, the residual risk to sensitive receptors associated with the construction of the converter station is negligible
    - With mitigation, the residual risk to ecological receptors associated with the construction of the land cable is negligible.
- For the proposed Driffield converter station option:
    - With mitigation, the residual risk to sensitive receptors associated with the construction of the land cable is negligible to low
    - With mitigation, the residual risk to sensitive receptors associated with the construction of the converter station is negligible
    - With mitigation, the residual risk to ecological receptors associated with the construction of the land cable is negligible.

The assessment found dust impacts for residents are expected to be minimal, the main impact may be noticeable for residents near to the construction works will be the gradual buildup of dust on surfaces due to deposition. These impacts will be temporary and only experienced when work is being carried out in close proximity to the receptor. In most cases, nearby residents are unlikely to notice a significant difference as compared to normal dust buildup.

Based on these findings the project will have a low risk for human health and, therefore, a quantitative assessment using dispersion modelling is not required to verify compliance for PM_{10}, $PM_{2.5}$ and combustion gases.

1. INTRODUCTION

The proposed Marinus Link (the project) comprises a high voltage direct current (HVDC) electricity interconnector between Tasmania and Victoria, to allow for the continued trading and distribution of electricity within the National Electricity Market (NEM).

The project was referred to the Australian Minister for the Environment 5 October 2021. On 4 November 2021, a delegate of the Minister for the Environment determined that the proposed action is a controlled action as it has the potential to have a significant impact on the environment and requires assessment and approval under the Environment Protection and Biodiversity Conservation Act 1999 (Cwlth) (EPBC Act) before it can proceed. The delegate determined that the appropriate level of assessment under the EPBC Act is an environmental impact statement (EIS).

On 12 December 2021, the former Victorian Minister for Planning under the Environment Effects Act 1978 (Vic) (EE Act) determined that the project requires an environment effects statement (EES) under the EE Act, to describe the project's effects on the environment to inform statutory decision making.

In July 2022 a delegate of the Director of the Environment Protection Authority Tasmania determined that the project be subject to environmental impact assessment by the Board of the Environment Protection Authority (the Board) under the Environmental Management and Pollution Control Act 1994 (Tas) (EMPCA).

As the project is proposed to be located within three jurisdictions, the Victorian Department of Transport and Planning (DTP), Tasmanian Environment Protection Authority (Tasmanian EPA) and Australian Department of Climate Change, Energy, Environment and Water (DCCEEW) have agreed to coordinate the administration and documentation of the three assessment processes. One EIS/EES is being prepared to address the requirements of DTP and DCCEEW. Two EISs are being prepared to address the Tasmanian EPA requirements for the Heybridge converter station and shore crossing.

This report has been prepared by Katestone Environmental Pty Ltd (Katestone) for the Victorian jurisdiction as part of the EIS/EES being prepared for the whole project.

1.1 Purpose of this report

Katestone was commissioned by Tetra Tech Coffey Pty Ltd (Tetra Tech Coffey) to conduct an air quality assessment for the project. The AQA of the project has been separated into two reports to address the individual state components and legislative requirements.

The project's AQA comprise of the following components:

- Marinus Link Victorian component (the subject of this AQA); and
- Marinus Link Tasmania component.

The purpose of this report is to assess the potential impacts on human heath, amenity and ecological receptors associated with commissioning, operation and decommissioning of the project as well as to address the DTP scoping requirements.

1.2 Project overview

The project is a proposed 1500 megawatt (MW) HVDC electricity interconnector between Heybridge in northwest Tasmania and the Latrobe Valley in Victoria (Figure 1). The project is proposed to provide a second link between the Tasmanian renewable energy resources and the Victorian electricity grids enabling efficient energy trade, transmission and distribution from a diverse range of generation sources to where it is most needed, and will increase energy capacity and security across the National Electricity Market (NEM).

Marinus Link Pty Ltd (MLPL) is the proponent for the project and is a wholly owned subsidiary of Tasmanian Networks Pty Ltd (TasNetworks). TasNetworks is owned by the State of Tasmania and owns, operates and maintains the electricity transmission and distribution network in Tasmania.

Tasmania has significant renewable energy resource potential, particularly hydroelectric power and wind energy. The potential size of the resource exceeds both the Tasmanian demand and the capacity of the existing Basslink interconnector between Tasmania and Victoria. The growth in renewable energy generation in mainland states and territories participating in the NEM, coupled with the retiring of baseload coal-fired generators, is reducing the availability of dispatchable generation that is available on demand.

Tasmania's existing and potential renewable resources are a valuable source of dispatchable generation that could benefit electricity supply in the NEM. The project will allow for the continued trading, transmission and distribution of electricity within the NEM. It will also manage the risk to Tasmania of a single interconnector across the Bass Strait and complement existing and future interconnectors on mainland Australia. The project is expected to facilitate the reduction in greenhouse gas emissions at a state and national level.

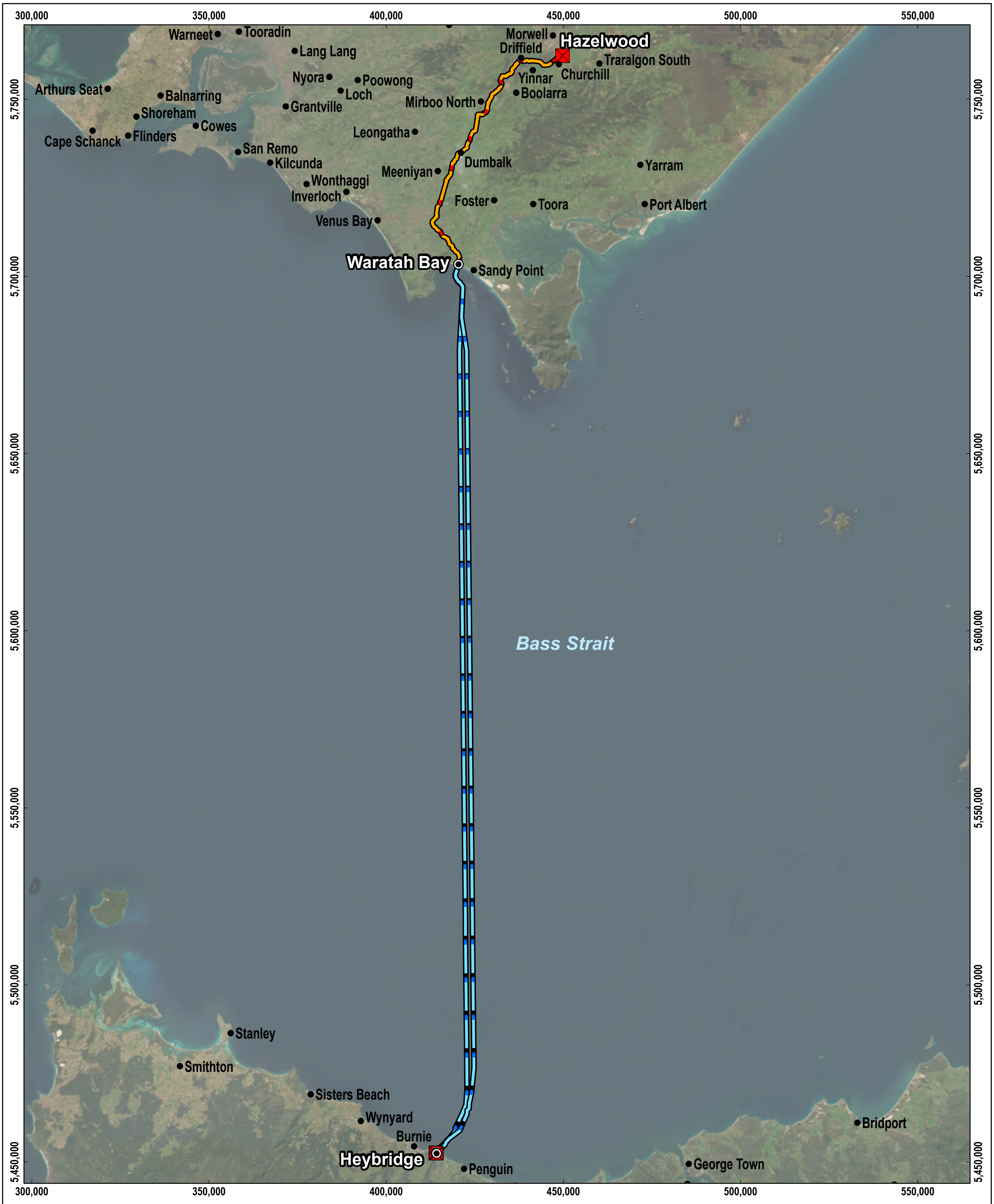
Interconnectors are a key feature of the future energy landscape. They allow power to flow between different regions to enable the efficient transfer of electricity from renewable energy zones to where the electricity is needed. Interconnectors can increase the resilience of the NEM and make energy more secure, affordable and sustainable for customers. Interconnectors are common around the world including in Australia. They play a critical role in supporting Australia's transition to a clean energy future.

1.3 Assessment context

Air quality is an important environmental issue in Australia. Emissions to air from industry, transport, domestic wood burning, and other sources have the potential to affect human health and public amenity. During the construction of the project, existing air quality has the potential to be impacted due to construction activities associated with the project. The key activities relevant to the air quality impact assessment for the Victorian component include:

- Vegetation and topsoil/subsoil clearing and stockpiling (with associated wind erosion)
- Construction and upgrading of roads, access tracks and other temporary infrastructure
- Excavation and levelling
- Construction of a converter station at either the Hazelwood or Driffield site
- Clearing and excavation associated with laying land cable
- Vegetation clearing for the shore crossing adjacent to the converter station.

It is important to consider air quality in an EIS/EES to minimise adverse air quality effects on human health and the amenity of nearby residents and local communities during the construction of the project.



LEGEND

- Landfall
- Converter station
- HVDC subsea cable
- Underground HVDC cable
- Cable option not progressing

MARINUS LINK

0 15 30 km

SCALE 1:1,500,000

PAGE SIZE: A4

PROJECTION: GDA2020 MGA Zone 55

SOURCE
Proposed route from Tetra Tech Coffey.
Imagery from ESRI Online.

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FIGURE 1

Project overview

TETRA TECH COFFEY

DATE: 16.05.24 PROJECT:754-MELEN215878ML FILE: 215878ML

2. ASSESSMENT GUIDELINES

This section outlines the assessment guidelines relevant to Air Quality assessment and the linkages to other EIS/EES technical assessments. A single consolidated EIS/EES is being prepared to address the requirements of Commonwealth and Victorian jurisdictions including the requirement for an EES. This will report will use the term EIS/EES going forward.

2.1 Commonwealth

DCCEEW have published the following guidelines for the EIS: 'Guidelines for the Content of a Draft Environmental Impact Statement – Environment Protection and Biodiversity Conservation Act 1999 – Marinus Link underground and subsea electricity interconnector cable (EPBC 2021/9053)'.

Impacts on ecological receptors are assessed in the terrestrial ecology technical study (ELA, 2023). The air quality assessment specifically considered the ecological receptors, identified in the terrestrial ecology technical study, within 20 m of the area of disturbance for the land cable and potential converter stations at Hazelwood and Driffield as potential impacts from the project are likely to be greatest, closest to the construction of project infrastructure located onshore. More than 20 m from the area of disturbance, potential risks of air quality impacts will be lower. The underground and subsea electricity interconnector cable components of the project will not result in emissions to air.

The relevant sections of the guidelines are Section 4.2, 5, 5.5, 5.11 and 6 and include:

- The EIS must include a description of the environment of the proposed site and the surrounding areas that may be impacted by the action.
- A detailed assessment of the nature, extent, severity and duration of the likely short-term and long-term impacts
- Details of the extent, intensity, and duration of potential impacts of the action on the identified threatened species and/or ecological communities
- The EIS should identify and address cumulative impacts, where potential project impacts are in addition to existing impacts of other activities (including known potential future expansions or developments by the proponent and other proponents in the region and vicinity that are approved or where development applications have been submitted).
- The EIS must provide information on proposed environmental performance requirements (EPRs), and any specific avoidance, management, and mitigation measures to deal with the relevant impacts of the project on MNESMNES, including those required by other Commonwealth, State, and local government approvals.

2.2 Victoria

The EES Scoping Requirements issued by the Minister for Planning (February, 2023) outline the specific matters to be assessed across a number of environmental and social disciplines relevant to the project, and to be documented in the EES for the project.

The EES Scoping Requirements inform the scope of the EES technical studies and define the EES evaluation objectives. The EES evaluation objectives identify the desired outcomes to be achieved and provide a framework for an integrated assessment of the environmental effects of a proposed project.

2.2.1 EES evaluation objective

The EES evaluation objectives relevant to the Air Quality assessment is:

Section 4.5 Amenity, health, safety, and transport:

Avoid and, where avoidance is not possible, minimise adverse effects on community amenity, health and safety, with regard to noise, vibration, air quality including dust, the transport network, greenhouse gas emissions, fire risk and electromagnetic fields.

2.2.2 EES scoping requirements

The relevant sections of the EES Scoping requirements that this assessment has addressed are summarised in Table 1.

Table 1 EES scoping requirements relevant to Air Quality

Aspects to be assessed	Scoping Requirement	Report Section
Key Issues	Potential for adverse effects resulting from project-related noise, vibration, dust and electromagnetic fields at sensitive receivers during construction and operation.	Section 8
Existing Environment	Characterise background air quality and ambient noise near the project in established residential, farming, commercial and open space areas and at other sensitive land use and high amenity locations	Section 7.4
Existing Environment	Identify sensitive receptors that could be affected by noise, dust or electromagnetic fields	Section 7.5
Likely effects	Predict likely air pollutant concentrations using an air quality assessment approach in accordance with Victorian Environment Protection Act and its regulations and associated publications	Section 8
Likely effects	Assess potential effects on noise, vibration and air quality amenity at sensitive receivers, considering Victorian Environment Protection Act and its regulations and associated publications	Section 8
Mitigation	Describe and propose siting, design, mitigation and management measures to control air pollutants from construction activities	Section 8.1.3

Aspects to be assessed	Scoping Requirement	Report Section
Performance	Describe the framework for monitoring and evaluating the measures implemented to mitigate environmental amenity, human health, transport and safety effects, greenhouse gas emissions and contingencies	Section 8.1.4

2.3 Linkages to other reports

This report is informed by or informs the technical assessments outlined in Table 2.

Table 2 Relevant technical assessment linkages

Technical assessment	Relevance to this assessment
Climate change	Data from this report have informed the existing environment, meteorological and climate sections of this report.
Terrestrial ecology	The locations where state significant fauna have been recorded, inform the risk assessment of ecological receptors.
Agriculture and forestry	The findings of this assessment regarding nature and sensitivity of agricultural areas have been utilised.

3. REGULATORY FRAMEWORK AND POLICY CONTEXT

3.1 Legislation

Victoria's new environmental regulations came into force from 1 July 2021 commencing with the new *Environment Protection Act 2017* (EP Act 2017). Supporting legislation, policy and guidance for the *EP Act 2017* relevant to this assessment and described below include:

- National Environment Protection (Ambient Air Quality) Measure (Air NEPM) (NEPM 2021) (Commonwealth of Australia)
- Environmental Reference Standard (ERS) (*Victoria*)
- Guideline for Assessing and Minimising Air Pollution in Victoria (Publication 1961)
- Guideline for Assessing Nuisance dust (Publication 1943)
- Construction – guide to preventing harm to people and the environment (Publication 1820)
- Civil construction, building and demolition guide (Publication 1834)
- General Environmental Duty (GED).

3.2 Guideline for assessing and minimising air pollution in Victoria

The Guideline for assessing and minimising air pollution in Victoria (Publication 1961) (February 2022) (The Guideline) is part of Victoria's new environmental laws and relates to the *EP Act 2017*. The Guideline "provides a framework to assess and control risks associated with air pollution. It is a technical guideline for air pollution practitioners and specialists with a role managing pollution discharges to air." The objectives of the Guideline include:

- A clear framework for air pollution assessment and management that protects the environmental values of air (as defined in the Environment Reference Standard (ERS) to ensure risks of harm to human health and the environment are minimised so far as reasonably practicable)
- Guidance on methods for assessing risk of harm from air pollution to human health and the environment. This includes a broad risk-based assessment framework, site-specific risk assessment methods, and risk-based air pollution assessment criteria (APACs)
- A conceptual framework for identifying and selecting risk management techniques and technologies to ensure that risks are minimised so far as reasonably practicable
- Clarity on Environment Protection Authority Victoria's (EPA Victoria) expectations for the minimum reporting standards related to the assessment and management of air pollution in Victoria.

The guideline is divided into four parts, which link directly to the risk management framework adopted by EPA Victoria for the assessment and control of risk presented below:

- Step 1 – Identify hazards
- Step 2 – Assess risks
- Step 3 – Implement controls
- Step 4 – Check controls.

The framework for the assessment of air pollution risks as part of Step 2, provide three levels of assessment in order of increasing complexity. The details associated with each level of assessment are presented below:

- Level 1 assessments – these screening level assessments are qualitative or semiquantitative in nature. They are used to quickly describe risks from activities that either have:
  - intrinsically low risks, or
  - risks that are so common and well understood they can be effectively controlled without the need for extensive assessment work.
- Level 2 assessments – are the most common type of risk assessment for industry. They usually involve the use of dispersion modelling or monitoring. Predicted or measured pollutant concentrations can be benchmarked against a set of pre-defined APACs to understand the resulting risks.
- Level 3 assessments – these detailed risk assessments are only used in exceptional circumstances when a simple comparison of a pollutant's concentration to an APAC cannot adequately describe the risk.

The activities associated with the project are of small scale over a large area, the risk associated with the onsite construction activities are well understood and accompanied by effective mitigation measures. In addition, the temporal nature of the construction activities associated with this project lend to a full quantitative assessment of the pollution risks being ineffective and unnecessary. Review of the receiving environment with regard to landscape, meteorology and ambient air quality in section 7 supports the application of a level 1 assessment. Additional review of the density and sensitivity of receptors in sections 7.6 and 7.7 supports the application of a level 1 assessment. Consequently, a level 1 assessment is sufficient to determine the risks from project construction and identify mitigation measures to ensure the risks can be effectively controlled.

3.3 National Environment Protection Measure for Ambient Air Quality

The National Environment Protection Council (NEPC) defines national ambient air quality standards and goals in consultation, and with agreement from all Australian state and territory governments. These were first published in 1998 in the Air NEPM. The Air NEPM sets national standards for the six key air pollutants to which most Australians are exposed: carbon monoxide, ozone, sulfur dioxide, nitrogen dioxide, lead and particulates (PM_{10} and $PM_{2.5}$). The Air NEPM air quality standards are health based.

3.4 Environment Reference Standard (ERS)

The Environment Reference Standard (ERS) is made under section 93 of the Environment Protection Act 2017. It sets out the environmental values of the ambient air, ambient sound, land and water environments that are sought to be achieved or maintained in Victoria and standards to support those values. The ERS came into operation on 1 July 2021. It sets environmental values, indicators and objectives for the ambient air environment in Victoria. The indicators and objectives for ambient air are largely based upon the Air NEPM, but are stricter for certain pollutants.

4. PROJECT DESCRIPTION

4.1 Overview

The project is proposed to be implemented as two 750 MW circuits to meet transmission network operation requirements in Tasmania and Victoria. Each 750 MW circuit will comprise two power cables and a fibre-optic communications cable bundled together in Bass Strait and laid in a horizontal arrangement on land. The two 750MW circuits would be installed in two stages with the western circuit being laid first as part of stage one, and the easter cable in stage two.

The key project components for each 750 MW circuit, from south to north, are:

- HVAC switching station and HVAC-HVDC converter station at Heybridge in Tasmania. This is where the project will connect to the North West Tasmania transmission network being augmented and upgraded by the North West Transmission Developments (NWTD).
- Shore crossing in Tasmania adjacent to the converter station
- Subsea cable across Bass Strait from Heybridge in Tasmania to Waratah Bay in Victoria
- Shore crossing at Waratah Bay approximately 3 km west of Sandy Point
- Land-sea cable joint where the subsea cables will connect to the land cables in Victoria
- Land cables in Victoria from the land-sea joint to the converter station site in the Driffield or Hazelwood areas
- HVAC switching station and HVAC-HVDC converter station at Driffield or at Hazelwood, where the project will connect to the existing Victorian transmission network.

A Transition Station at Waratah Bay may also be required if there are different cable manufactures or substantially different cable technologies adopted for the land and subsea cables. The location of the transition station will also house the fibre optic transition station in Victoria. However, regardless of whether a transition station is needed, a fibre optic terminal station will still be required in the same location.

Approximately 255 kilometres (km) of subsea HVDC cable will be laid across Bass Strait. The preferred technology for the project is two 750 megawatt (MW) symmetrical monopoles using ±320 kV, cross-linked polyethylene insulated cables and voltage source converter technology. Each symmetrical monopole is proposed to comprise two identical size power cables and a fibre-optic communications cable bundled together. The cable bundles for each circuit will transition from approximately 300m apart at the HDD (offshore) exit to 2km apart in offshore waters.

In Victoria, the shore crossing is proposed to be located at Waratah Bay with the route crossing at the Waratah Bay–Shallow Inlet Coastal Reserve. From the land-sea joint located behind the coastal dunes, the land cable will extend underground for approximately 90 km to the converter station. From Waratah Bay the cable would run northwest to the Tarwin River Valley and then travel to the north to the Strzelecki Ranges. The route crosses the ranges between Dumbalk and Mirboo North before descending to the Latrobe Valley where it turns northeast to Hazelwood. The Victorian converter station will be at either a site south of Driffield or Hazelwood adjacent to the existing terminal station.

The land cables will be directly laid in trenches or installed in conduits in the trenches. A construction area of 20 to 36 m wide would be required for laying the land cables and construction of joint bays. Temporary roads for accessing the construction area and temporary laydown areas would also be required to support construction. Where possible, existing roads and tracks will be used for access, for example, farm access tracks or plantation forestry tracks.

Land cables will be installed in ducts under major roads, railways, major watercourses and substantial patches of native vegetation using trenchless construction methods (e.g., HDD) where geotechnical conditions permit. A larger area than the 36m construction area will be required for the HDD crossings.

The assessment is focused on the Victorian of the project. This report will inform the EIS/EES being prepared to assess the project's potential environmental effects in accordance with the legislative requirements of the Commonwealth and Victorian governments (Figure 2).

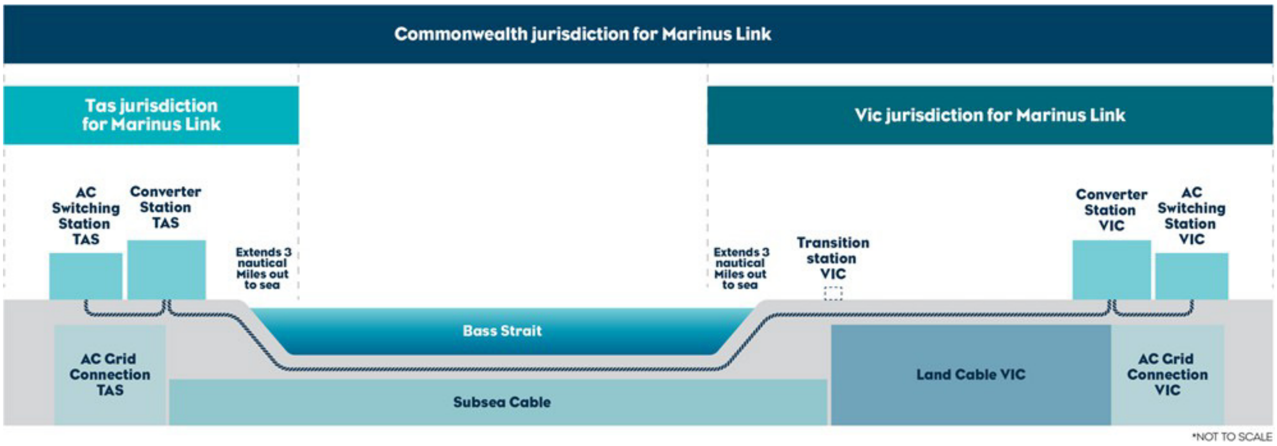

Figure 2 **Project components considered under applicable jurisdictions (Marinus Link Pty Ltd 2022)**

The project is proposed to be constructed in two stages over approximately five years following the award of works contracts to construct the project. On this basis, stage 1 of the project is expected to be operational by 2030, with Stage 2 to follow, with final timing to be determined by market demand. The project will be designed for an operational life of at least 40 years.

4.2 Construction

4.2.1 Process

Land cable construction crews will be working a 7-day work week calendar with one rostered day off (RDO) per fortnight for all site activities. It is assumed the land cable construction works will occur between 7am and 5pm seven days a week. Where site conditions do not allow for works it is assumed that works will be moved to a more suitable location.

Work associated with access tracks, easement clearing, and earthworks associated with the trenching for the land cable are likely to be the most significant in terms of emissions of dust to air. Subsequent stages, including construction of the proposed converter stations are likely to involve predominantly non-dusty materials such as pre-mixed concrete and steel. Rehabilitation works may result in emissions of dust also, as this typically involves tasks such as the redistribution of stockpiled material and dozing.

Construction areas will be progressively rehabilitated during the construction stage. After construction and commissioning, temporary workplaces may be rehabilitated and revegetated depending on the wishes of landowners and the pre-construction level of vegetation.

Key activities during the construction phase that will generate emissions to air include:

- Land clearing along the land cable route and for the construction work associated with the proposed Hazelwood and Driffield converter stations
- Excavation and stockpiling of topsoil associated with trenching of the land cable
- Horizontal directional drilling associated with the Waratah Bay shore crossing

- Earthworks and surface preparation required for the construction and upgrading of roads and access tracks
- Transport of dust and dirt from the construction sites onto the public road network.

The project will source construction material from international and local manufacturers, which will be subject to their own approvals. Thus, consideration of emissions from these existing facilities is not required in this assessment.

After construction and commissioning, temporary workplaces may be rehabilitated and revegetated depending on the wishes of landowners and the pre-construction level of vegetation.

4.2.2 Construction equipment

Construction of the project is separated into numerous phases with each phase requiring specific equipment. The operation hours of equipment used in construction will be dependent on the duration of each phase. The list of potential equipment used during construction is listed in Table 3.

Table 3 List of potential equipment required for construction

Construction activity	Equipment
Trenching	Up to 36 tonne excavators
	Bulldozers
	Graders
	Franna crane
	Front end loader
HDD pads	Drilling rig
Converter stations and trenching	Medium and heavy rigid trucks
	Agitator trucks
	Light vehicles
Converter stations	Wheeled and tracked excavators
	Piling rig
	Elevated work platforms
	Spider crane
	1500 kVA diesel generators

4.3 Operations

Operation and maintenance activities include:

- Operation of two 1500 kVA backup diesel generators with above ground fuel storage of 5000L
- Routine inspections of the land cable easement for potential operational and maintenance issues
- Servicing, testing and repair of land cables, transition station and converter stations equipment and infrastructure via light vehicles
- Maintenance of access tracks using light vehicles.

4.4 Decommissioning

The operational lifespan of the project is a minimum 40 years. At this time the project will be either decommissioned or upgraded to extend its operational lifespan.

Decommissioning will be planned and carried out in accordance with regulatory and landowner or land manager requirements at the time. A decommissioning plan in accordance with approvals conditions will be prepared prior to planned end of service and decommissioning of the project.

Requirements at the time will determine the scope of decommissioning activities and impacts. The key objective of decommissioning is to leave a safe, stable and non-polluting environment, and minimise impacts during the removal of infrastructure.

In the event that the project is decommissioned, all above-ground infrastructure will be removed, and associated land returned to the previous land use or as agreed with the landowner or land manager.

Decommissioning activities required to meet the objective will include, as a minimum, removal of above ground buildings and structures. Remediation of any contamination and reinstatement and rehabilitation of the site will be undertaken to provide a self-supporting landform suitable for the end land use.

Decommissioning and demolition of project infrastructure will implement the waste management hierarchy principles being avoid, minimise, reuse, recycle and appropriately dispose. Waste management will accord with applicable legislation at the time.

Decommissioning activities may include recovery of land and subsea cables and removal of land cable joint pits. Recovery of land cables would involve opening the cable joint pits and pulling the land cables out of the conduits, spoiling them onto cable drums and transporting them to metal recyclers for recovery of component materials. The conduits and shore crossing ducts would be left in-situ as removal would cause significant environmental impact.

The concrete cable joint pits would be broken down to at least one metre below ground level and buried in-situ or excavated and removed. Subsea cables would be recovered by water jetting or removal of rock mattresses or armouring to free the cables from the seabed.

A decommissioning plan will be prepared to outline how activities will be undertaken and potential impacts managed.

5. CONSIDERATIONS FOR ASSESSING AIR QUALITY

5.1 Key air emissions

Construction activities with the most potential for the generation of dust emissions include:

- Land clearing of the operational area and associated with the land cable and construction of the proposed converter station at Hazelwood or Driffield
- Excavation and stockpiling of topsoil associated with the development of the proposed converter station at Hazelwood or Driffield and land cable trenches
- Horizontal directional drilling associated with the Waratah Bay shore crossing
- Earthmoving and surface preparation required for the construction and upgrading of roads and access tracks

Dust emissions will occur due to the earthmoving activities involved in preparing these areas, including:

- Materials handling associated with excavation and dozing
- Wheel generated dust from material transport
- Wind erosion from stockpiled material and exposed ground.

The operation of the land cable and associated converter stations and infrastructure is unlikely to result in emissions to air. The potential impacts of dust emissions during decommissioning will be assessed prior to decommissioning but are likely to be smaller in scale than construction. Therefore, emissions due to operations and decommissioning have not been assessed further. The key issue relating to air quality will be emissions of dust due to construction activities.

In addition to the key pollutant of dust from the construction activities, the operation of vehicles, machinery, and stationary engines as part of the construction works will result in emissions of carbon monoxide, nitrogen oxides, hydrocarbons, volatile organic compounds and sulfur dioxide. The potential impacts associated with these combustion-generated pollutants are addressed in accordance with the IAQM guidance in section 6.1.

5.2 Odour

Odour may arise if the topsoil and subsoil removed during the construction phase of the project is contaminated. Contaminated soil refers to in-situ material that has previously received one or more potentially hazardous xenobiotic chemical substances, with the contamination persisting over time. Soil contamination is typically caused by past industrial activity, use of agricultural chemicals, or a disposal of waste, but can include naturally occurring contamination such as sulfate or arsenic (DCCEEW, 2014). However, odour from contaminated soil is generally temporary in nature and dissipates after a few days. Standard management practices proposed for the project have identified measures that will assist in managing contaminated soils. Contingencies for removal and treatment of material (if significant odorous material is excavated) will be incorporated into the construction management plan. Therefore, odour has not been assessed further at this stage.

5.3 Impacts of dust

The key potential emissions to air from the construction works will be in the form of dust or particulate matter. Particulate matter is sub-divided into metrics based on particle size. These metrics are total suspended particulates (TSP), PM_{10}, $PM_{2.5}$ and dust deposition rate:

- TSP refers to the total of all particles suspended in the air. TSP is used as a metric of the potential for particulate matter to affect amenity
- PM_{10} is a subset of TSP and refers to particles suspended in the air with an aerodynamic diameter less than 10 µm
- $PM_{2.5}$ is a subset of TSP and PM_{10} and refers to particles suspended in the air with an aerodynamic diameter less than 2.5 µm
- Dust deposition refers to any dust that falls out of suspension in the atmosphere.

PM_{10} and $PM_{2.5}$ are both potential components of TSP, but the relative proportion of each within TSP is dependent on the nature of the dust source (e.g. handling of fine powders compared with handling of dry topsoil during earthworks).

Elevated concentrations of dust have the potential to cause adverse impacts on the amenity and health of people. Dust can affect communities in various ways, depending upon the source and size of particles present. Dust typically emitted by construction activities is assessed in terms of dust deposition, TSP and PM_{10}.

Dust from construction activities consists primarily of larger particles generated through the handling of rock and soil, as well as through wind erosion of stockpiles and exposed ground. Larger particles (measured as dust deposition) are mostly associated with dust nuisance or amenity impacts in residential areas, through settling or deposition of the particles. Elevated dust deposition rates can reduce public amenity, through deposition on roof areas, washing into water tanks which are relied on as water sources, soiling of clothes (drying on clothes lines), vehicles, buildings and other surfaces.

Smaller particles such as PM_{10} can also be generated by the same construction activities. Elevated levels of PM_{10} have the potential to affect human health as these particles can be trapped in the nose, mouth, or throat and be drawn into the lungs.

Very fine particles such as $PM_{2.5}$ are mostly generated through combustion processes, and so will be emitted by the vehicle fleet and other construction equipment. Combustion of fuel in the vehicle fleet will also produce oxides of nitrogen, oxides of sulfur and carbon monoxide.

Some ecological habitats and agricultural activities may also be sensitive to dust. This may be due to sensitivity to the direct impacts of dust deposition to aquatic ecosystems, vegetation (by reducing photosynthesis or other processes), or indirect impacts on fauna. The timeframe over which construction activities occur, and the frequency of rainfall events are relevant to assess the risk posed to ecological receptors by construction activities.

There are three main agricultural activities within the project area; dairy production, beef production and horticultural operations. Dairy and beef production are unlikely to be affected by dust. In terms of horticultural operations, the primary crop in the area is potatoes. There is also one organic farm. Advice from the agricultural technical specialist indicates that the risk of dust affecting potatoes is low, particularly due to standard management practices proposed for the project. Further detail will be provided in the agriculture technical report for the project. Therefore, potential impacts of dust due to construction on agricultural activities has not been assessed further.

The potential key air quality risks associated with the construction phase of the project are:

- Reduced public amenity due to dust soiling
- Health impacts due to elevated levels of PM_{10} and $PM_{2.5}$
- Harm to ecological receptors.

These risks are generally avoidable through the implementation of diligent dust management and controls.

6. DUST RISK ASSESSMENT METHODOLOGY

6.1 Justification of approach

In Katestone's experience, dispersion modelling of construction projects is not normally undertaken, due to the short-term nature of activities and significant variability in emission rates and locations through the construction activity. Under these conditions there is significant scope to manage activities and emissions to avoid adverse impacts.

EPA Victoria's Publication 1961: Guideline for Assessing and Minimising Air Pollution states that fugitive emissions are difficult to assess accurately. For certain fugitive emission sources, a full quantitative assessment is prone to such large uncertainties that it is often more effective to invest resources into risk controls rather than into assessment works. This is particularly true of dust emissions from diffuse sources such as construction activities.

Therefore, the potential impacts of dust emissions during construction of the project have been addressed using a risk-based methodology. This is appropriate due to the temporary nature of the proposed construction activities, and well-established mitigation measures that can be applied to minimise potential dust emissions. The Institute of Air Quality Management (IAQM) has published a risk assessment methodology titled Guidance on the assessment of dust from demolition and construction (IAQM Methodology) (Holman et al, 2014). While it was drafted with the intention of application in the United Kingdom, the IAQM Methodology is applicable and widely used in Australia. This IAQM Methodology has been adopted to assess construction dust impacts and to inform the implementation of appropriate dust management measures.

The IAQM Methodology considers the potential for impacts within 350 m of the boundary of construction works, or within 50 m of roads used by construction vehicles within 500 m of the site. The methodology follows a sequence of steps detailed in section 6.2.

The construction dust risk assessment approach does not require a focus on individual specific receptors to be identified, instead, the numbers of different types of receptors within given distance bands of the construction works are counted.

The IAQM Methodology explains that the "*experience of assessing the exhaust emissions from on-site plant* (also known as non-road mobile machinery) *and site traffic suggests that they are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed*". Those cases where quantitative assessment is required tend to be major construction projects in dense urban areas, such as large cities. Katestone's professional judgement is that there is no risk of significant air quality impacts due to emissions from site machinery or traffic accessing the construction sites. Thus, these emissions are not considered further. Standard practice mitigation measures to reduce emissions from vehicles and machinery are included in the site-specific mitigation recommended in section 8.1.3. Any stationary engines used during construction will be situated as far as possible from sensitive receptors; specific locations where stationary engines may be used are not available at this time and will be considered in detail within the construction dust management plan (CDMP) to ensure that there is no risk of significant impacts at sensitive receptors.

The potential for air quality impacts due to construction associated with the Hazelwood converter station option and the Driffield converter station option within Victoria has been assessed using the IAQM Methodology, detailed below.

6.2 Detailed methodology

The risk assessment framework developed by the IAQM determines the level of risk based on the sensitivity of the area (i.e. the presence of sensitive receptors and the air quality in the area with respect to the air quality criteria) combined with the magnitude of change (i.e. the increase in predicated concentrations or deposition rates as a result of project activities).

Construction activities have been divided into four types by the IAQM to reflect their different potential impacts. These are:

- Demolition – any activities involved in the removal of an existing structure
- Earthworks – covers the processes of soil-stripping, ground levelling, excavation and landscaping
- Construction – any activities involving the provision of a new structure, its modification or refurbishment
- Trackout – the transport of dust and dirt from the construction site onto the public road network where it may be deposited and then re-suspended by vehicles using the road network.

The assessment method considers three separate dust impacts, which are considered the key impacts of construction activities:

- Annoyance due to dust soiling
- The risk of health effect due to an increase in exposure to PM_{10}
- Harm to ecological receptors.

The assessment is used to define appropriate mitigation measures to ensure that there will be no significant effect.

The methodology involves the following steps:

STEP 1 is to screen the requirement for a more detailed assessment (with no further assessment required if there are no receptors within a certain distance of the works).

STEP 2 is to assess the risk of dust impacts. This is done separately for each of the four activities (demolition, earthworks, construction and trackout) and takes account of the following factors:

- **STEP 2A**: The scale and nature of the works, which determines the potential dust emission magnitude
- **STEP 2B**: The sensitivity of the area
- **STEP 2C**: Combine the factors from STEP 2A and STEP 2B to give the risk of dust impacts

Risks are described in terms of there being a low, medium or high risk of dust impacts for each of the four separate potential activities. Where there are low, medium or high risks of an impact, then site-specific mitigation will be required, proportionate to the level of risk.

Based on the threshold criteria and professional judgement, one or more of the groups of activities may be assigned a ‘negligible’ risk. Such cases could arise, for example, because the emissions magnitude is small and there are no receptors near the activities.

STEP 3 is to determine the site-specific mitigation for each of the four potential activities in STEP 2. This will be based on the risk of dust impacts identified in STEP 2. Where a local authority has issued guidance on measures to be adopted at demolition/construction sites, these should also be considered.

STEP 4 is to examine the residual effects and to determine whether these are significant.

STEP 5 is to prepare the dust assessment report.

Each of the above steps is described in more detail in the following sections.

6.2.1 Step 1: Screen the need for a detailed assessment

An assessment is normally required where there is the following:

- A 'human receptor' within:
  - 350 m of the boundary of the site or;
  - 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s)
- An 'ecological receptor' within:
  - 50 m of the boundary of the site; or
  - 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).

6.2.2 Step 2: Assess the risk of dust impacts

6.2.2.1 Step 2A – Define the potential dust emission magnitude

The dust emission magnitude is based on the scale of the anticipated works as defined in Table 4.

Table 4 Magnitude of emissions by activity relevant to the project (IAQM, 2014)

Magnitude of emissions	Description
Demolition	
Large	Total building volume >50,000 m^3, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >20 m above ground level
Medium	Total building volume 20,000 m^3 – 50,000 m^3, potentially dusty construction material, demolition activities 10-20 m above ground level
Small	Total building volume <20,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10 m above ground, demolition during wetter months
Earthworks	
Large	Total site area >10,000 m^2, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >8 m in height, total material moved >100,000 tonnes
Medium	Total site area 2,500 m^2 – 10,000 m^2, moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4 m – 8 m in height, total material moved 20,000 tonnes – 100,000 tonnes
Small	Total site area <2,500 m^2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4 m in height, total material moved <20,000 tonnes, earthworks during wetter months
Construction	
Large	Total building volume >100, 000 m^3, on site concrete batching, sandblasting
Medium	Total building volume 25,000 m^3 – 100,000 m^3, potentially dusty construction material (e.g. concrete), on site concrete batching

Magnitude of emissions	Description
Small	Total building volume <25,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber).
Trackout	
Large	>50 HDV (>3.5 t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100 m
Medium	10-50 HDV (>3.5 t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 m – 100 m
Small	<10 HDV (>3.5 t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50 m.
Tables notes: HDV = Heavy Duty Vehicle	

6.2.2.2 Step 2B – Define the sensitivity of the area

The sensitivity of the area considers several factors:

- The specific sensitivities of receptors in the area (see Table 5)
- The proximity and number of those receptors
- The local background concentration of PM_{10}
- Site-specific factors, such as whether there are natural shelters (e.g. trees) to reduce the risk of wind-blown dust.

The sensitivity of receptors to the effects of dust due to soiling, human health and ecological receptors are each considered. Table 5 provides a description of the range of sensitivities for an individual receptor associated with each impact category.

Table 5 Receptor sensitivity to dust effects

Receptor sensitivity	Description
Sensitivities of people to dust soiling effects	
High	• users can reasonably expect enjoyment of a high level of amenity or; • the appearance, aesthetics or value of their property would be diminished by soiling and; • the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land
Medium	• users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home or; • the appearance, aesthetics or value of their property could be diminished by soiling or; • the people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land
Low	• the enjoyment of amenity would not reasonably be expected or; • property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling or; • there is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land

Receptor sensitivity	Description
Sensitivities of people to the human health effects of PM_{10}	
High	• locations where members of the public are exposed over a time period relevant to the air quality criteria for PM_{10} (in the case of the 24-hour criteria, a relevant location would be one where individuals may be exposed for eight hours or more in a day)
Medium	• locations where the people exposed are workers and exposure is over a time period relevant to the air quality criteria for PM_{10} (in the case of the 24-hour criteria, a relevant location would be one where individuals may be exposed for eight hours or more in a day)
Low	• locations where human exposure is transient
Sensitivities of ecological receptors	
High	• locations with an international or national designation and the designated features may be affected by dust soiling or; • locations where there is a community of a particularly dust-sensitive species
Medium	• locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown or; • locations with a national designation where the features may be affected by dust deposition
Low	• locations with a local designation where the features may be affected by dust deposition

Table 6, Table 7 and Table 8 show how the sensitivity of the area is determined for dust soiling, human health and ecosystem impacts, respectively. These tables account for a number of factors that may influence the sensitivity of the area. When using these tables, it should be noted that distances are measured from the dust source, and as such, a different area (and therefore, different number of receptors) may be affected by trackout than by on-site works. The highest level of sensitivity from each table should be recorded.

Table 6 Sensitivity of the area to dust soiling effects on people and property

Receptor Sensitivity	Number of receptors	Distance from the Source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table 7 Sensitivity of the area to human health Impacts

Receptor Sensitivity	Annual Mean PM_{10} concentration ($\mu g/m^3$) *	Number of receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
High	>20	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	17.5 – 20	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low

Receptor Sensitivity	Annual Mean PM_{10} concentration ($\mu g/m^3$) *	Number of receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
	15 – 17.5	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<15	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>20	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	17.5 – 20	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	15 – 17.5	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<15	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	≥1	Low	Low	Low	Low	Low

Table note: * IAQM criteria revised to reflect annual PM_{10} criteria relevant in Victoria

Table 8 Sensitivity of the area to ecological impacts

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

6.2.2.3 *Step 2C – Define the Risk of Impacts*

The dust emission magnitude determined at STEP 2A (section 6.2.2.1) is combined with the sensitivity of the area determined at STEP 2B (section 6.2.2.2) to determine the risk of impacts with no mitigation applied. The matrices in Table 9, Table 10 and Table 11 provide a method of assigning the level of risk for each activity. This is used to determine the level of mitigation that must be applied. Mitigation is discussed in STEP 3 (section 8.1.3). For those cases where the risk category is 'negligible', no mitigation measures beyond those required by legislation are required.

Table 9 Risk of Dust Impacts – Earthworks

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Medium	Low
Low	Low	Low	Negligible

Table 10 Risk of Dust Impacts – Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Medium	Low
Low	Low	Low	Negligible

Table 11 Risk of Dust Impacts – Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Low	Negligible
Low	Low	Low	Negligible

6.2.3 Step 3: Site-specific mitigation

The IAQM recommends that the dust risk categories for each of the four activities determined in STEP 2C be used to define the appropriate, site-specific, mitigation measures to be adopted.

For almost all construction activity, the IAQM guideline notes that the aim should be to prevent significant effects on receptors by using effective mitigation. Experience shows that this is normally possible.

The IAQM guidelines include appropriate mitigation measures that could be adopted for construction activities that are determined to have low, medium and high preliminary risk of adverse air quality impacts.

6.2.4 Step 4: Determine significant effects

Once the risk of dust impacts has been determined in STEP 2C and the appropriate dust mitigation measures have been identified in STEP 3, the final step is to determine whether there are significant effects arising from the construction phase of a proposed development.

6.2.5 Step 5: Dust assessment report

The IAQM recommends that the dust assessment report summarises the dust emission magnitude, the sensitivity of the area and the risk of impacts without mitigation. In addition, the report is to describe the mechanism for ensuring that the appropriate level of mitigation will be implemented.

7. EXISTING ENVIRONMENT

7.1 Topography and landscape

Local topography can have several influences on plume transport and diffusion. Hills or rough terrain can change wind speeds, directions and turbulence characteristics, and nearby water bodies can considerably dampen turbulence levels. Valleys can restrict horizontal movement and dispersion, and encourage the development and persistence of drainage flows. Coastal landforms can influence wind speed and direction of wind flows, controlling the dispersion of the pollutants. The topography in the vicinity of the site is summarised below.

Along the route of the HVDC land cable, the elevation ranges from approximately 0 m Australian Height Datum (AHD) at Sandy Point to a peaking around 300 m around Mirboo. The elevation along the development is presented in Figure 3. The key terrain features along the route include the coastal region to the south and the Strzelecki Ranges. These features are likely to play a large role in the predominant wind directions and wind speeds across the project area.

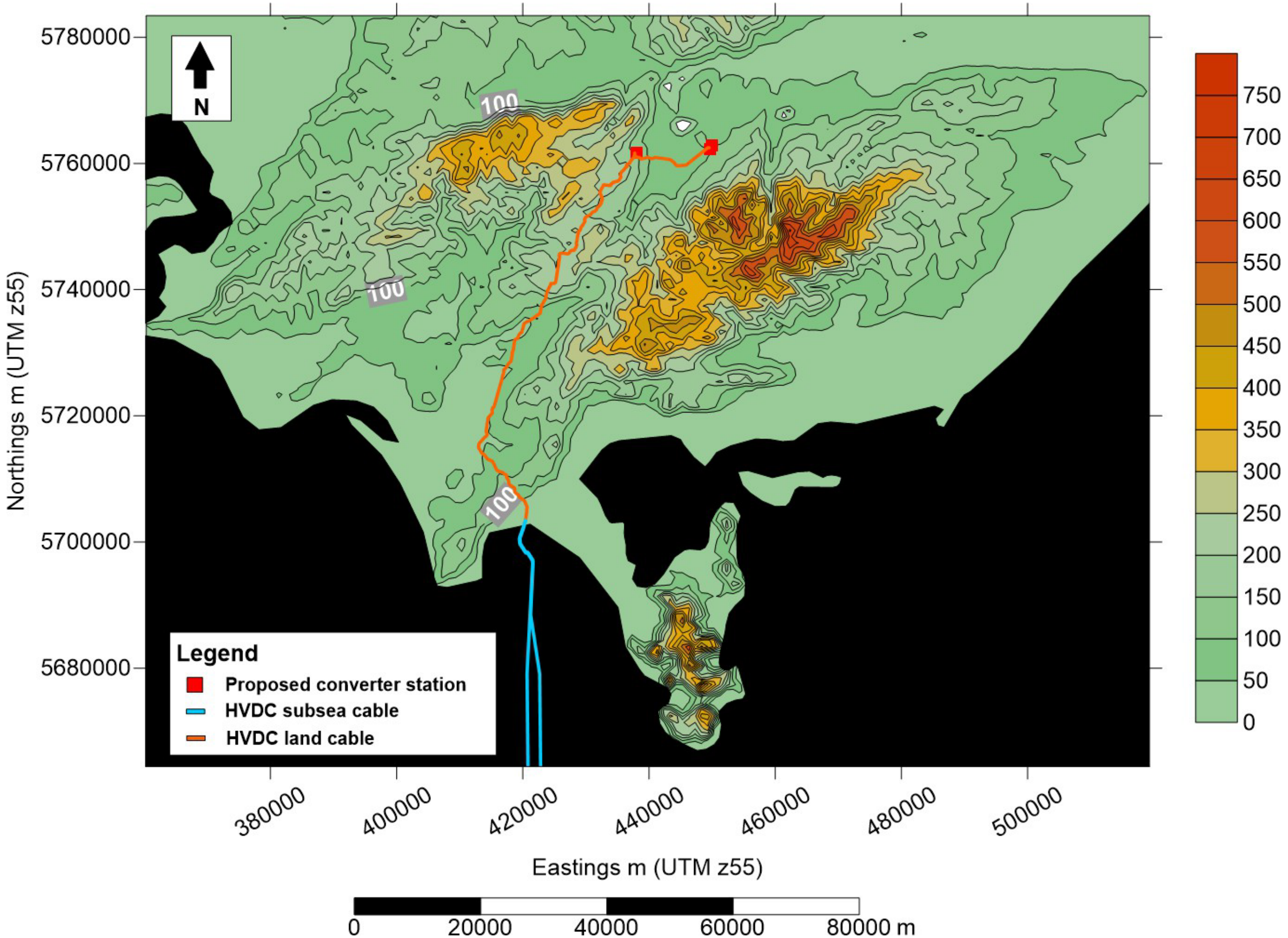

Figure 3 **Elevation across the project area**

7.2 Land use

Figure 4 presents a detailed overlay of Victorian Land Use Information System Land Use. The predominant land use intersected by the project is primary production. Approximately 80% of the land cable route passes through agricultural land.

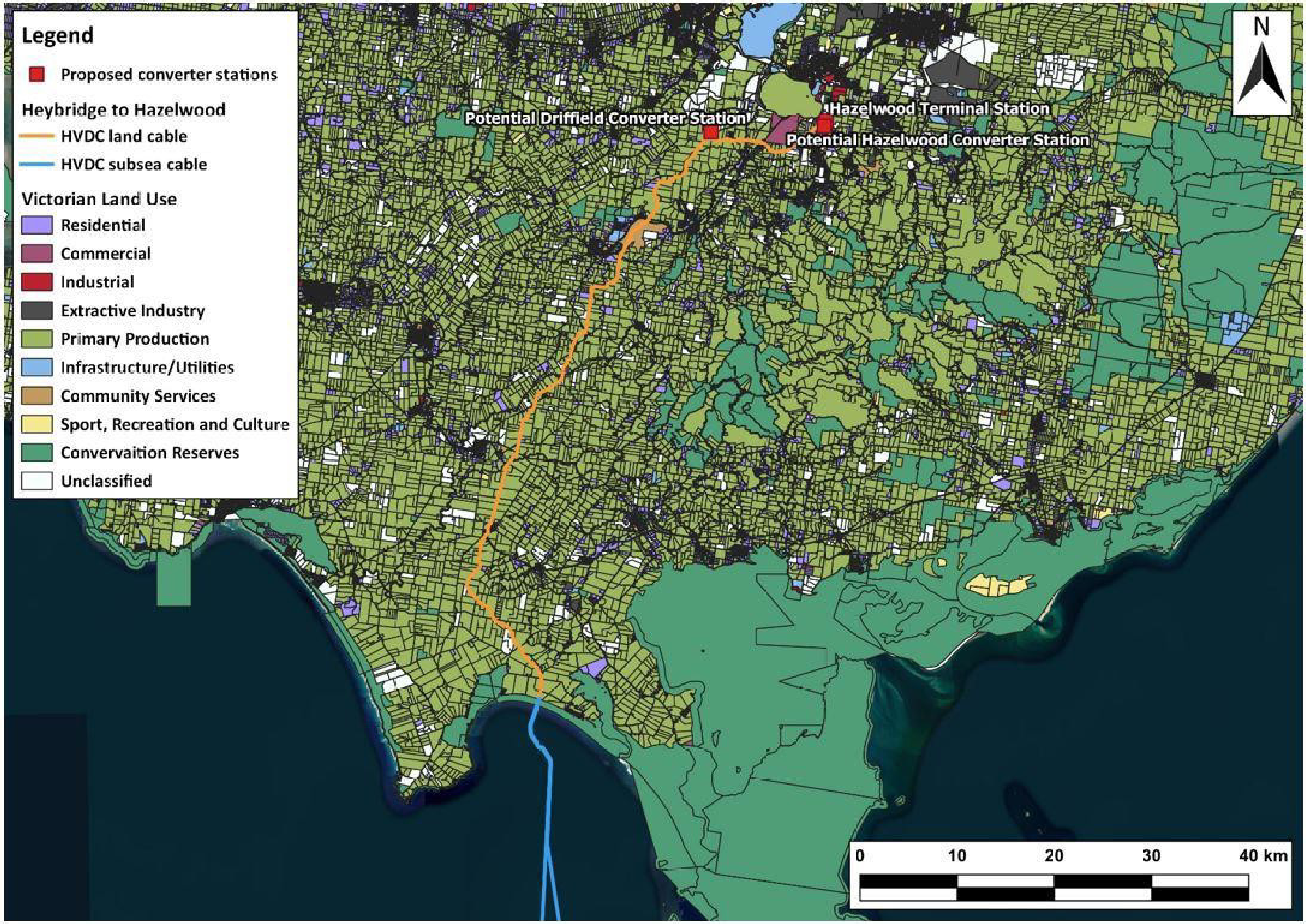

Figure 4 **Victorian Land Use Information System Land Use data in the vicinity of the project**

7.3 Meteorology and climate

The local meteorological conditions are important in understanding the potential air quality impacts associated with a project as they dictate the direction of dust transport, and where and when the higher concentrations are likely to occur. In general, it is under hot, dry and windy conditions where dust emissions have the highest potential to adversely impact on air quality away from their point of release. The meteorological parameters that may lead to these conditions are summarised in the following sections.

The project has construction activities in central southern Victoria. The region is classified as temperate with no dry season and mild summer under the BoM's (Bureau of Meteorology) modified Koeppen Classification (BoM, 2020). The climate is characterised by mild/warm summers and cold winters.

The location of each BoM site relative to the project is presented in Figure 5. A summary of each BoM site considered for the existing meteorology summary is provided in Table 12. BoM sites located at Corner Inlet (Yanakie) (from 2013 onwards), Morwell (Latrobe Valley Airport) (from 1984 onwards) and Wonthaggi (from 1911 onwards) have been selected to characterise the meteorology for the Victorian component of the project. These sites are expected to be representative of meteorological conditions at the project site due to their similar elevation and geographic location.

Table 12 BoM Monitoring Site summary

BOM Monitoring Site	State	Opened	Last Record	Distance from the project	Parameters	Climate Summary
Corner Inlet (Yanakie)	Victoria	2013	Open	7.9 km E	Rainfall, temperature, and meteorological data	Coastal site, 13.3 m AHD
Morwell (Latrobe Valley Airport)	Victoria	1984	Open	9.3 km N	Rainfall, temperature, meteorological data, and climate statistics	Aviation site, 56.3 m AHD
Wonthaggi	Victoria	1911	Open	36 km W	Climate statistics	Coastal site, 51.9m AHD

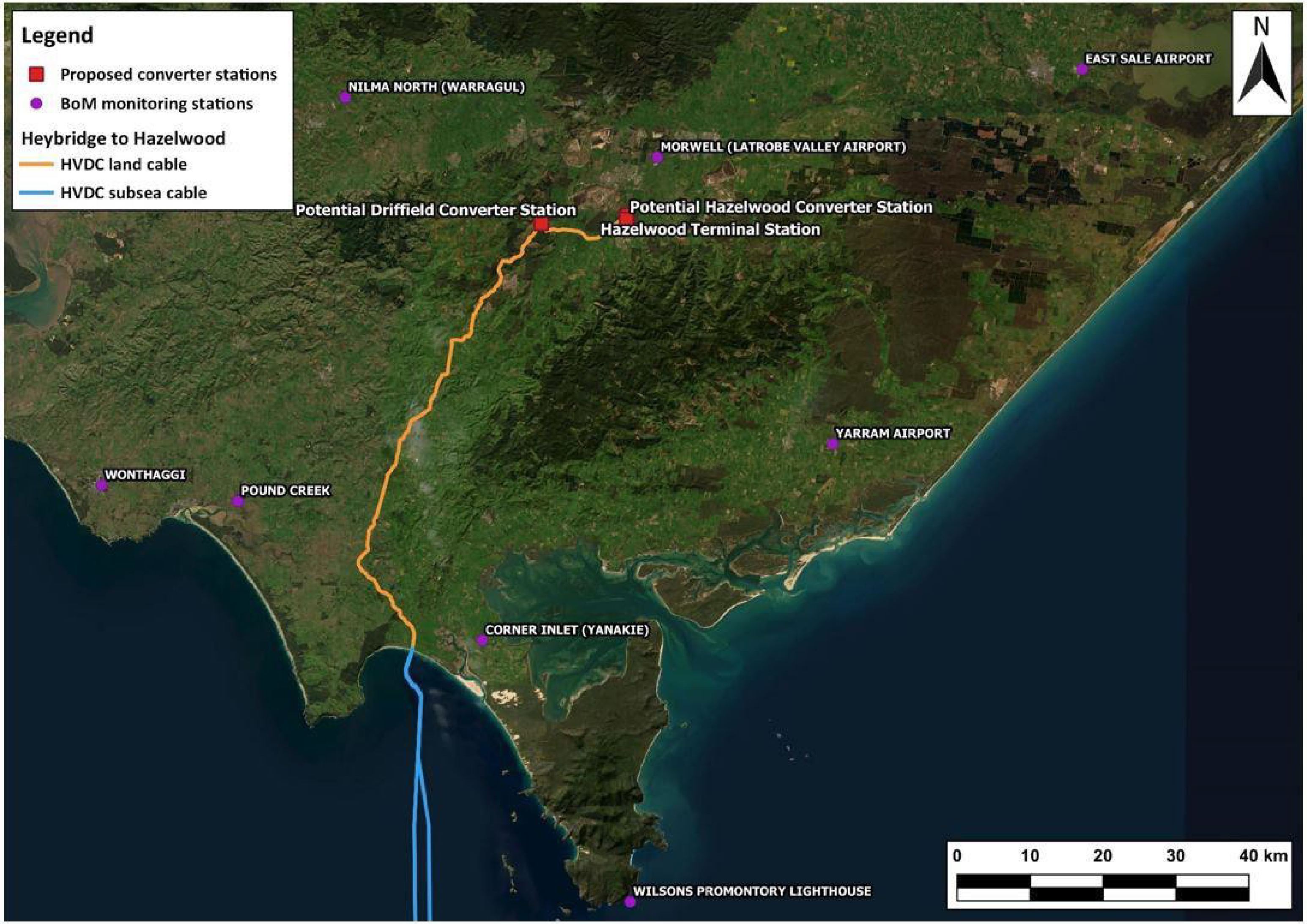

Figure 5 BoM monitoring stations within the vicinity of the project

7.3.1 Wind speed and wind direction

Wind speed and wind direction are important parameters for the transport and dispersion of air pollutants including dust. BoM sites located at Morwell (Latrobe Valley Airport) (2005 – 2022), and Corner Inlet (Yanakie) (2013 – 2022) have been selected to characterise the wind speed for both Hazelwood and Driffield converter station options within the Victorian component of the project, due to the similar elevation, geographic location and the availability of hourly wind speed and wind direction data from these automatic weather stations.

The surface wind climate is driven by the large-scale circulation pattern of the atmosphere. The project is in the Southern Slopes region which is at the northern edge of the 'Roaring Forties' belt of westerly circulation (Grose, M. *et al.,* 2015), and therefore receives predominantly westerly winds.

The annual, seasonal, and diurnal distribution of winds based on the Morwell (Latrobe Valley Airport) site are presented in Figure 6, Figure 7 and Figure 8 , respectively. The annual, seasonal, and diurnal distribution of winds based on the Corner Inlet (Yanakie) site are presented in Figure 9, Figure 10 and Figure 11, respectively.

The analysis of the wind speed and wind direction shows that:

- The winds recorded at the Morwell (Latrobe Valley Airport) site are generally moderate to strong with an average speed of 3.74 m/s. Approximately 47% of winds are from the westerly direction with approximately 16% of winds from the northeast. There is slight variation in wind speed throughout the seasons of the year. Spring and summer are characterised by stronger wind speeds compared to autumn and winter. There is slight variation in wind speed during the day and night, with wind speeds increasing throughout the day to be at their strongest during the afternoon (midday – 6pm) and lightest overnight (midnight – 6am).
- The winds recorded at the Corner Inlet (Yanakie) site are generally strong with an average speed of 4.63 m/s. Approximately 50% of winds occur from the southwest to northwest directions with a further 25% occurring from the east-northeast direction. There is a variation in both wind direction and wind speed throughout the seasons of the year. Spring and summer are characterised by stronger wind speed compared to autumn and winter. The seasonal variation indicates that northwest winds peak in winter and remain consistent throughout the year. There is slight variation in wind speed during the day and night, with wind speeds increasing throughout the day to be at their strongest during the afternoon (midday – 6pm) and lightest overnight (midnight – 6am).

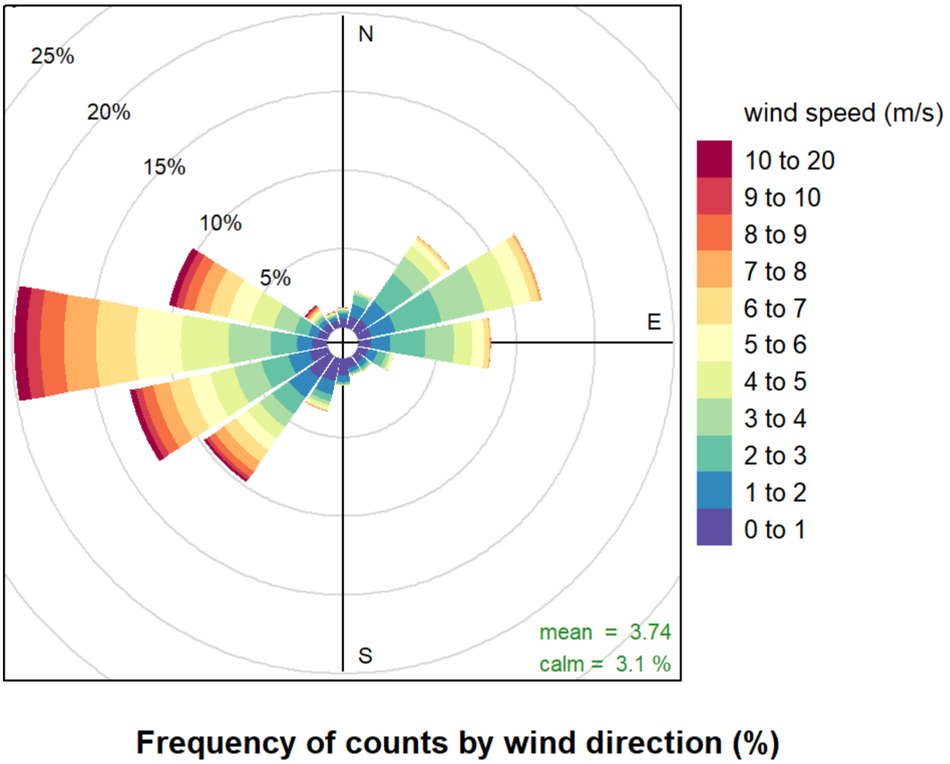

Figure 6 Annual distribution of wind speed and wind direction derived from BoM Morwell (Latrobe Valley Airport) (2005 to 2022)

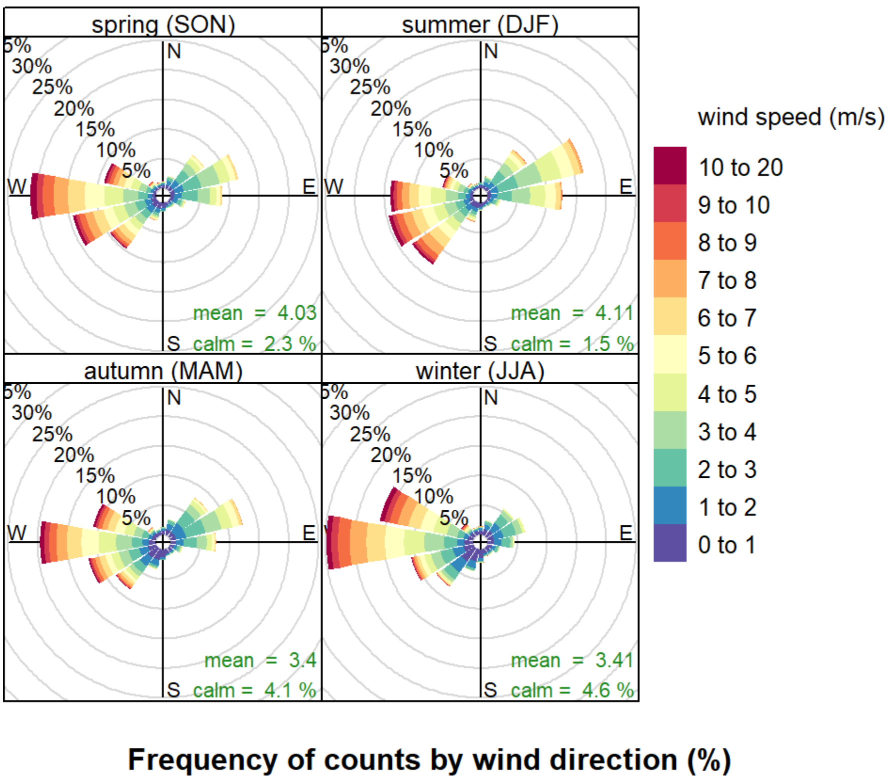

Figure 7 Seasonal distribution of wind speed and wind direction for BoM Morwell (Latrobe Valley Airport) (2005 to 2022)

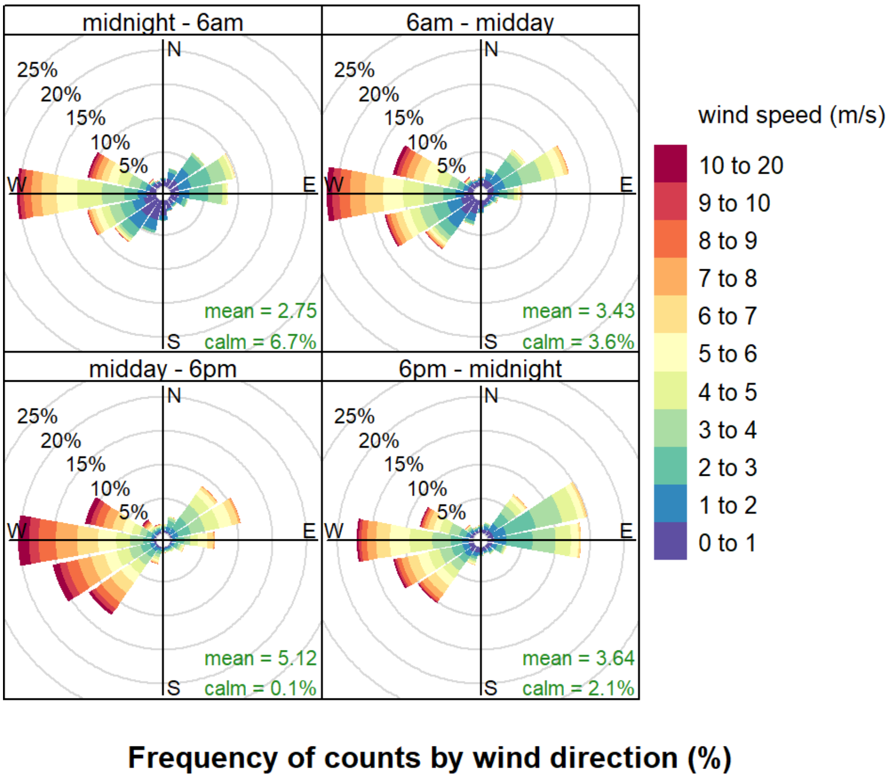

Figure 8 Diurnal distribution of wind speed and wind direction for BoM Morwell (Latrobe Valley Airport) (2005 to 2022)

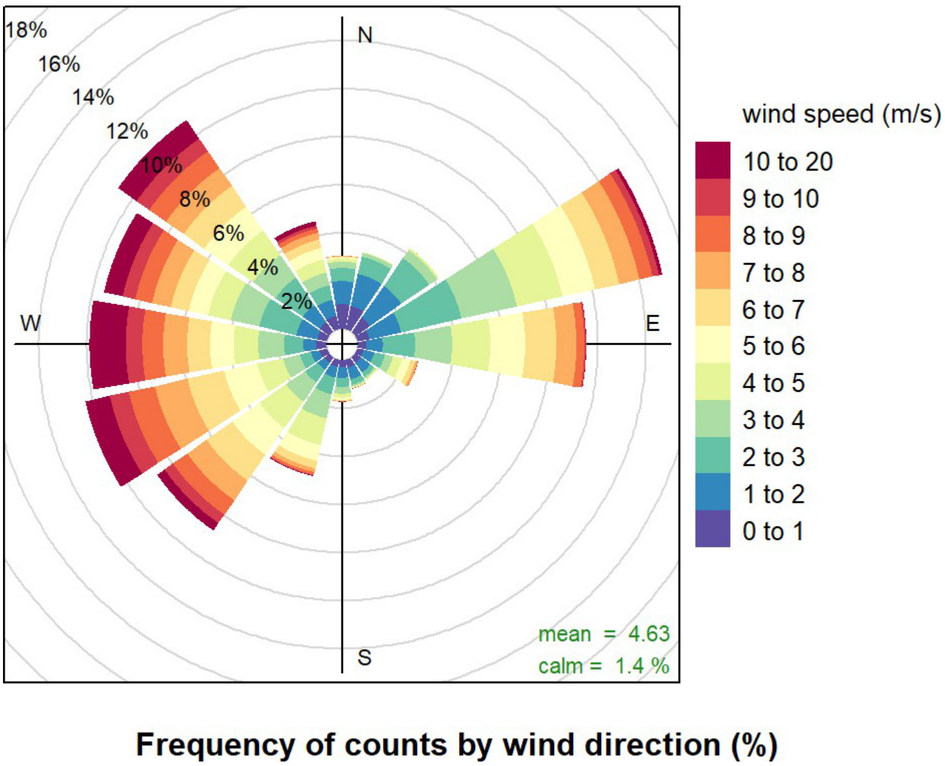

Figure 9 Annual distribution of wind speed and wind direction derived from BoM Corner Inlet (Yanakie) (2013 to 2022)

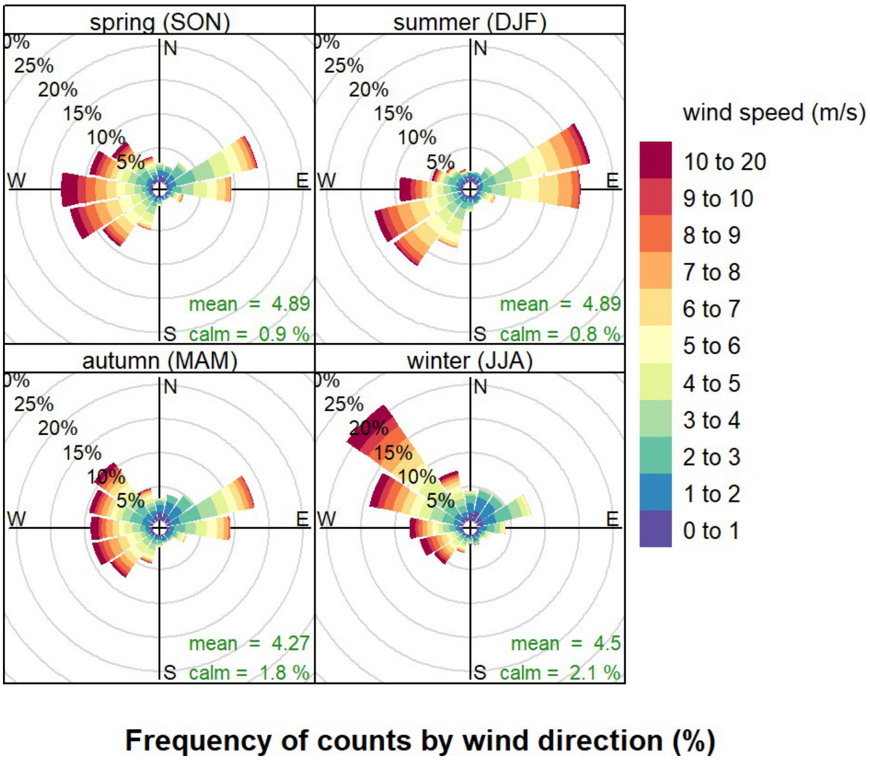

Figure 10 **Seasonal distribution of wind speed and wind direction for BoM Corner Inlet (Yanakie) (2013 to 2022)**

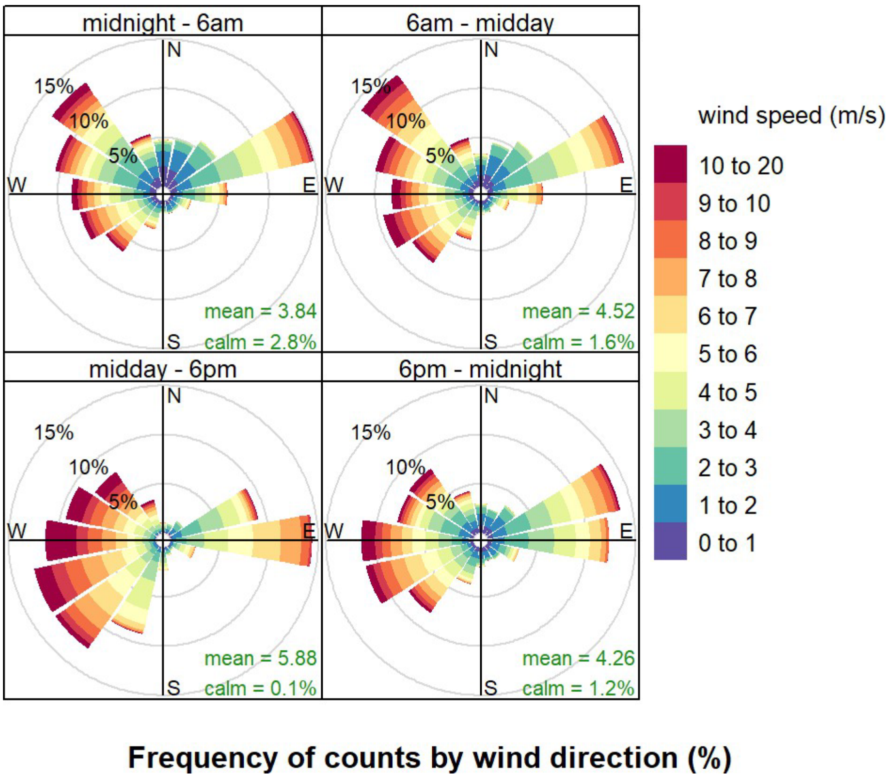

Figure 11 **Diurnal distribution of wind speed and wind direction for BoM Corner Inlet (Yanakie) (2013 to 2022)**

7.3.2 Temperature

The temperature at the site of the facility influences the convective movement of air in the lower atmosphere and, therefore, the rate of dispersion of dust from the site. In addition, temperature variations provide an indication of times during which dust emissions may increase.

Table 13 shows the minimum and maximum seasonal temperatures for Morwell (Latrobe Valley Airport), and Corner Inlet (Yanakie).

Table 13 Maximum and minimum daily temperatures recorded at Morwell (Latrobe Valley Airport), and Corner Inlet (Yanakie)

Season	Maximum Temperature (°C)[1]		Minimum Temperature (°C)[1]	
	Morwell (Latrobe Valley Airport)	Corner Inlet (Yanakie)	Morwell (Latrobe Valley Airport)	Corner Inlet (Yanakie)
Autumn	40.4	36.6	-2.8	-0.3
Spring	38.6	36.8	-2.6	0.6
Summer	46.3	43.7	1.7	3.2
Winter	26.8	21.5	-4.8	-3

Table notes:
[1] Maximum and minimum daily temperature obtained from http://www.bom.gov.au/climate/data/stations/

7.3.3 Rainfall

Rainfall reduces emissions of dust from construction activities and exposed ground. Figure 12 and Figure 13 show the annual distributions of rainfall at Morwell (Latrobe Valley Airport) and Corner Inlet (Yanakie), respectively, for the available data periods. Figure 14 and Figure 15 show the seasonal distributions of rainfall at Morwell (Latrobe Valley Airport) and Corner Inlet (Yanakie), respectively, for the available data periods.

At the Morwell (Latrobe Valley Airport) site, the annual total is the sum of validated months of rainfall data for each year. The annual average rainfall at this site for the monitoring period is 711 mm with a maximum annual total of 947 mm and a minimum annual total of 384 mm.

At the Corner Inlet (Yanakie) site, the annual total is the sum of validated months of rainfall data for each year. The annual average rainfall at this site for the monitoring period is 725 mm with a maximum annual total of 966 mm and a minimum annual total of 319 mm.

At the Morwell (Latrobe Valley Airport) site, the winter period accounts for 27% of the mean annual rainfall while summer only accounts for 22%. The shoulder seasons of spring and autumn at this site account for 30% and 21%, respectively.

At the Corner Inlet (Yanakie) site, the winter period accounts for 33% of the mean annual rainfall while summer only accounts for 17%. The shoulder seasons of spring and autumn at this site account for 26% and 24%, respectively.

The mean total rainfall peaks during the winter months and is at its lowest during summer. This seasonal rainfall is characteristic of the oceanic climate, with the absence of a dry season and the distribution of rainfall across the year.

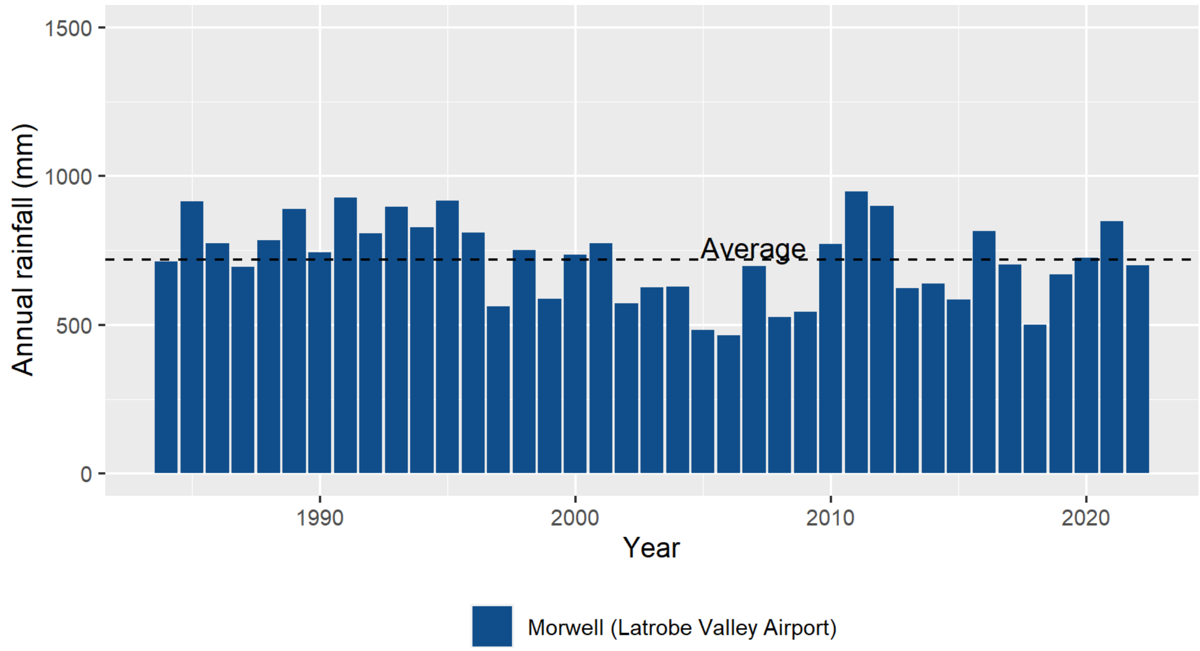

Figure 12 Annual total rainfall at Morwell (Latrobe Valley Airport) (1984 – 2022)

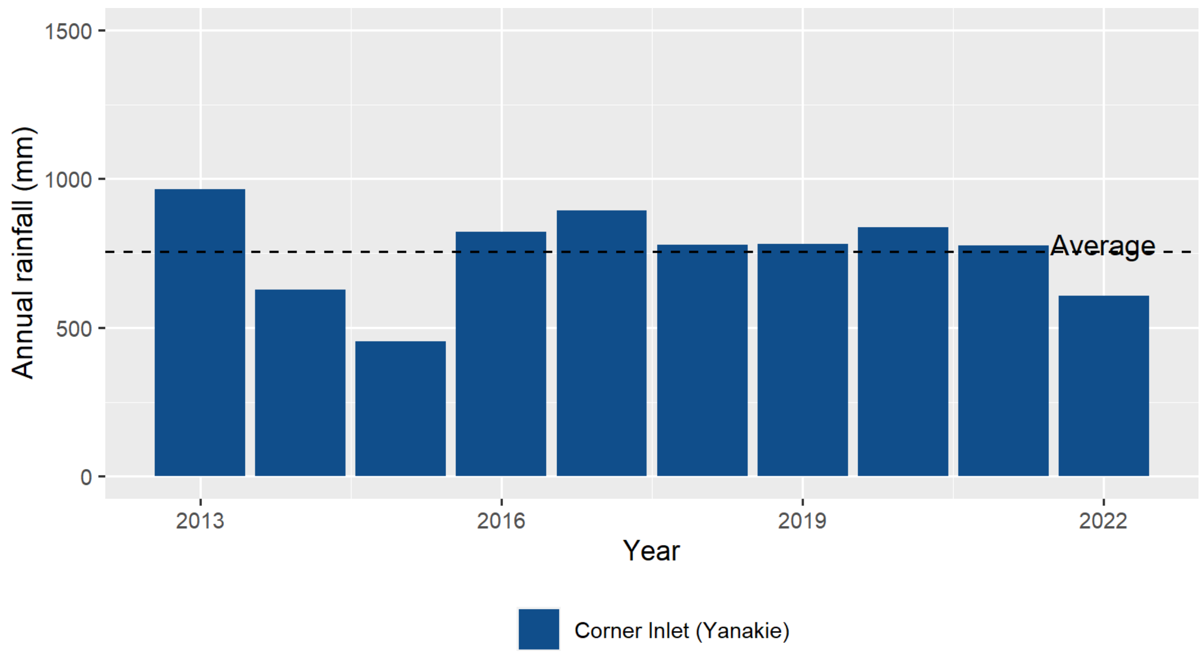

Figure 13 Annual total rainfall at Corner Inlet (Yanakie) (2013 – 2022)

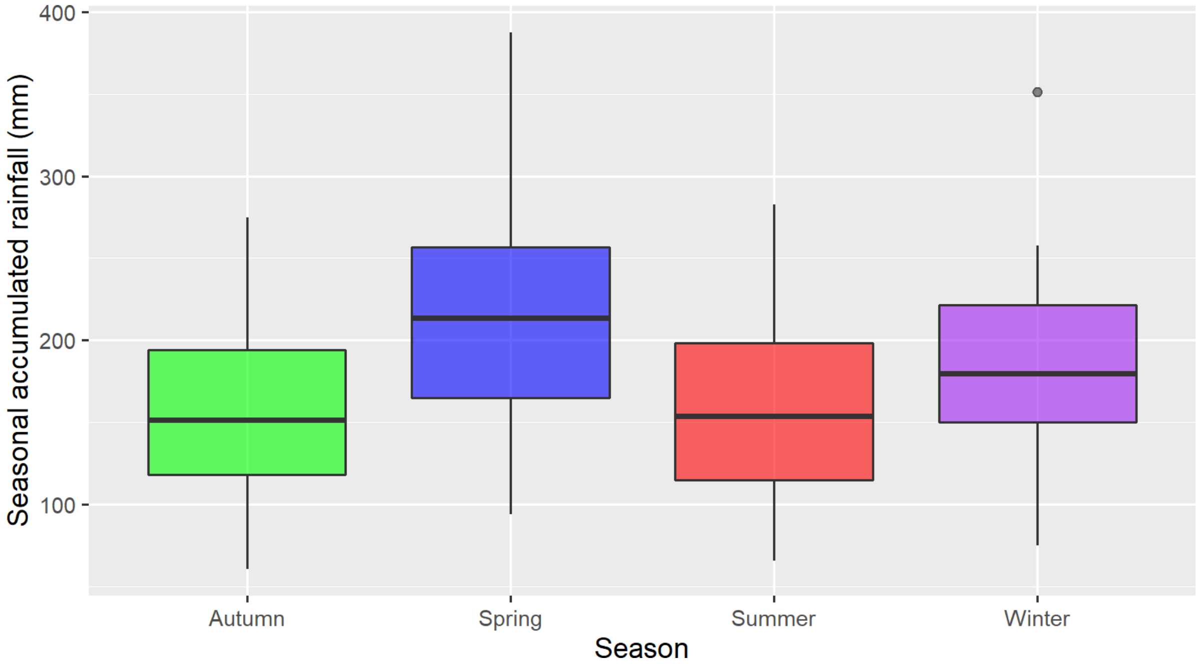

Figure 14 **Season rainfall at the BoM Morwell (Latrobe Valley Airport) monitoring station (1984 – 2022)**

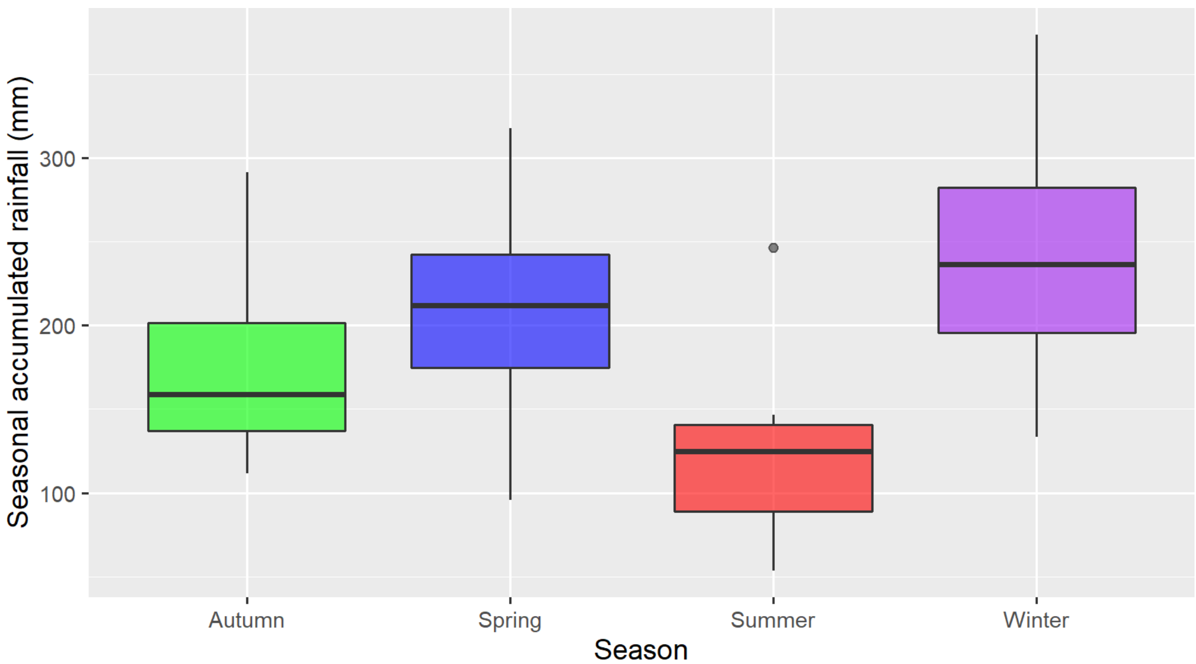

Figure 15 **Season rainfall at the BoM Corner Inlet (Yanakie) monitoring station (2013 – 2022)**

7.4 Ambient air quality

7.4.1 Existing sources of dust and particulates

There are several facilities within the vicinity of the project that report particulate emissions to the National Pollutant Inventory (NPI), the locations of these facilities are shown in Figure 16 and summarised in Table 14. There are six facilities within ten km of the project area of disturbance: Former ENGIE Hazelwood Power Station and Mine, Ecogen Power Station, Jeeralang quarry, Australian Char PTY LTD, Daily Foods and Latrobe Regional Hospital.

The Ecogen Power Station is located 1.2 km North of the Hazelwood converter station option, the facility reported emitting approximately 3000 kg/year of PM_{10}. Given the temporal nature of construction activities and the magnitude of dust emissions from the power station it is expected that the time that construction activities from the Hazelwood converter station and the Ecogen Power Station will be cumulatively contributing to impacts at receptors will be minimal.

The former ENGIE Hazelwood Power Station ceased operations on 31 March 2017. The facility is now in a rehabilitation and infrastructure demolition phase. Despite the reported figures of PM_{10}, this facility is not expected to influence impacts from the project. The Jeeralang Quarry is located 6.3 km East of the project and reported approximately 92,000 kg/year of PM_{10}.

Given the location of EPA Churchill monitor between the potential Hazelwood converter station and the Jeeralang Quarry, the contribution of the Jeeralang Quarry will be considered because its existing emissions are captured by the EPA monitoring which will be used to inform the project assessment.

Considering the high density of EPA monitors concentrated around the key facilities located within 40 km of the project, it is expected that a conservative review of EPA monitoring data will capture the contributions of the facilities to the north section of the project. The remainder of facilities are not expected to influence the project, due to the magnitude of emissions and distance from the project.

Table 14 NPI reporting facilities within 40 km of the project

Facility name	Main activities	Distance and direction from Project	Emissions to air (kg/year)	
			PM_{10}	$PM_{2.5}$
Ecogen Power Station	Power generation	1.2 km N	3,089	2,979
Former ENGIE Hazelwood Power Station and Mine [1]	Coal mining and power generation	2.7 km N	4,865,282	14,716
Australian Char Pty Ltd	Barbecue fuel briquettes production	4.9 km N	111	111
Jeeralang quarry	Quarry rock processing	6.3 km E	92,416	2,160
Dairy Foods	Dairy product manufacturing	6.6 km N	1,335	1,335
Latrobe Regional Hospital	Hospital	8.3 km NE	0	0
Koonwarra Landfill (New)	Landfill	11.5 km W	429	408
Hyland Highway Landfill	Landfill	11.8 km E	865	822
Paper Australia Maryvale Mill	Wood pulp manufacturing	12.1 km N	222,320	92,880
Traralgon Lime Manufacturing Plant	Limestone manufacturing processes	13.3 km NE	18,542	5,820

Facility name	Main activities	Distance and direction from Project	Emissions to air (kg/year)	
			PM_{10}	$PM_{2.5}$
Loy Yang B Power Station	Power generation	13.6 km NE	863,430	609,642
Energy Australia Yallourn	Mining and power generation	13.8 km N	4,767,348	1,905,540
Saputo Dairy Australia – Leongatha	Dairy product manufacturing	13.8 km W	13,719	4,836
Leongatha quarry	Quarry rock processing	14.8 km W	168,592	3,130
Valley Power Limited	Power generation	14.9 km N	778	750
AGL Loy Yang	Coal mining and power generation	15.0 km NE	8,177,594	1,223,695
Greenham Gippsland	Meat processing	16.5 km NW	401	123
Gooding Compressor Station	Gas transmission compression	17.8 km NW	346	346
NovaPower Traralgon	Power generation	17.8 km NE	7	7
Burra Foods Factory	Dairy product manufacturing	25.7 km W	32,352	2,530
Darnum	Dairy product manufacturing	27 km W	23,833	3,411
West Gippsland Heathcare Group	Healthcare	35.1 km W	81	81
Yarram Sawmill	Sawmilling and CCA treatment	35.9 km E	95,500	80,821

Table Note

[1] Operations at this facility ceased on 31 March 2017. The facility is now in a rehabilitation and infrastructure demolition phase.

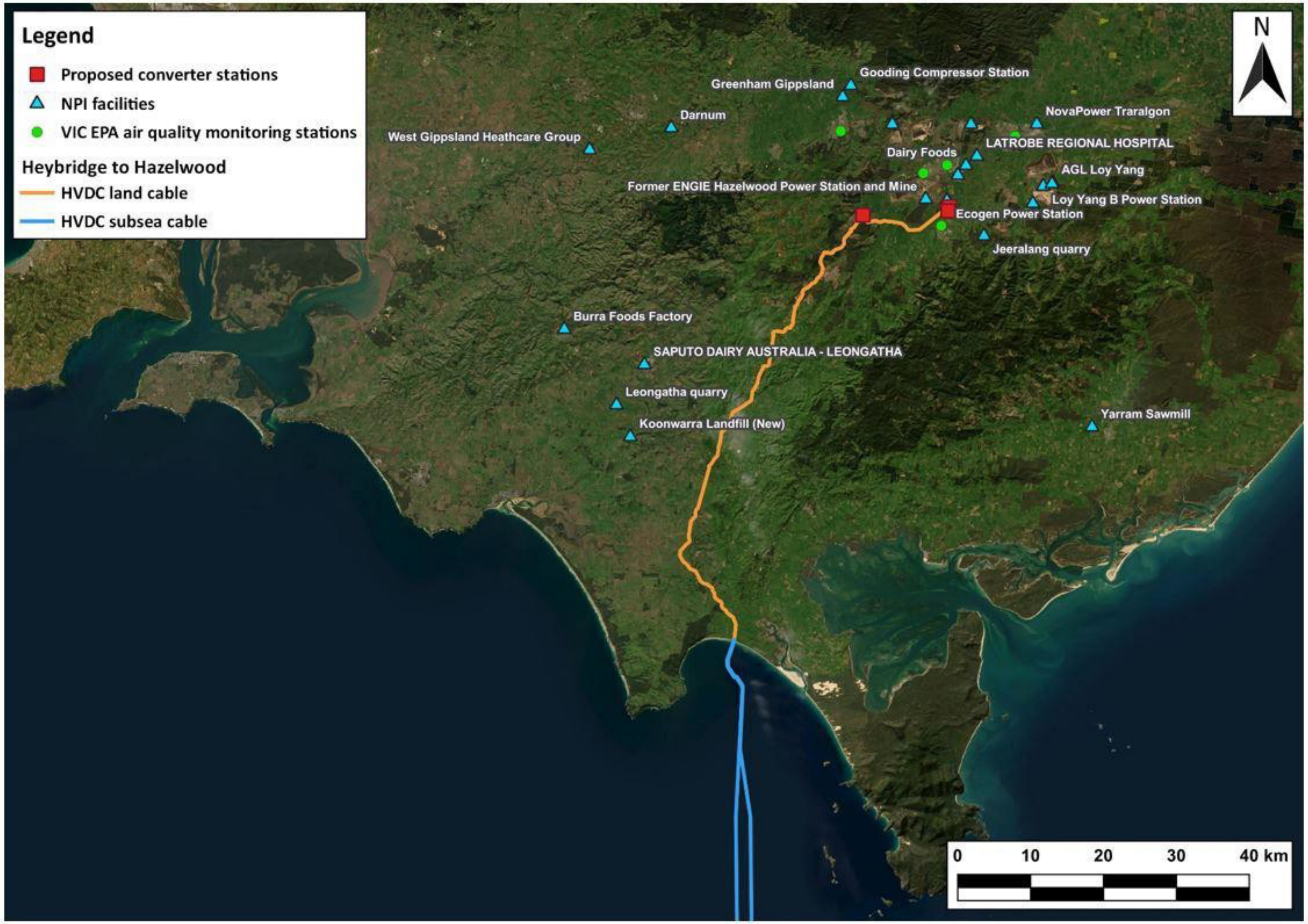

Figure 16 Location of facilities reporting particulate emissions to the NPI for 2020/2021

7.4.2 Existing ambient air quality

Existing ambient air quality has been quantified through a desktop assessment based on data sourced from EPA Victoria. The location of EPA Victoria's air monitoring stations within 20 km of the project can be seen in Figure 17. A summary of the settings and pollutants monitored at these stations is provided in Table 15.

Review of the EPA air monitoring stations within 20 km of the project indicated that Traralgon was the only site measuring PM_{10}, and $PM_{2.5}$ was measured at several sites including, Moe, Morwell South, Morwell East, Churchill and Traralgon. The ambient background levels at the project site are expected to be low because of minimal nearby emission sources. All the EPA monitors in the vicinity of the project are located within residential areas to the north of project focused on capturing the impacts from the existing industrial facilities. Measured concentrations are expected to be conservative along the sections of the project where there are minimal existing industrial operations. A conservative approach has been taken where the highest ambient background concentrations at Traralgon have been used for PM_{10}, and the highest background concentrations from Moe, Morwell South, Morwell East, Churchill or Traralgon has been used to characterise $PM_{2.5}$.

Table 15 EPA Victoria Monitoring Site summary

EPA Victoria Monitoring Site	Minimum distance from project	Surrounding Environment	Relevant Pollutants Monitored
Churchill	1.4 km SW	Located within the residential area of Churchill	$PM_{2.5}$
Morwell South	5.8 km NW	The Morwell South monitor is approximately 1.5 km southeast of the town centre. This monitor is 700 m north of the Morwell Opencut mine.	$PM_{2.5}$
Morwell East	6 km N	The Morwell East monitor is approximately 1.5 km southwest of the town centre. This monitor is 2.5 km northeast of the Morwell Opencut mine.	$PM_{2.5}$
Moe	12.4 km N	The Moe is positioned within a residential area, approximately 75 m from the Princess Freeway.	$PM_{2.5}$
Traralgon	13.8 km SE	The Traralgon monitor is surrounded by residential areas with an industrial area to the east. Approximately 600 m south of the monitor is the Princess Highway.	PM_{10} and $PM_{2.5}$

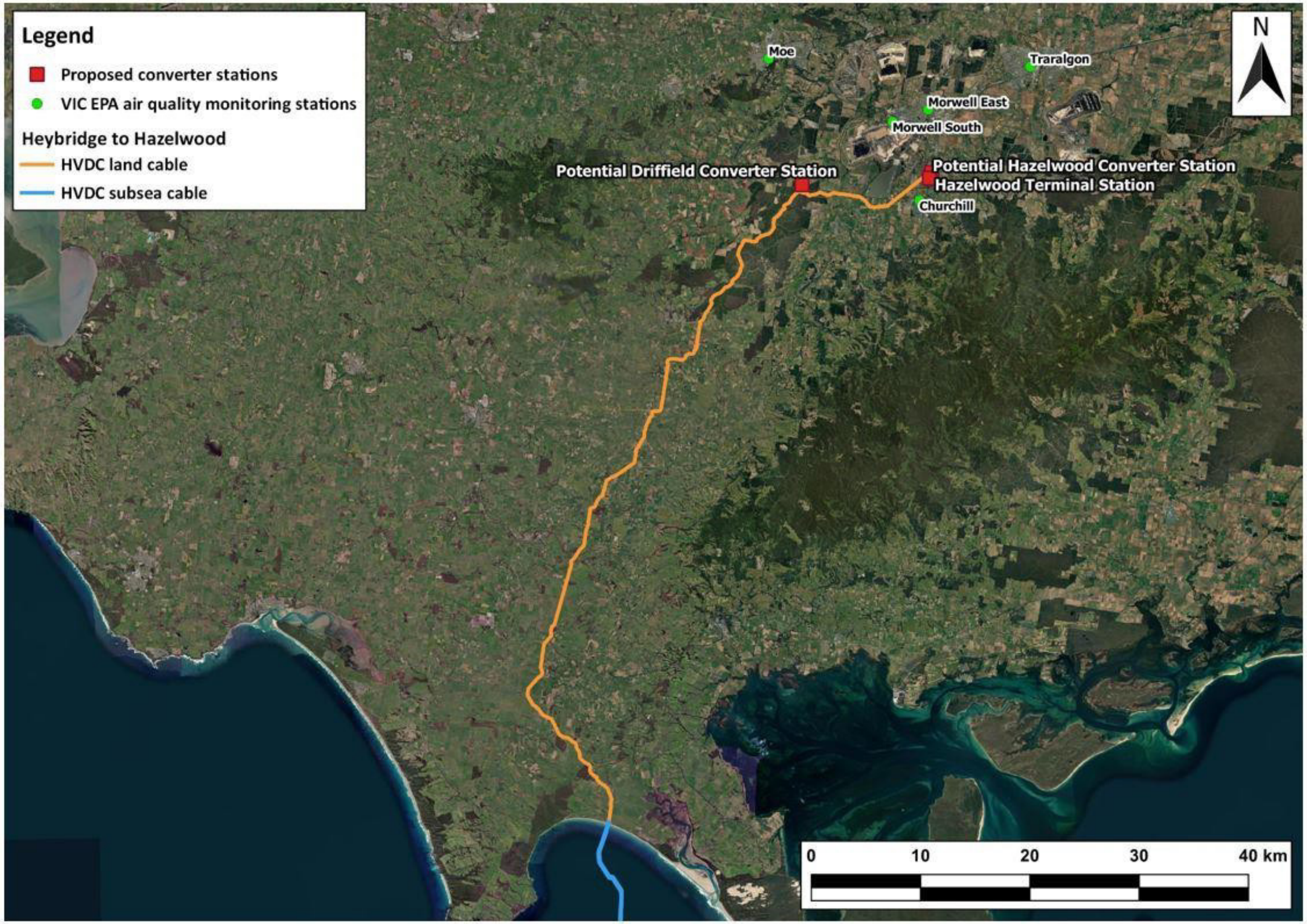

Figure 17 **Location of EPA Victoria dust monitoring station locations**

Seven years of EPA Victoria's available data (2015 – 2021) have been analysed to understand likely ambient background concentrations of particulates in the vicinity of the project. Relevant PM_{10} statistics from EPA Victoria's Traralgon site measured from 2015 to 2021 are presented in Table 16, and relevant $PM_{2.5}$ statistics for EPA Victoria sites Moe, Morwell South, Morwell East, Churchill and Traralgon are presented in Table 17 to Table 21. A summary of the exceedance days identified at the EPA sites during the monitoring period in the context of bushfires is presented in Table 22.

Table 16 Concentrations of PM_{10} at EPA Victoria Traralgon site from 2015 to 2021

Year	PM_{10} (µg/m³)			
	24-hour average (Maximum)	No. days above 50 µg/m³	24-hour average (70th percentile)	Annual average
2015	45.4	0	16.5	13.5
2016	49.2	0	16.6	13.8
2017	42.8	0	17.1	14.3
2018	47.4	0	16.9	14.5
2019	78.0	5	21.2	17.6
2020	248.7	10	18.9	19.2
2021	43.4	0	17.4	15.4
Criteria	**50**	**-**	**-**	**25**

Table 17 Concentrations of $PM_{2.5}$ at EPA Victoria Moe site from 2015 to 2021

Year	$PM_{2.5}$ (µg/m³)			
	24-hour average (Maximum)	No. days above 25 µg/m³	24-hour average (70th percentile)	Annual average
2015	17.6	0	7.5	6.5
2016	31.2	2	7.4	6.6
2017	33.5	3	7.3	6.4
2018	26.9	1	7.4	6.4
2019	45.8	6	8.5	7.5
2020	220.4	7	7.7	8.6
2021	25.1	1	6.8	6.0
Criteria	**25**	**-**	**-**	**8**

Table 18 Concentrations of $PM_{2.5}$ at EPA Victoria Morwell South site from 2015 to 2021

Year	$PM_{2.5}$ (µg/m³)			
	24-hour average (Maximum)	No. days above 25 µg/m³	24-hour average (70th percentile)	Annual average
2015	13.7	0	6.9	5.8
2016	29.3	1	6.9	6.3
2017	42.1	2	7.3	6.5
2018	31.4	2	6.8	6.5

Year	PM2.5 (µg/m³)			
	24-hour average (Maximum)	No. days above 25 µg/m³	24-hour average (70th percentile)	Annual average
2019	51.2	5	7.8	7.2
2020	200.3	8	7.3	7.9
2021	22.5	0	5.9	5.2
Criteria	**25**	**-**	**-**	**8**

Table 19 Concentrations of $PM_{2.5}$ at EPA Victoria Morwell East site from 2015 to 2021

Year	PM2.5 (µg/m³)			
	24-hour average (Maximum)	No. days above 25 µg/m³	24-hour average (70th percentile)	Annual average
2015	32.6	1	7.7	6.8
2016	33.0	2	7.9	7.2
2017	37.8	1	7.9	6.7
2018	29.9	1	7.9	6.8
2019	33.1	4	8.9	7.9
2020	218.8	9	7.8	9.1
2021	27.1	1	7.1	6.4
Criteria	**25**	**-**	**-**	**8**

Table 20 Concentrations of $PM_{2.5}$ at EPA Victoria Churchill site from 2015 to 2021

Year	PM2.5 (µg/m³)			
	24-hour average (Maximum)	No. days above 25 µg/m³	24-hour average (70th percentile)	Annual average
2015	34.9	2	7.7	6.9
2016	24.3	0	6.7	5.7
2017	34.1	4	7.3	6.9
2018	27.8	1	7.0	6.4
2019	68.8	7	8.3	7.6
2020	241.6	10	8.8	10.5
2021	23.6	0	6.7	6.2
Criteria	**25**	**-**	**-**	**8**

Table 21 Concentrations of $PM_{2.5}$ at EPA Victoria Traralgon site from 2015 to 2021

Year	PM2.5 (µg/m³)			
	24-hour average (Maximum)	No. days above 25 µg/m³	24-hour average (70th percentile)	Annual average
2015	35.1	1	8.3	7.7
2016	25.7	1	8.6	7.8

Year	$PM_{2.5}$ (µg/m³)			
	24-hour average (Maximum)	No. days above 25 µg/m³	24-hour average (70th percentile)	Annual average
2017	32.3	5	9.1	8.4
2018	30.1	2	9.0	8.0
2019	37.4	7	9.9	8.9
2020	244.4	4	8.4	8.8
2021	31.8	2	7.9	7.2
Criteria	**25**	**-**	**-**	**8**

Table 22 Analysis of $PM_{2.5}$ and PM_{10} exceedances days from 2015 to 2021

Month-Year	Day	$PM_{2.5}$ Exceedances	PM_{10} Exceedances	Cause of exceedance
March-2015	31st	1	-	Unknown source
April-2015	1st	1	-	Unknown source
Februrary-2016	12th	1	-	Bushfire
April-2016	20th, 27th	2	-	Unknown source
April-2017	6th, 7th, 20th	3	-	Unknown source
May-2017	12th, 23rd	2	-	Unknown source
July-2017	22nd	1	-	Unknown source
April-2018	23rd	1	-	Bushfire
May-2018	2nd	1	-	Unknown source
June-2018	2nd	1	-	Unknown source
July-2018	4th	1	-	Unknown source
February-2019	4th	1	-	Unknown source
March-2019	3rd, 4th, 10th	3	1	Unknown source
May-2019	19th, 20th	2	-	Unknown source
November-2019	26th	1	1	Bushfire
December-2019	20th, 28th	2	2	Bushfire
January-2020	3rd, 4th, 6th, 7th, 13th, 14th, 15th, 31st	27	8	Bushfire
February-2020	6th, 7th	10	2	Bushfire
May-2020	17th	1	-	Other
May-2021	1st, 2nd, 22nd	4	-	Other

7.4.3 Summary of background particulate concentrations

Ambient levels of particulates used in the assessment are shown in Table 23. Maximum PM_{10} levels measured at Traralgon have been selected to characterise the ambient levels in the vicinity of the project (although the years 2019 and 2020 have not been considered due to the influence of bushfires in these years).

Table 23 Ambient background concentrations used in assessment

Pollutant	Annual average background concentration (µg/m^3)	Number of exceedances of 24-hour average criterion	Source
PM_{10} [1]	15.4	0	EPA Victoria Traralgon

Table Note:

[1] 2019 and 2020 have been excluded from this assessment due to the impact of bushfires.

7.5 Sensitive receptors

7.5.1 Residential receptors

Tetra Tech Coffey has provided details of sensitive receptors within 1 km of the land cable and potential converter stations at Hazelwood and Driffield for assessment purposes. Katestone has refined the list of sensitive receptors as per the specifics of the IAQM method, focussing on high sensitivity receptors. As shown in Figure 18, the receptor density varies greatly along the route, with key clusters around Churchill and Mirboo. In total, 245 residential buildings have been identified within 1 km of the land cable and potential converter stations at Hazelwood and Driffield. The nearest resident to construction activities is approximately 11 m from the disturbance boundary of the land cable.

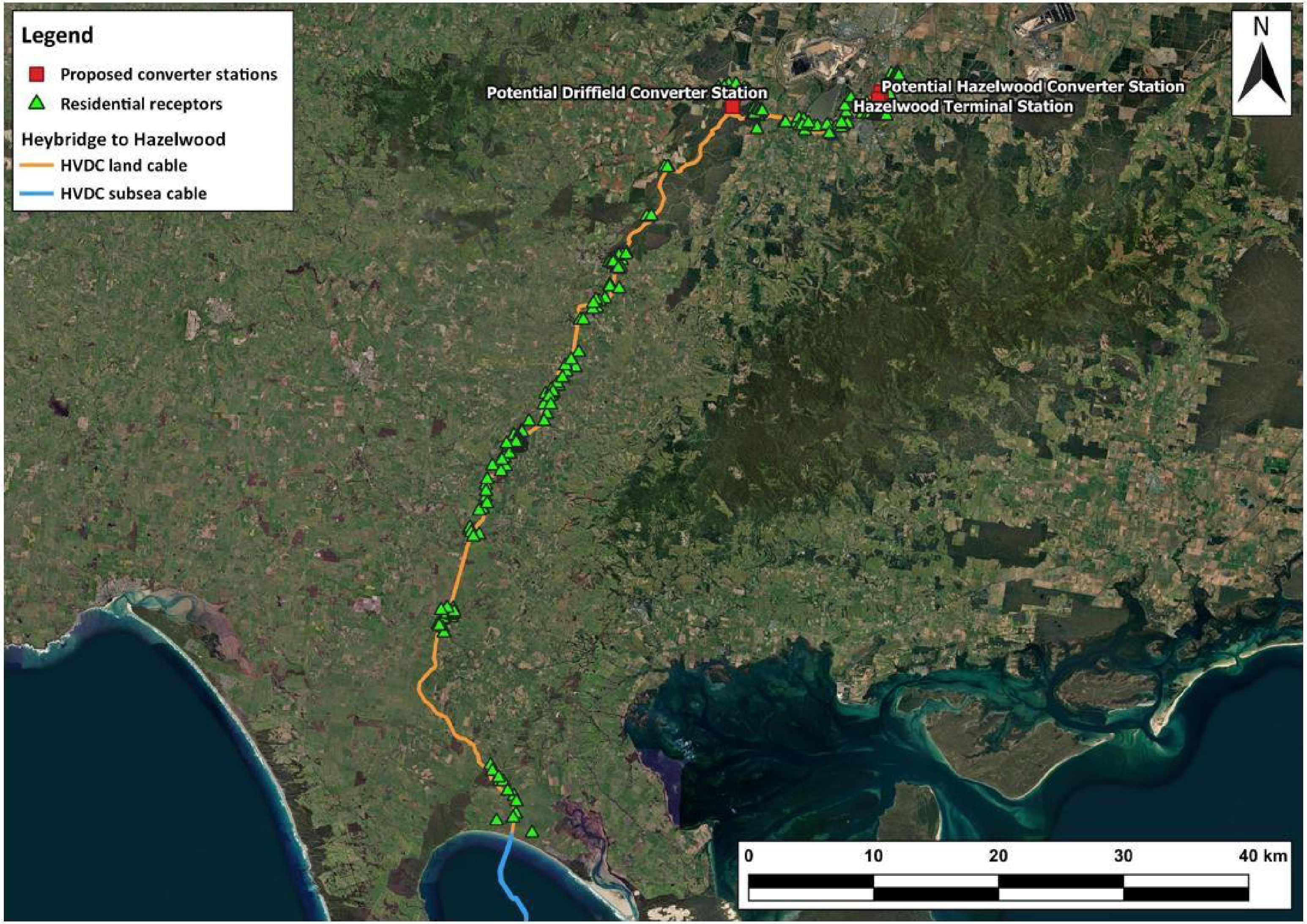

Figure 18 Residential receptors within the vicinity of the land cable and potential converter stations at Hazelwood and Driffield

7.5.2 Ecological receptors

Impacts on ecological receptors are assessed in the terrestrial ecology technical study (ELA, 2023) for the project, which has concluded that it is unlikely that any ecological habitats within the survey area will be particularly susceptible to dust. Regarding vegetation, potential impacts as a result of dust deposition may include reduced rates of photosynthesis and respiration. However, large volumes of dust would be required for this to happen and this is less likely in higher rainfall environments. Therefore, for the purposes of this dust risk assessment, the ecological receptors identified by ELA have been classified as low sensitivity receptors. Katestone has refined the list to only include those within 20 m of the area of disturbance for the land cable and potential converter stations at Hazelwood and Driffield.

7.6 Population density

The receiving environment of the project has been reviewed with reference to usual resident population as reported according to Mesh Blocks. Mesh Blocks are the smallest geographical area defined by the Australian Bureau of Statistics (ABS) and form the building blocks for the larger regions of the Australian Statistical Geography Standard (ASGS). The 2016 ASGS contains 358,122 Mesh Blocks covering the whole of Australia without gaps or overlaps.

As can be seen in Figure 19, the project primarily intersects Mesh Blocks with population densities of 250 to 500. The greatest Mesh Block population intersected by the project is approximately 611 residents. The construction of the converter station, at either Hazelwood or Driffield, is expected to be the most dust intensive phase of construction associated with the project. Both the proposed converter stations are in areas of population densities of less than 500 residents.

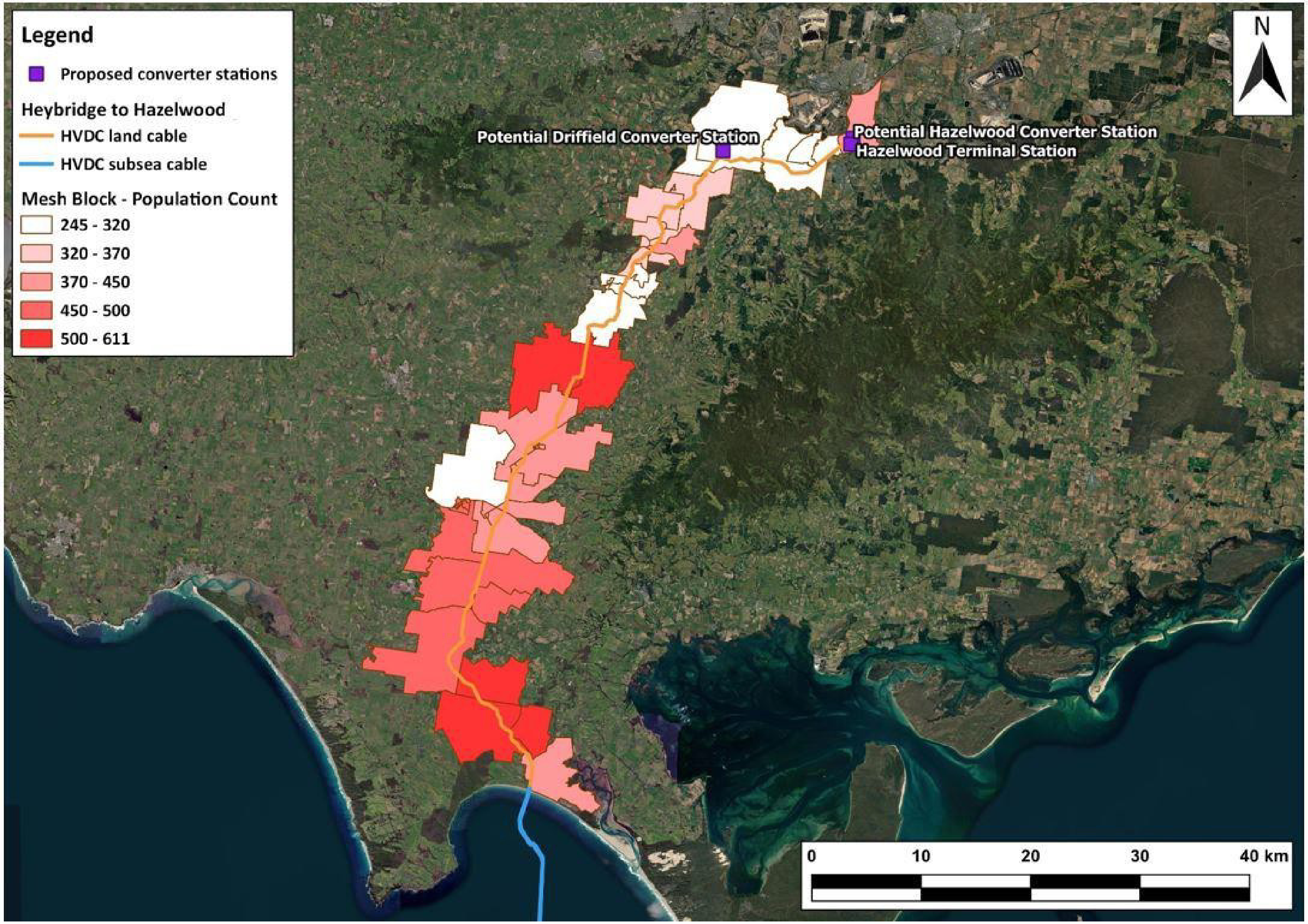

Figure 19 **Population density in the receiving environment as reported by Mesh Block**

7.7 Population vulnerability

The vulnerability of the receiving environment of the project has been reviewed with reference to socio-economic indexes as reported by Socio-Economic Indexes for Areas (SEIFA) as the Index of Relative Socio-Economic Disadvantage (IRSD). The IRSD is reported by the ABS, as a general socio-economic index that summarises a range of information about the economic and social conditions of people and households in an area. A low score indicates relatively greater disadvantage in general, whereas a high score indicates a relative lack of disadvantage. The IRSD within the vicinity of the project is presented in Figure 20, the figure shows that IRSD ranges from two to four along the project. Both the proposed converter stations at Hazelwood and Driffield are in areas with a score of 4 indicating a relative lack of disadvantage where dust impacts are expected to be most intensive.

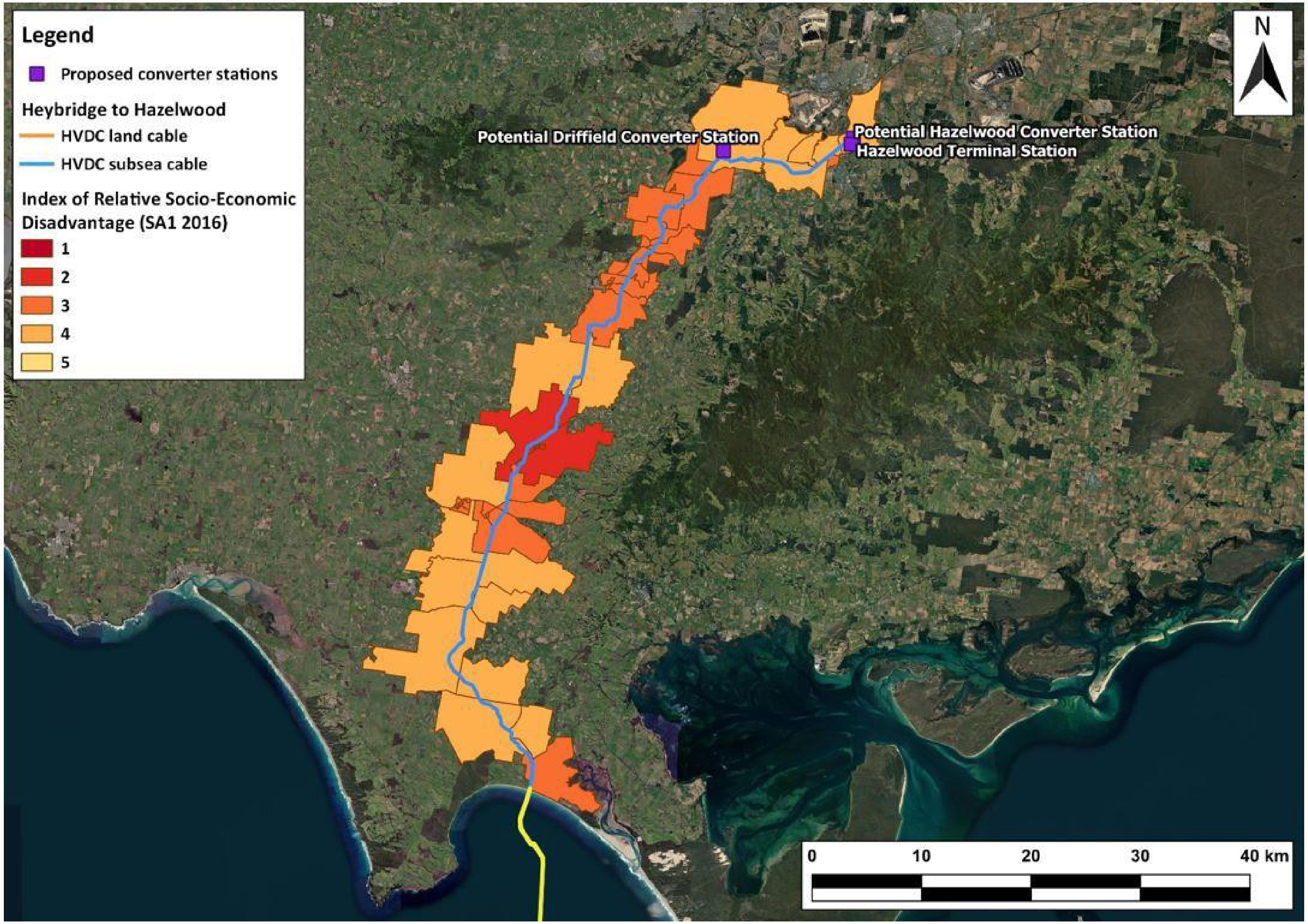

Figure 20 **Vulnerability of the surrounding environment presented as the Index of Socio- Economic Disadvantage for the statistical area level 1 (SA1)**

8. AIR QUALITY ASSESSMENT

8.1 Construction risk assessment

8.1.1 Hazelwood converter station option

This section will outline the risk assessment for the Hazelwood converter station option, separately assessing the land cable and the Hazelwood converter station construction.

8.1.1.1 Land cable construction

This section will outline the risk assessment for the land cable construction associated with the Hazelwood converter station option.

8.1.1.1.1 Step 1: Screening assessment

There are 197 residential receptors within 350 m of the land cable, with 207 residential receptors within 350 m of the land cable and access track routes. Therefore, a detailed risk assessment is required.

The receptors surrounding the proposed Hazelwood land cable construction are presented in Figure 21 to Figure 23.

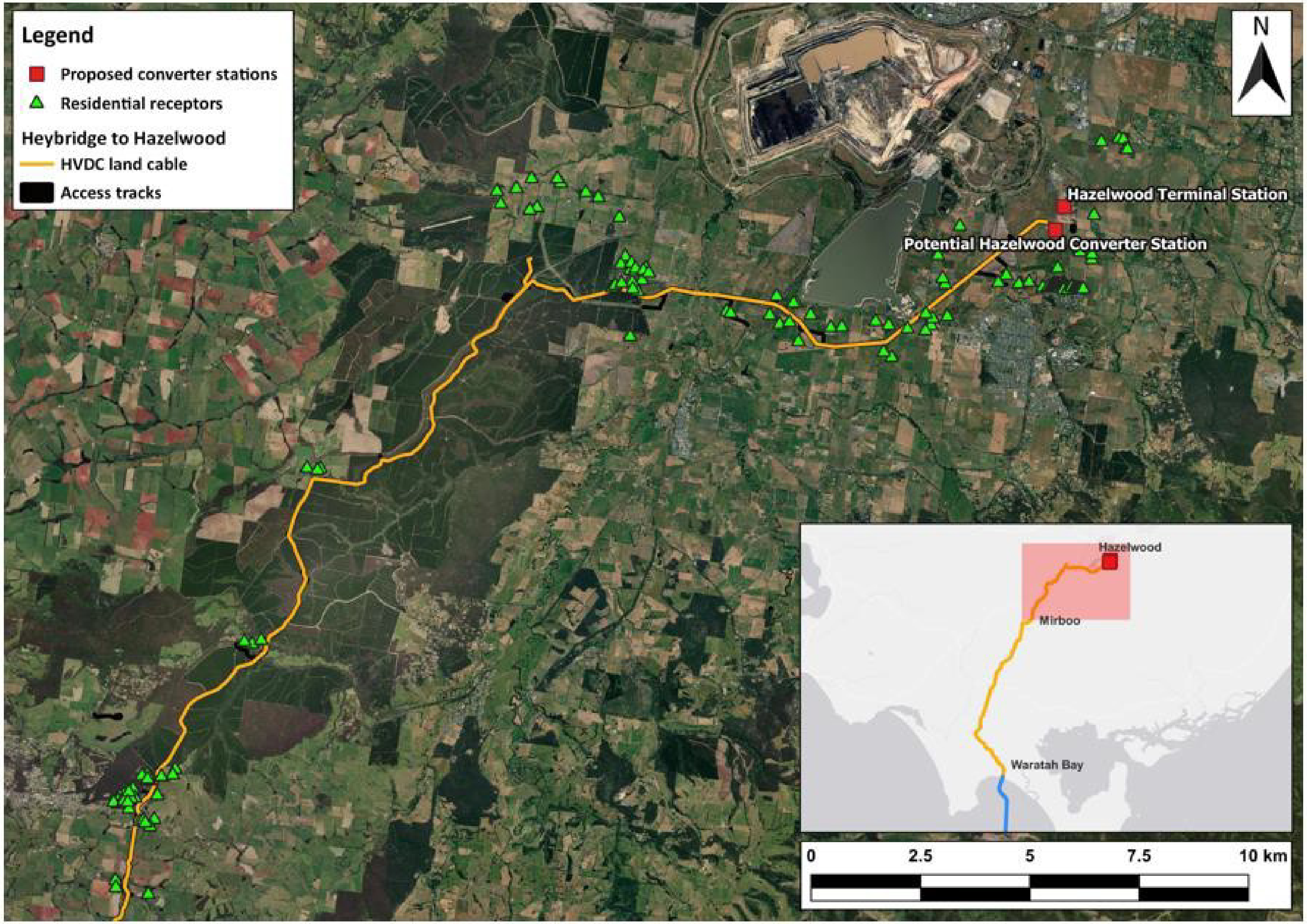

Figure 21 Residential receptors along the proposed Hazelwood land cable option and associated access tracks (North)

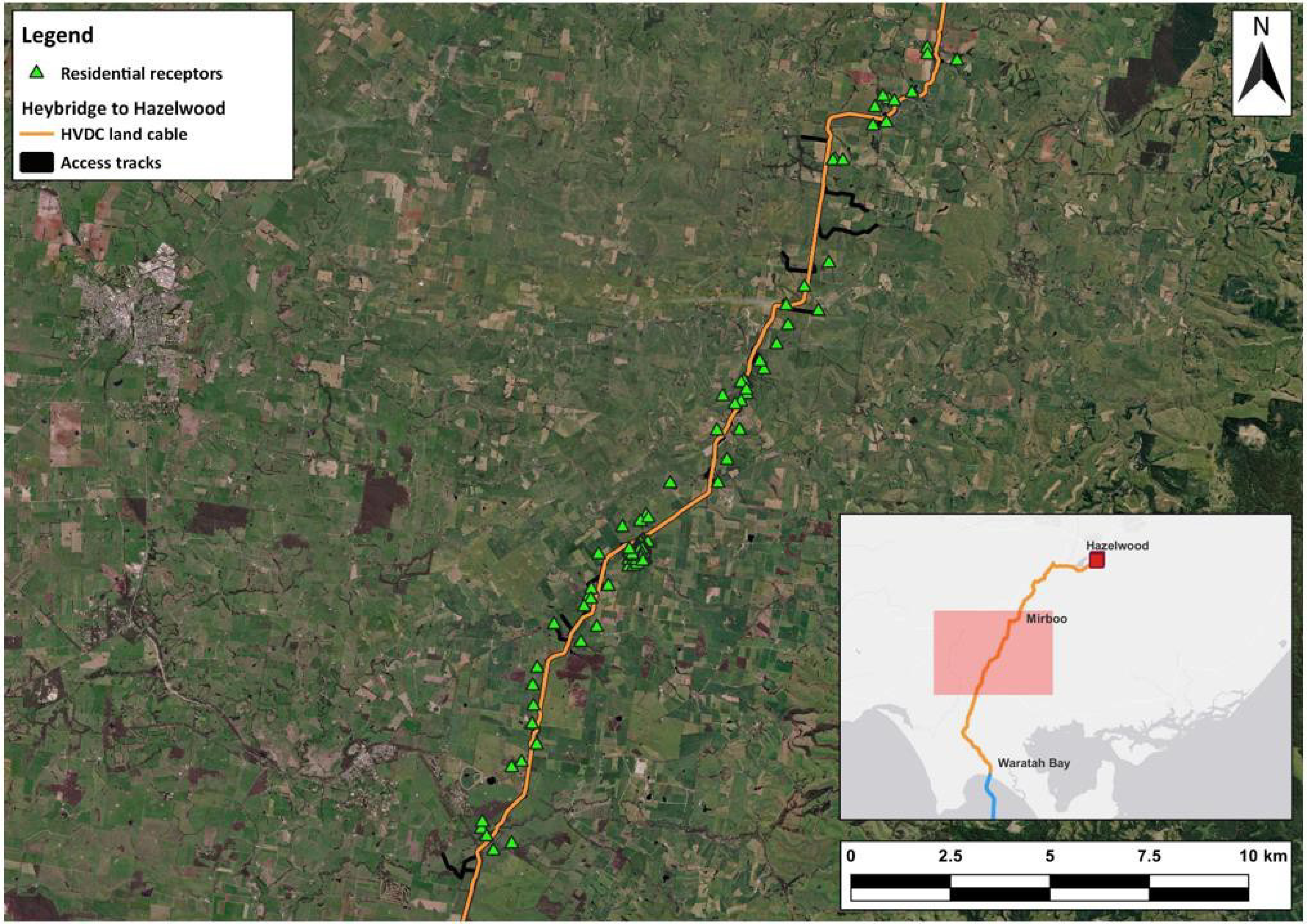

Figure 22 **Residential receptors along the proposed Hazelwood land cable option and associated access tracks (Central)**

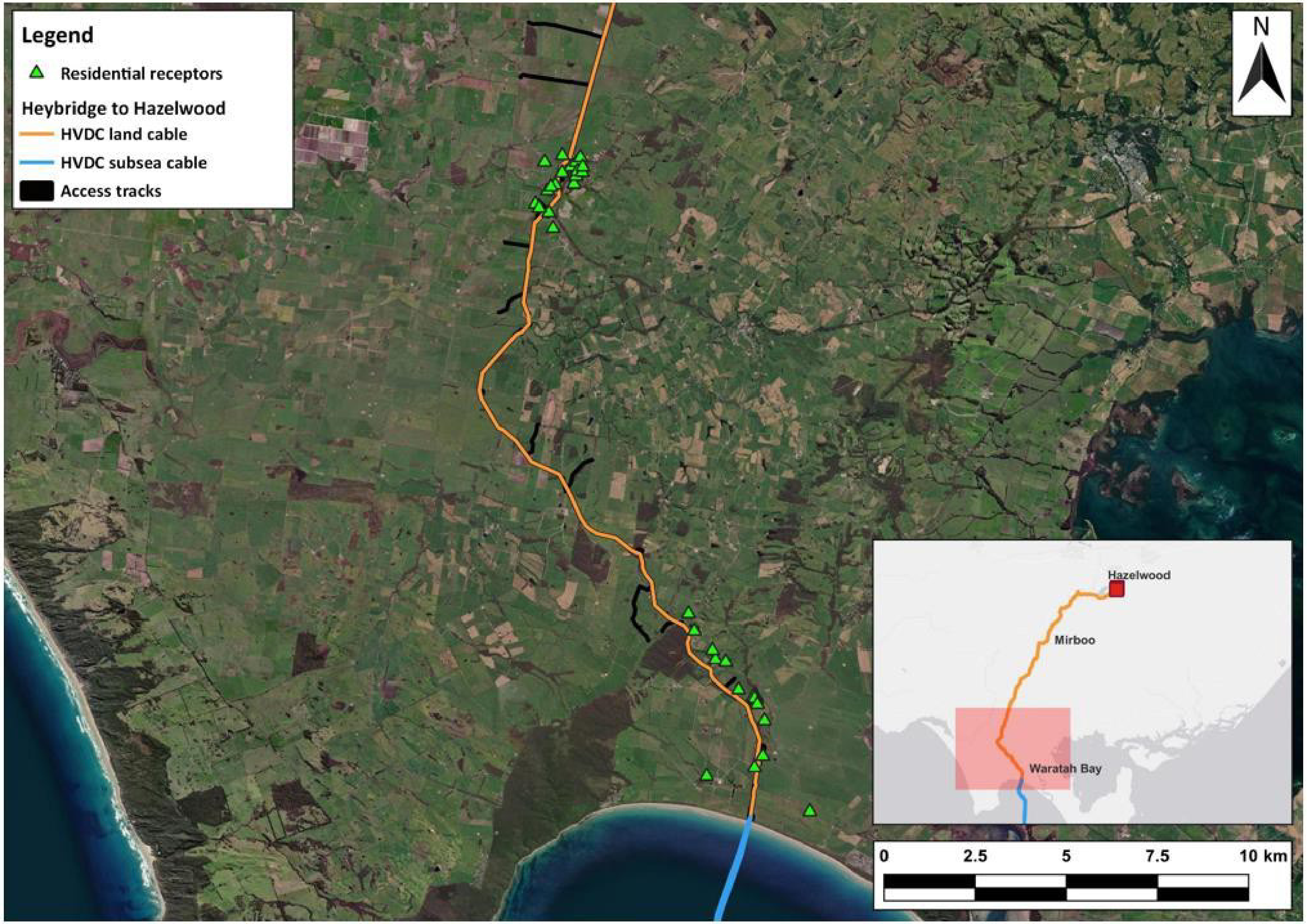

Figure 23 **Residential receptors along the proposed Hazelwood land cable option and associated access tracks (South)**

8.1.1.1.2 Step 2: Risk of dust impacts

8.1.1.1.2.1 Emission magnitude

The magnitude of emissions associated with earthworks, construction and trackout for the Hazelwood Converter Station option of the land cable are presented in Table 24. No demolition work is required.

Table 24 Magnitude of emissions by activity for Hazelwood land cable option

Magnitude of emissions	Key features of the project determining risk level
Earthworks	
Large	Total earthworks (approximately 3,532,000m^2 based on land clearing for laydown areas, construction of new access tracks and upgrading of existing access tracks) for the land cable construction is based on a 36 m wide corridor for the 1 m wide by 1.5 m deep land cable trenches, cable joint pits, associated access tracks and laydown areas. Although the scale of works in any single location will be considerably smaller, and the duration of works in any single location will be relatively short, the length of the route results in the earthworks being classified as large.
Construction	
Medium	Construction works will consist of laying predominantly steel land cables, thus a very low potential for dust generation.
Trackout	
Large	Some access tracks will be long (up to several km), with up to 13 trucks per day required for material movement.

8.1.1.1.2.2 Sensitivity of the area

Table 25 presents the number of residential receptors within various distances of the Hazelwood land cable and associated infrastructure. Table 27 presents the determined sensitivity of the area based on the receptor counts, determined using the matrices in Table 6 and Table 7, taking the highest sensitivity rating based on any of the receptor counts. The sensitivity rating for trackout has been checked by considering the numbers of receptors along the local road network near to the ends of unsealed access tracks as well as the nature of those access tracks (i.e., whether they would individually be classed as having a small, medium or large dust emission magnitude). In this case the sensitivity of the area to dust during earthworks, construction and trackout is medium. For human health impacts, the sensitivity is medium where the background annual mean PM_{10} concentration is below 17.5 µg/m^3 (a background concentration of 15.4 µg/m^3 has been used in this assessment – see Table 23) and there are between 1 to 10 receptors within 20 m of the works. A spatial review of the ecological receptors indicated that receptors were identified within 20 m of the works as can be seen in Table 26. For ecological receptors the sensitivity is low as determined in Section 7.5.2.

Table 25 Proximity of receptors to the Hazelwood land cable option

Receptor Summary	Distance to activity				
	<20 m	< 50 m	< 100 m	< 350 m	< 500 m
Proximity of receptors to the land cable	3	12	37	197	240
Proximity of receptors to land cable and access roads (for earthworks & trackout)	6	17	56	207	245

Table 26 Proximity of ecological receptors to the Hazelwood land cable option

Receptor Summary	Distance to activity	
	<20 m	< 50 m
Ecological receptors located within proximity to the land cable and access roads	Yes	Yes

Table 27 Sensitivity of the area surrounding the Hazelwood land cable option

Potential impact	Earthworks	Construction	Trackout
Dust soiling effects	Medium	Medium	Medium
Human health impacts	Medium	Medium	Medium
Ecological impacts	Low	Low	Low

8.1.1.1.2.3 Risk of Impacts

Table 28 presents the preliminary risk for the Hazelwood land cable option, without any mitigation measures applied. The preliminary risk to sensitive receptors associated with the construction of the land cable is low to medium. The preliminary risk to ecological receptors with the construction of the land cable is low.

It should be noted that a conservative approach has been taken to defining the emission magnitude for these works (*Large*), and the duration of works in proximity to individual receptors will be brief.

Table 28 Preliminary risk for Hazelwood land cable option

Potential impact	Earthworks	Construction	Trackout
Dust soiling effects	Medium	Low	Medium
Human health impacts	Medium	Low	Medium
Ecological impacts	Low	Low	Low

8.1.1.2 Hazelwood converter station construction

8.1.1.2.1 Step 1: Screening assessment

There are zero residential properties within 350m of the Hazelwood converter station construction area, with the closest receptor located 375 m from the disturbance area. Therefore, a detailed risk assessment is not required. The site-specific mitigation measures are presented in section 8.1.3, mitigation measures should be followed to ensure that there are no impacts on the surrounding environment from the activities associated with the Hazelwood converter station construction.

The area surrounding the proposed Hazelwood converter station construction area is presented in Figure 24.

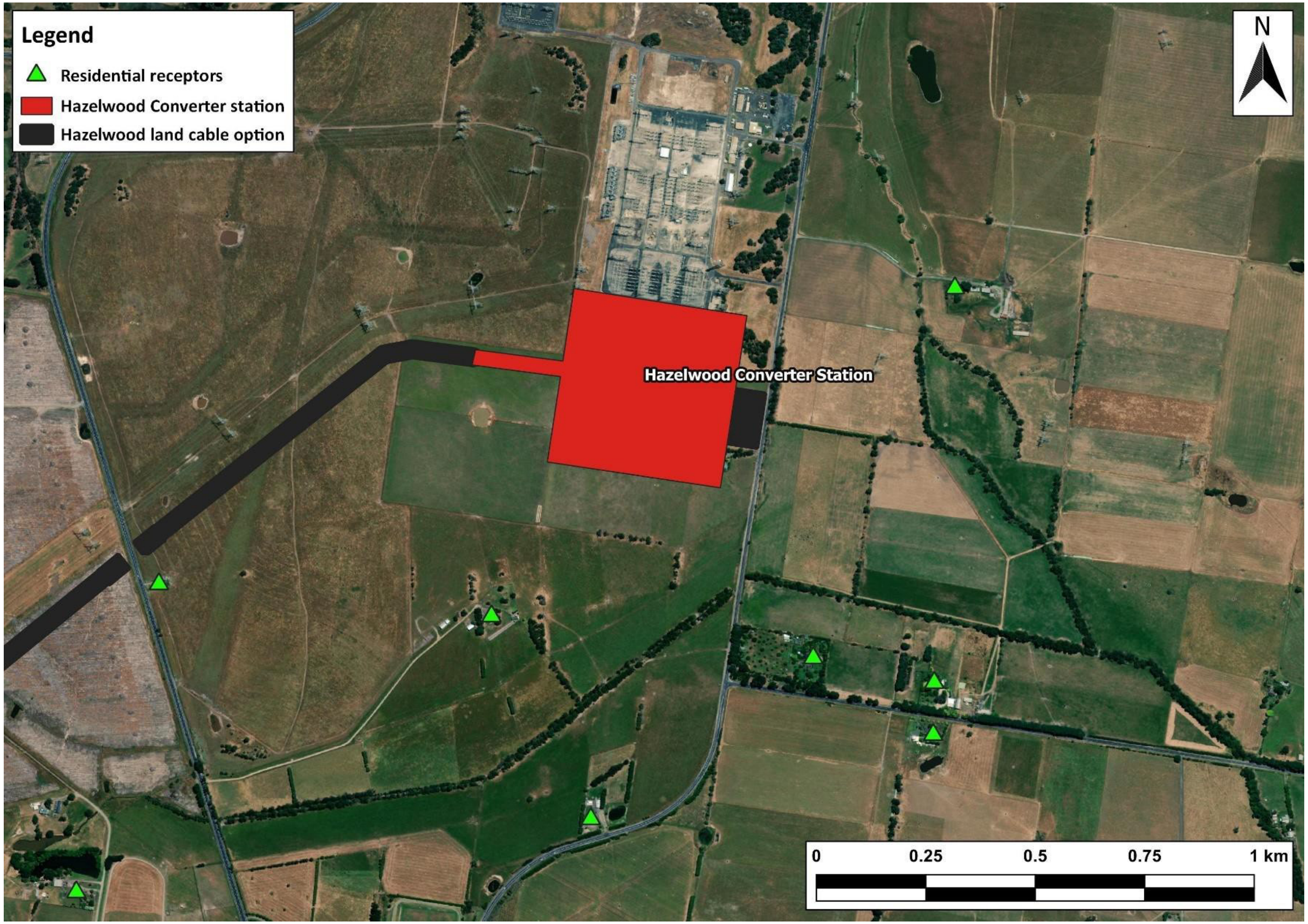

Figure 24 **Residential receptors surrounding the Hazelwood converter station construction**

8.1.2 Driffield converter station option

This section will outline the risk assessment for the Driffield converter station option, separately assessing the land cable and the Driffield converter station construction.

8.1.2.1 Land cable construction

This section will outline the risk assessment for the land cable construction associated with the Driffield converter station option.

8.1.2.1.1 Step 1: Screening assessment

There are 169 residential receptors within 350 m of the land cable, with 172 residential receptors within 350 m of the land cable and access track routes. Therefore, a detailed risk assessment is required.

The receptors surrounding the proposed Driffield land cable construction are presented in Figure 25 to Figure 27.

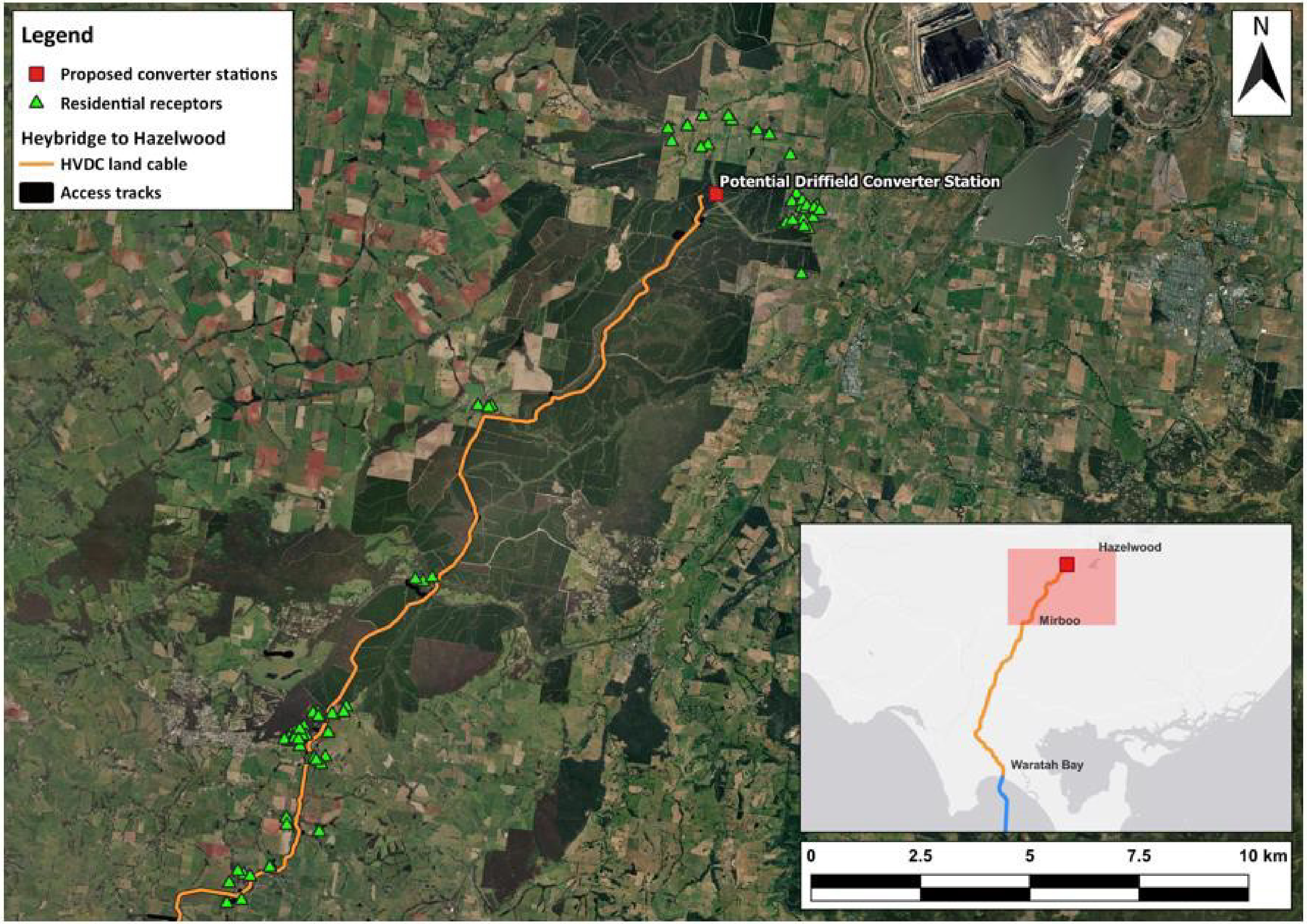

Figure 25 **Residential receptors along the proposed Driffield land cable option and associated access tracks (North)**

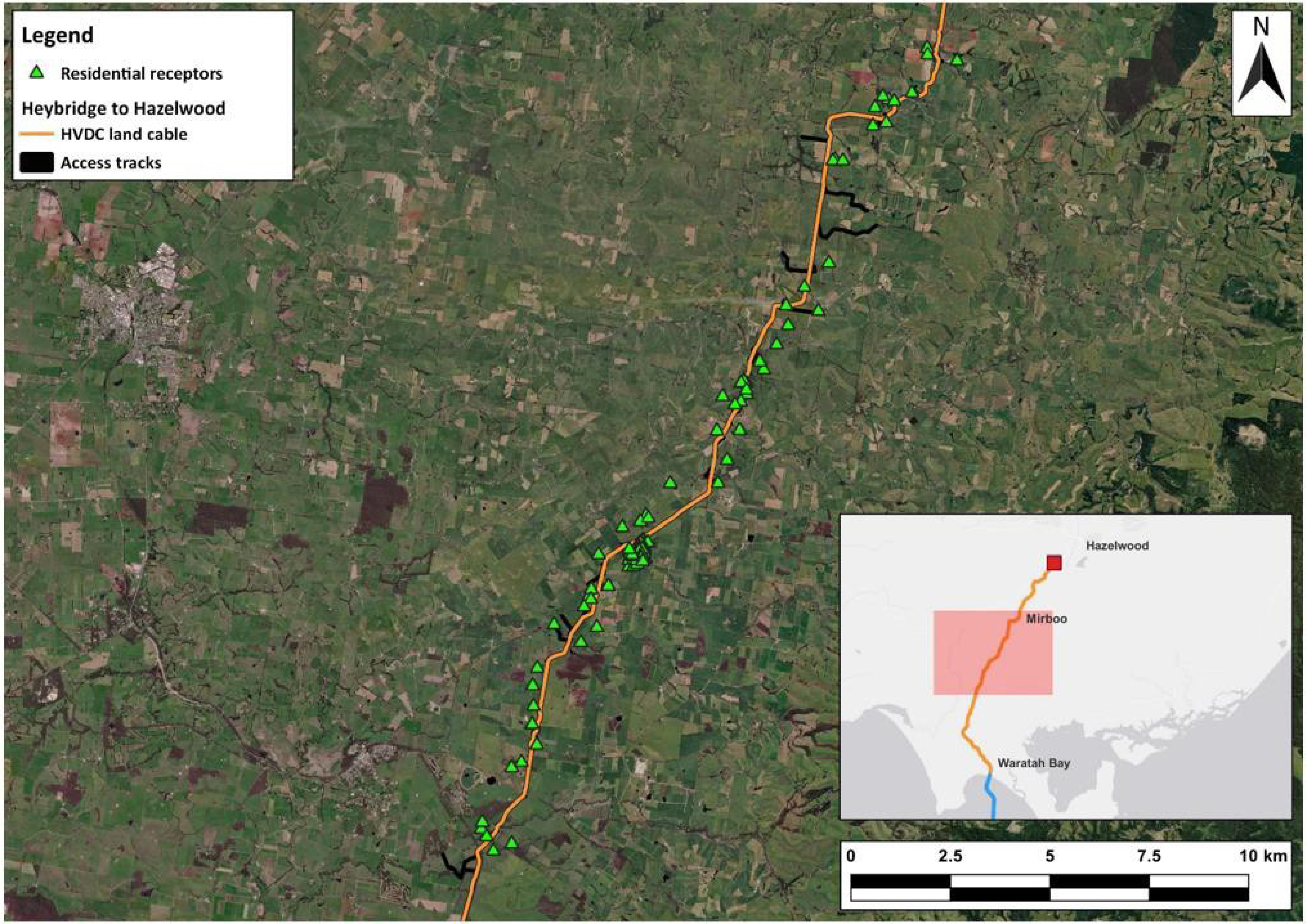

Figure 26 **Residential receptors along the proposed Driffield land cable option and associated access tracks (Central)**

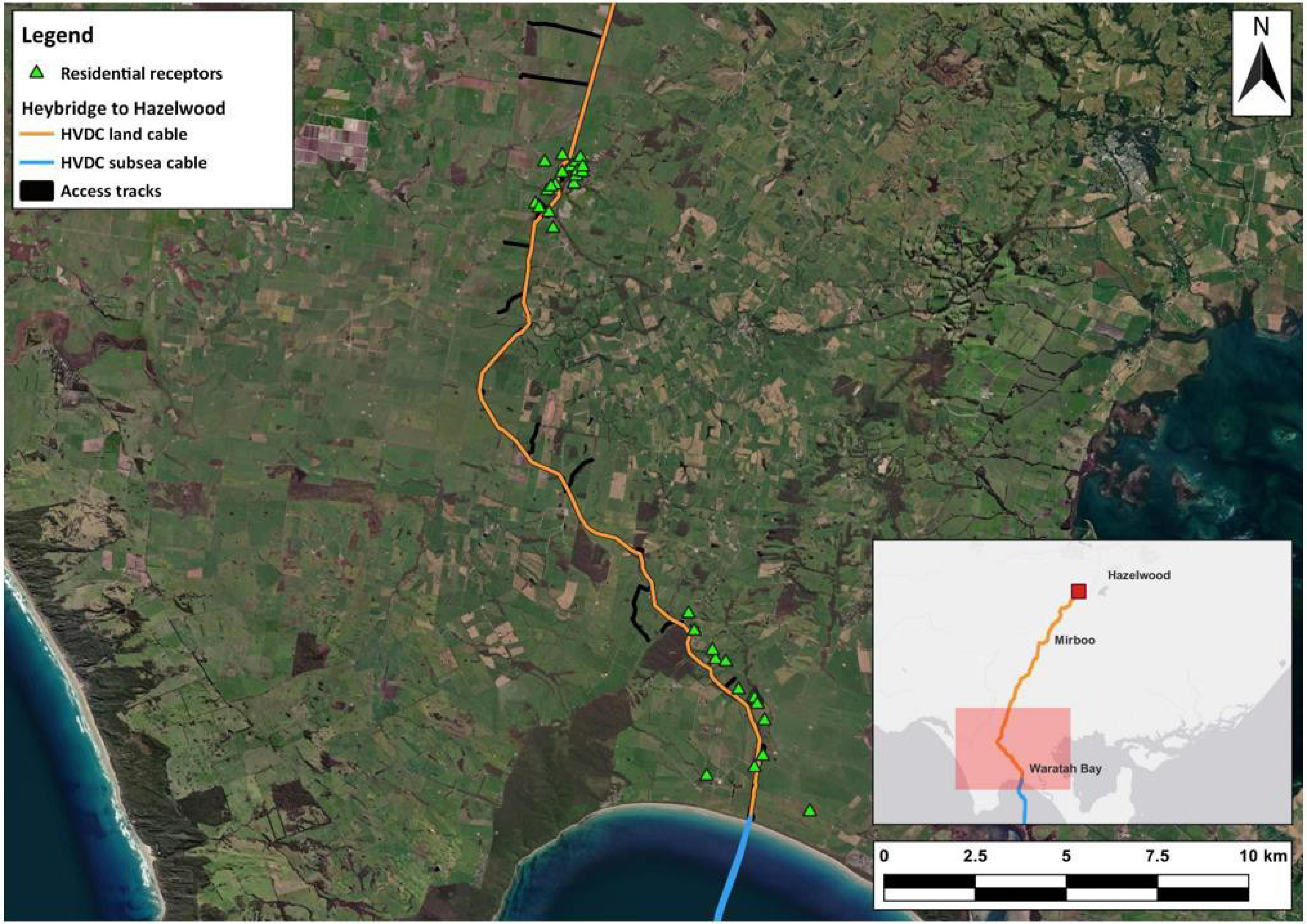

Figure 27 **Residential receptors along the proposed Driffield land cable option and associated access tracks (South)**

8.1.2.1.2 Step 2: Risk of dust impacts

8.1.2.1.2.1 Emission magnitude

The magnitude of emissions associated with earthworks, construction and trackout for the Driffield option of the land cable are presented in Table 29. No demolition work is required.

Table 29 Magnitude of emissions by activity for Driffield land cable option

Magnitude of emissions	Key features of the project determining risk level
Earthworks	
Large	Total earthworks (2,889,000m^2) for the land cable construction is based on a 36 m wide corridor for the 1 m wide by 1.5 m deep land cable trenches, cable joint pits, associated access tracks and laydown areas. Although the scale of works in any single location will be considerably smaller and the duration of works in any single location will be relatively short, the length of the route results in the earthworks being classified as large.
Construction	
Medium	Construction works will consist of laying predominantly steel land cables, thus a very low potential for dust generation.
Trackout	
Large	Some access tracks will be long (up to several km), with up to 13 trucks per day required for material movement.

8.1.2.1.2.2 Sensitivity of the area

Table 30 presents the number of residential receptors within various distances of the Hazelwood land cable and associated infrastructure. Table 32 presents the determined sensitivity of the area based on the receptor counts, determined using the matrices in Table 6 and Table 7, taking the highest sensitivity rating based on any of the receptor counts. The sensitivity rating for trackout has been checked by considering the numbers of receptors along the local road network near to the ends of unsealed access tracks as well as the nature of those access tracks (i.e., whether they would individually be classed as having a small, medium or large dust emission magnitude). In this case the sensitivity of the area to dust during earthworks, construction and trackout is medium. For human health impacts, the sensitivity is medium where the background annual mean PM_{10} concentration is below 17.5 µg/m^3 (a background concentration of 15.4 µg/m^3 has been used in this assessment – see Table 23) and there are between 1 and 10 receptors within 20 m of the works. A spatial review of the ecological receptors indicated that receptors were identified within 20 m of the works as can be seen in Table 31. For ecological receptors the sensitivity is low as determined in Section 7.5.2.

Table 30 Proximity of receptors to the Driffield land cable option

Receptor Summary	Distance to activity				
	<20 m	< 50 m	< 100 m	< 350 m	< 500 m
Proximity of receptors to the land cable	3	9	30	169	204
Proximity of receptors to land cable and access roads (for earthworks & trackout)	5	12	45	172	204

Table 31 Proximity of ecological receptors to the Hazelwood land cable option

Receptor Summary	Distance to activity	
	<20 m	< 50 m
Ecological receptors located within proximity to the land cable and access roads	Yes	Yes

Table 32 Sensitivity of the area surrounding the Driffield land cable option

Potential impact	Earthworks	Construction	Trackout
Dust soiling effects	Medium	Medium	Medium
Human health impacts	Medium	Medium	Medium
Ecological	Low	Low	Low

8.1.2.1.2.3 Risk of Impacts

Table 33 presents the preliminary risk for the Driffield land cable option, without any mitigation measures applied. The preliminary risk to sensitive receptors associated with the construction of the land cable is low to medium. The preliminary risk to ecological receptors with the construction of the land cable is low.

It should be noted that a conservative approach has been taken to defining the emission magnitude for these works (*Large*), and the duration of works in proximity to individual receptors will be brief.

Table 33 Preliminary risk for Driffield land cable option

Potential impact	Earthworks	Construction	Trackout
Dust soiling effects	Medium	Low	Medium
Human health impacts	Medium	Low	Medium
Ecological	Low	Low	Low

8.1.2.2 Driffield converter station construction

8.1.2.2.1 Step 1: Screening assessment

There are zero residential properties within 350m of the Driffield converter station construction area. Therefore, a detailed risk assessment is not required. The site-specific mitigation measures are presented in section 8.1.3, mitigation measures should be followed to ensure that there are no impacts on the surrounding environment from the activities associated with the Driffield converter station construction.

The area surrounding the proposed Driffield converter station construction area is presented in Figure 28.

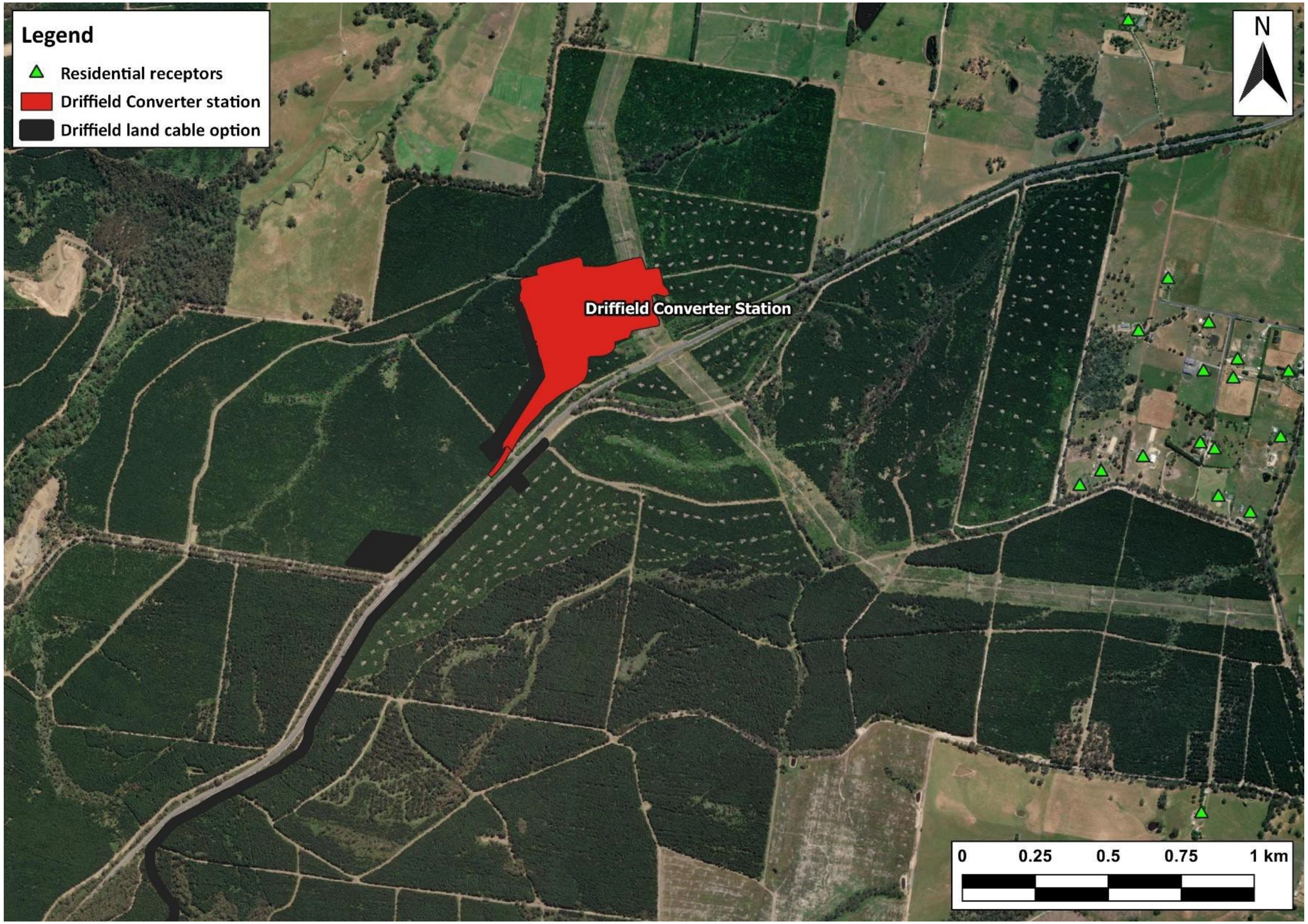

Figure 28 **Residential receptors surrounding the Driffield converter station construction**

8.1.3 Typical site-specific mitigation

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.

The key potential emissions to air from construction works will be in the form of dust or particulate matter. Particulate matter is sub-divided into multiple metrics based on particle size. Standard management practices proposed for the project have identified measures that will assist in managing contaminated soils.

Emissions controls have been determined from the level 1 assessment, which follows the UK's IAQM Methodology on the assessment of dust from demolition and construction (2014). This will address the requirements of the EPA Victoria's Guideline for Assessing Nuisance dust (1943) and the EPA Victoria's Construction – Guide to preventing harm to people and the environment (Publication 1820).

The IAQM method includes several mitigation measures that will form the basis of the environmental performance requirements (EPRs) depending on the level of risk identified without measures being applied. Not all measures included in the IAQM method are considered relevant or practical for this project. Table 34 presents those that are, edited as necessary, to align with Australian practices and to achieve maximum effectiveness under the circumstances. Measures are site-specific and should be applied according to the activities, surrounding land uses and proximity to sensitive receptors.

The following EPRs are proposed for the project to manage air quality risks and impacts.

- EPR AQ01: Develop and implement a construction dust management plan
- EPR AQ02: Develop and implement measures to manage emissions to air during operations.

It is recommended that mitigation measures are especially focused around areas of earthworks and construction of access tracks in areas of high receptor density. The typical measures that could be included in a CDMP to comply with the EPRs are summarised below in Table 34.

Table 34 Recommended mitigation measures

Mitigation Measure
Communications
Display the name and contact details of the person(s) accountable for air quality and dust issues on the site boundary or near active construction works. This may be the environment manager/engineer or the site manager.
Display the head or regional office contact information
Detail the responsibilities for personnel on site regarding dust management, and corrective procedures in the event of complaints and/or dust events
Site management
Record all dust and air quality complaints, identify the cause(s), take appropriate measures to reduce emissions in a timely manner and record the measures taken
Make the complaints log available to the local authority when requested
Record any exceptional incidents that cause dust and/or air emissions, either on/off site, and the action taken to resolve the situation in the logbook
Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes.
Monitoring

Undertake regular inspections to check for visible dust emissions and adjust controls if required to minimise dust emissions Record results of inspection, corrective action, and residual emissions
Carry out regular site inspections to monitor compliance with the CDMP
Increase the frequency of site inspections when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions
Conduct dust deposition monitoring at selected sensitive receptors
Preparing and maintaining the site
Suppressing dust with water spraying and or chemical additives, particularly when construction activities are within 100m of sensitive receptors
Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is practicable
Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site If they are being re-used on site cover as described below
Storing materials susceptible to dust uplift (e.g., aggregate) in a way that minimises dust uplift e.g., covering or spraying stockpiles and use of enclosed storage facilities
Operating vehicle/machinery and sustainable travel
Ensure all on-road vehicles comply with relevant vehicle emission standards, where applicable
Turn off vehicles, plant and equipment when not in use or throttle down when used intermittently
Avoid the use of diesel or petrol-powered generators and use mains electricity or battery powered equipment where practicable
Impose and signpost a suitable maximum-speed-limit on unsurfaced haul roads and work areas
Service vehicles, plant and equipment and operate in accordance with manufacturer's specifications to reduce emissions
Operations
Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction (e.g. suitable local exhaust ventilation systems) when proximate to sensitive receptors
Ensure an adequate water supply on the site for effective dust/particulate matter suppression/ mitigation using non-potable water where possible and appropriate.
Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as practicable after the event using wet cleaning methods
Monitor severe weather, flood, damaging wind and storm warnings issued by BoM and plan or defer activities, such as excavation works, to minimise the risk of environmental harm. Particularly dust, erosion and sedimentation.
Waste management
No on-site burning of waste materials
Measures specific to earthworks
Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable
Use hessian, mulches or tackifiers where it is not possible to re- vegetate or cover with topsoil, as soon as practicable
Minimise the area where cover is removed or material disturbed as much as practical
Minimise the drop height when unloading material from haul trucks
Measures specific to construction
Avoid scabbling (roughening of concrete surfaces)

Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place
Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery
Store bulk cement and other fine powder materials in enclosed silos or enclosed bunded areas to prevent windblown material and material washing offsite Prevent overfilling during delivery to avoid spill
Measures specific to trackout
Maintain access tracks to suitable standard
Where practical, ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport
Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as practicable Record all inspections
Apply water to unsealed access tracks, particularly during dry periods and where construction works are within 100m of sensitive receptors

8.1.4 Environmental performance requirements

The EPRs relevant to air quality for the project are presented in Table 35. The EPRs have been developed through review of the following documents:

- Guideline for Assessing Nuisance dust (Publication 1943)
- Construction – guide to preventing harm to people and the environment (Publication 1820)
- Civil construction, building and demolition guide (Publication 1834).

The EPRs are designed around the mitigation measures for best practice provided within the relevant documents which have the capacity to ensure dust impacts from construction activities are not significant.

A decommissioning plan will be prepared to outline how activities would be undertaken and potential impacts managed including due to dust and emissions addressing the items outlined in these air quality EPRs. The requirements for the decommissioning management plan are outlined in the EIS/EES.

Table 35 Environmental Performance Requirements for air quality

EPR ID	Environmental Performance Requirement	Project Stage
AQ01	**Develop and implement a construction dust management plan** Prior to commencement of project works, develop a construction dust management plan that documents measures to avoid, minimise and mitigate dust emissions. The construction dust management plan must: • Identify sources of dust and airborne pollutants, including diffuse sources and the location of sensitive receptors in accordance with EPA Victoria *Publication 1943 – Guideline for assessing nuisance dust*. • Describe dust management measures to be adopted in construction considering: o Earthworks, exposed areas and stockpiles o Access tracks and haul routes o Construction vehicles and equipment o Construction materials, transport, handling and storage o Waste management transport, handling and storage • Describe measures to avoid and, where avoidance is not practicable, reduce the risk of harm from air emissions so far as reasonably practicable to minimise impacts on health, safety or amenity in accordance with EPA Victoria *Publication 1820.1 – Guide to preventing harm to people and the environment*. • Describe inspection requirements for construction areas to monitor implementation of controls. • Define roles and responsibilities of the contractors, and how implementation of dust management measures will be communicated. • Outline a process to address complaints related to dust and dust events and identify opportunities for continual improvement of air quality impacts from construction. • Outline a process for review and improvement of dust and emission reduction and management measures. • Consider the mitigation measures presented in the Air Quality impact assessment prepared for the Marinus Link EIS/EES including mitigation for cumulative impacts.	Construction
AQ02	**Develop and implement measures to manage emissions to air during operations** As part of the OEMP, develop measures to avoid or minimise air quality impacts. These measures must include consideration of: • Converter station site maintenance and exposed soil areas • Access roads • Vehicles and equipment • Waste management.	Operation

8.1.5 Residual risk

Residual risk has been determined considering the application of the environmental performance requirements presented in Section 8.1.4. The mitigation measures presented in Table 34 and the general guidance measures presented in EPA Victoria guidelines 1943, 1820 and 1834 will be the foundation of the CDMP. The IAQM guidance is clear that, with appropriate mitigation in place, the residual effects will normally be 'not significant'. With these measures in place and effectively implemented, the residual effects are judged to be 'not significant' for both the potential land cable options, as shown in Table 36 and Table 37.

The IAQM guidance does, however, recognise that, even with a rigorous CDMP in place, it is not possible to guarantee that dust mitigation measures will always be effective. For instance under adverse weather conditions. During these events, short-term dust annoyance may occur. However, the scale of this will not normally be considered sufficient to change the conclusion that overall, the effects will be 'not significant'.

Dust impacts for residents are expected to be minimal; they should not, for example, witness visible plumes of dust leaving construction sites and travelling towards their properties. The main impact that may be noticeable for residents near to the construction works will be the gradual buildup of dust on surfaces due to deposition. These impacts will be temporary and only experienced when work is being carried out in close proximity to the receptor (a matter of weeks or months in most cases). In most cases, nearby residents are unlikely to notice a significant difference as compared to normal dust buildup.

It is likely that dust emissions will be greater during the summer months, when temperatures are highest and there are fewer rainy days. The use of water and other mitigation measures during these months may need to be greater than during winter periods. Particularly where construction activities are occurring near sensitive receptors.

Table 36 Overall residual risk for the Hazelwood land cable option

Potential impact	Earthworks	Construction	Trackout
Dust soiling effects	Low	Negligible	Low
Human health impacts	Low	Negligible	Low
Ecological	Negligible	Negligible	Negligible

Table 37 Overall residual risk due for the Driffield land cable option

Potential impact	Earthworks	Construction	Trackout
Dust soiling effects	Low	Negligible	Low
Human health impacts	Low	Negligible	Low
Ecological	Negligible	Negligible	Negligible

8.1.6 Cumulative impacts

The EIS guidelines and EES scoping requirements both include requirements for the assessment of cumulative impacts. Cumulative impacts result from incremental impacts caused by multiple projects occurring at similar times and within proximity to each other.

To identify possible projects that could result in cumulative impacts, the International Finance Corporation (IFC) guidelines on cumulative impacts have been adopted. The IFC guidelines (IFC, 2013) define cumulative impacts as those that 'result from the successive, incremental, and/or combined effects of an action, project, or activity when added to other existing, planned, and/or reasonably anticipated future ones.'

The approach for identifying projects for assessment of cumulative impacts considers:

- Temporal boundary: the timing of the relative construction, operation and decommissioning of other existing developments and/or approved developments that coincides (partially or entirely) with the project.

- Spatial boundary: the location, scale and nature of the other approved or committed projects are expected to occur in the same area of influence as the project. The area of influence is defined at the spatial extent of the impacts a project is expected to have.

Proposed and reasonably foreseeable projects were identified based on their potential to credibly contribute to cumulative impacts due their temporal and spatial boundaries. Projects were identified based on publicly available information at the time of assessment. The projects considered for cumulative impact assessment across Tasmania, Bass Strait and Victoria are:

- Delburn Windfarm
- Star of the South Offshore Windfarm
- Offshore wind development zone in Gippsland including Greater Gippsland Offshore Wind Project (BlueFloat Energy), Seadragon Project (Floatation Energy), Greater Eastern Offshore Wind (Corio Generation).
- Hazelwood Mine Rehabilitation Project
- Wooreen Energy Storage System
- North West Transmission Developments
- Guilford Windfarm
- Robbins Island Renewable Energy Park
- Jim's Plain Renewable Energy Park
- Robbins Island Road to Hampshire Transmission Line
- Bass Highway upgrades between Deloraine and Devonport
- Bass Highway upgrades between Cooee and Wynard
- Hellyer Windfarm
- Table Cape Luxury Resort
- Youngmans Road Quarry
- Port Latta Windfarm
- Port of Burnie Shiploader Upgrade
- Quaylink – Devonport East Redevelopment.

The projects relevant to this assessment have been determined based on there is potential for cumulative impacts to receptors. The Delburn Wind Farm and Hazelwood Rehabilitation Project were assessed as relevant to this assessment due to their proximity to this project and its sensitive receptors. The cumulative assessment has considered the potential for activities associated with the projects to emit dust and the likelihood of cumulative impacts due to distance.

8.1.6.1 Delburn Wind Farm

The Delburn Windfarm is a proposed development within the vicinity of the disturbance area associated with the construction of the land cable and potential converter stations. The Delburn Wind Farm is a proposed wind energy facility comprising thirty-three turbines and associated infrastructure. The proposed locations of the turbines are shown in Figure 29 along with the project and the identified sensitive receptors within 1 km of the land cable. The turbines are all located over 1.3 km from the sensitive receptors considered in the construction dust risk assessment for the project, with all new or existing access roads at least 1 km from those same receptors. Dust impacts as a result of emissions from construction works associated with the Delburn Wind Farm are considered highly unlikely over such distances, thus no significant cumulative impacts are likely to occur.

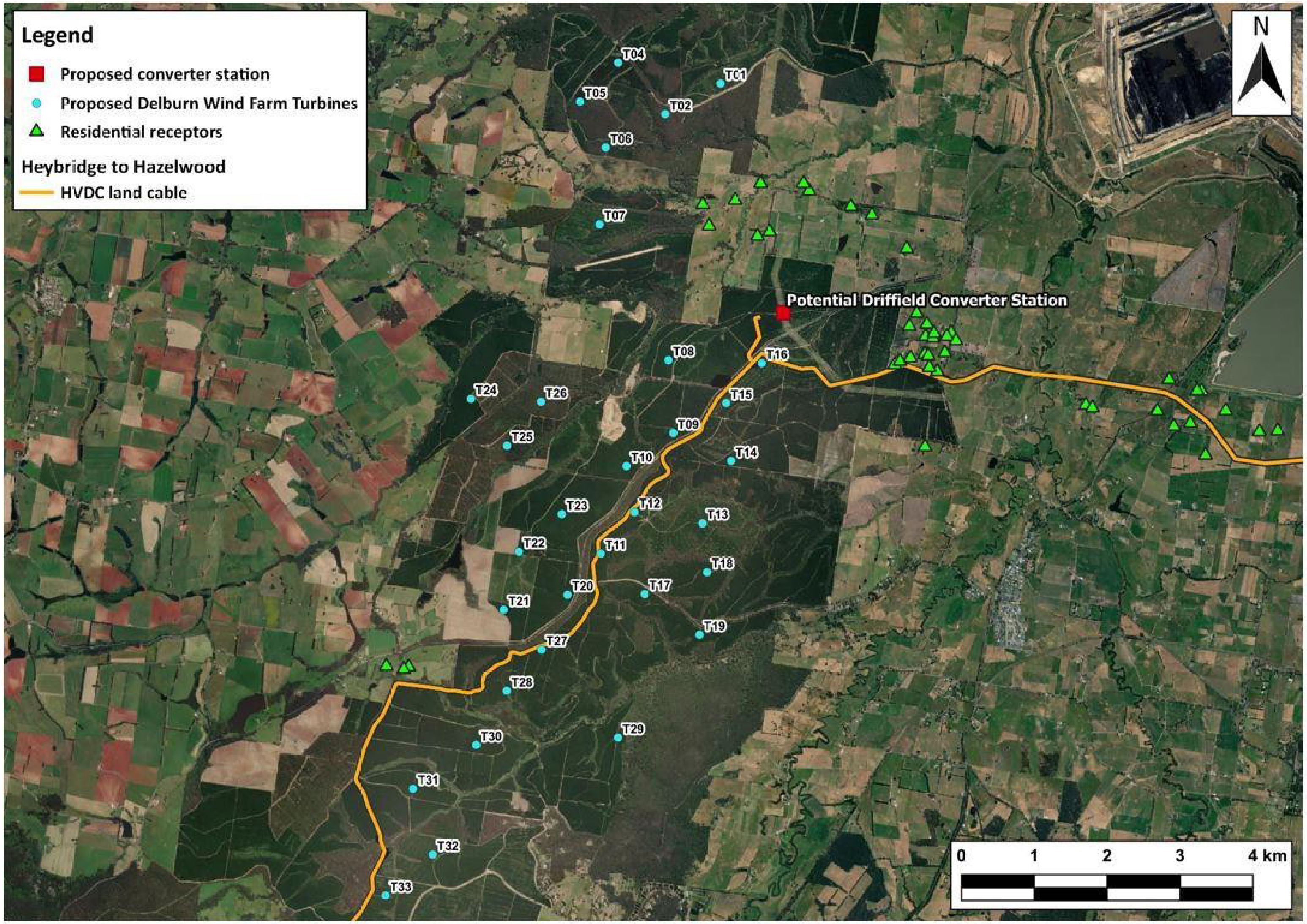

Figure 29 **Location of the Delburn Wind Farm with relation to the project and residential receptors**

8.1.6.2 Hazelwood Rehabilitation Project

The Hazelwood Rehabilitation Project is an ongoing project within the vicinity of the disturbance area associated with the construction of the land cable and potential converter stations. The location of the Hazelwood Rehabilitation Project with relation to the project and the identified sensitive receptors is presented in Figure 30. The Hazelwood Rehabilitation Project involves decommissioning remaining buildings, roads and infrastructure, earthworks to reprofile steep slopes, reinstating some water courses to a more natural alignment, and the proposed creation of key urban, agricultural and tourism hubs centralised around a mine lake.

The most up to date concept layout for the Hazelwood Rehabilitation Project indicates that the area to the south of the rehabilitation project is proposed to become an agriculture hub. This will involve the draining of the cooling pond, leaving a relatively unconstrained pasture with fertile soils. Once operational, opportunities for land uses include intensive soil-based agriculture, high tech agriculture and hardwood forestry plantations. The draining of the existing cooling pond as part of construction, and agriculture activities associated with operation, are unlikely to routinely generate significant dust emissions, although it is reasonably likely that dust-generating activities will occasionally be carried out for short periods of time.

Where there are sites that could have a cumulative impact, the IAQM guidance recommends that the following additional mitigation measure is implemented:

"Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes".

Provided this liaison and coordination takes place, dust emission should be adequately managed such that there will be no significant cumulative impacts.

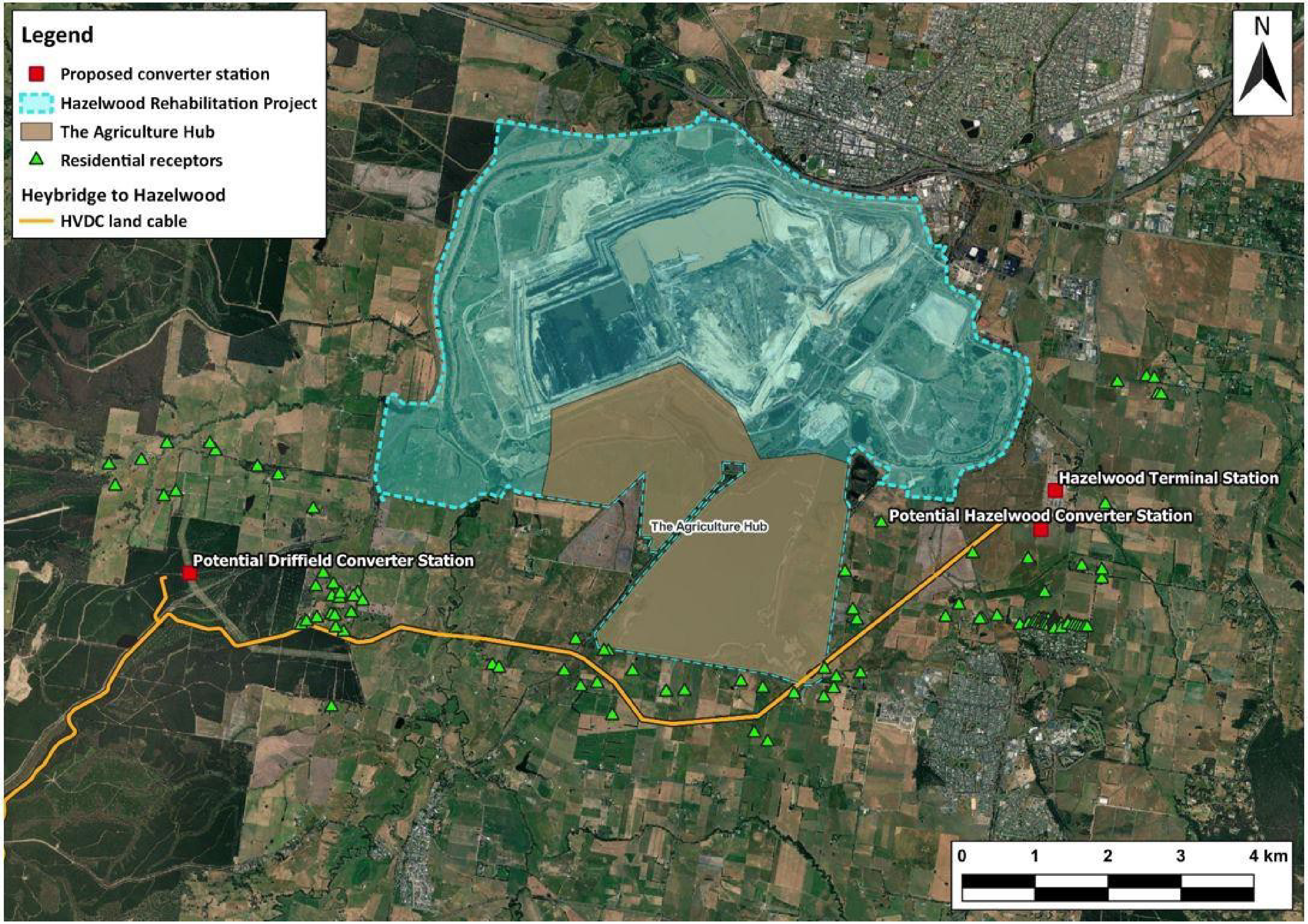

Figure 30 **Location of the Hazelwood Rehabilitation Project and Agriculture hub with relation to the project and residential receptors**

8.2 Operations risk assessment

Assessment of the operational phase of the project identified four activities that could result in emissions to air.

- Operation of two 1500 kVA backup diesel generators with above ground fuel storage of 5000L
- Routine inspections of the land cable easement for potential operational and maintenance issues
- Servicing, testing and repair of land cables, transition station and converter station equipment and infrastructure via light vehicles
- Maintenance of access tracks using light vehicles.

The backup diesel generators will only operate in case of emergency and during routine testing and maintenance. With the nearest sensitive receptors being over 350 m away from the nearest generator, this occasional use of the generators and the associated emissions of combustion-related pollutants will not result in significant air quality impacts.

Routine inspections of the land cable will occur quarterly, while planned outages will occur twice a year. The only relevant emissions to air from these activities will be from the small number of light vehicles accessing the converter stations and land cable to carry out the maintenance works; tailpipe emissions and wheel generated dust from this small number of light vehicles will not result in significant air quality impacts.

Occasional maintenance of access tracks could generate some dust emissions, but these will be temporary in nature (hours or days) and would not result in significant dust impacts at nearby sensitive receptors.

Overall, it can be concluded that the operational phase of the project will not generate significant emissions to air and would not result in significant dust impacts at nearby sensitive receptors.

8.3 Decommissioning risk assessment

The operational lifespan of the project is a minimum 40 years. At this time the project will be either decommissioned or upgraded to extend its operational lifespan.

Decommissioning will be planned and carried out in accordance with regulatory and landowner or land manager requirements at the time. A decommissioning plan in accordance with approvals conditions will be prepared prior to planned end of service and decommissioning of the project.

Requirements at the time will determine the scope of decommissioning activities and impacts. The key objective of decommissioning is to leave a safe, stable and non-polluting environment, and minimise impacts during the removal of infrastructure.

In the event that the project is decommissioned, all above-ground infrastructure will be removed, and associated land returned to the previous land use or as agreed with the landowner or land manager.

Decommissioning activities required to meet the objective will include, as a minimum, removal of above ground buildings and structures. Remediation of any contamination and reinstatement and rehabilitation of the site will be undertaken to provide a self-supporting landform suitable for the end land use.

Decommissioning and demolition of project infrastructure will implement the waste management hierarchy principles being avoid, minimise, reuse, recycle and appropriately dispose. Waste management will accord with applicable legislation at the time.

Decommissioning activities may include recovery of land and subsea cables and removal of land cable joint pits. Recovery of land cables would involve opening the cable joint pits and pulling the land cables out of the conduits, spoiling them onto cable drums and transporting them to metal recyclers for recovery of component materials. The conduits and shore crossing ducts would be left in-situ as removal may potentially cause significant environmental impact.

The concrete cable joint pits would be broken down to at least one metre below ground level and buried in-situ or excavated and removed. Subsea cables would be recovered by water jetting or removal of rock mattresses or armouring to free the cables from the seabed.

A decommissioning plan will be prepared to outline how activities will be undertaken and potential impacts managed. Potential impacts to air quality from decommissioning activities are expected to be no greater than construction related impacts and managed in accordance with a decommissioning plan.

9. CONCLUSIONS

Katestone was commissioned by Tetra Tech Coffey to complete an air quality assessment of the Victorian component of the project.

Once operational, the operation and maintenance activities associated with the project will include routine inspections of the cable easement, periodic inspection of the subsea cable routes, maintenance of access tracks, servicing, testing and repair of subsea cables, transition station and converter stations equipment and infrastructure. The operational phase of the project is not expected to generate significant emissions to air. Decommissioning air quality impacts will be assessed prior to decommissioning in accordance with the regulations at the time and in agreement with landowners or land managers and EPA Victoria. Therefore, detailed assessment of impacts during operation and decommissioning has not been carried out.

The assessment has focused on the potential impacts of dust emissions during construction. A risk assessment approach has been used, based on the method detailed by the United Kingdom's IAQM.

The assessment has shown:

- For the Hazelwood converter station option:
  - Without mitigation, the preliminary risk to sensitive receptors associated with the construction of the land cable is low to medium
  - Without mitigation, the preliminary risk to sensitive receptors associated with the construction of the converter station is negligible
  - Without mitigation, the preliminary risk to ecological receptors associated with the construction of the land cable is low
- For the Driffield converter station option:
  - Without mitigation, the preliminary risk to sensitive receptors associated with the construction of the land cable is low to medium
  - Without mitigation, the preliminary risk to sensitive receptors associated with the construction of the converter station is negligible
  - Without mitigation, the preliminary risk to ecological receptors associated with the construction of the land cable is low.

The initial impact of the construction activities as determined through the IAQM methodology led to the establishment of the following EPRs that utilise the dust management and mitigation measures from the IAQM, EPA Victoria guidance documents 1943, 1820 and 1834. The EPRs should be incorporated to ensure that construction activities have minimal impact on sensitive receptors.

- EPR AQ01: Develop and implement a construction dust management plan
- EPR AQ02: Develop and implement measures to manage emissions to air during operations

With the implementation of the EPRs the residual risk is as follows:

- For the Hazelwood converter station option:
  - With mitigation, the residual risk to sensitive receptors associated with the construction of the land cable is negligible to low
  - With mitigation, the residual risk to sensitive receptors associated with the construction of the converter station is negligible

    - With mitigation, the residual risk to ecological receptors associated with the construction of the land cable is negligible.

- For the Driffield converter station option:
    - With mitigation, the residual risk to sensitive receptors associated with the construction of the land cable is negligible to low
    - With mitigation, the residual risk to sensitive receptors associated with the construction of the converter station is negligible
    - With mitigation, the residual risk to ecological receptors associated with the construction of the land cable is negligible.

The assessment found dust impacts for residents are expected to be minimal, the main impact may be noticeable for residents near to the construction works will be the gradual buildup of dust on surfaces due to deposition. These impacts will be temporary and only experienced when work is being carried out in close proximity to the receptor. In most cases, nearby residents are unlikely to notice a significant difference as compared to normal dust buildup.

Based on these findings the project will have a low risk for human health and, therefore, a quantitative assessment using dispersion modelling is not required to verify compliance for PM_{10}, $PM_{2.5}$ and combustion gases.

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