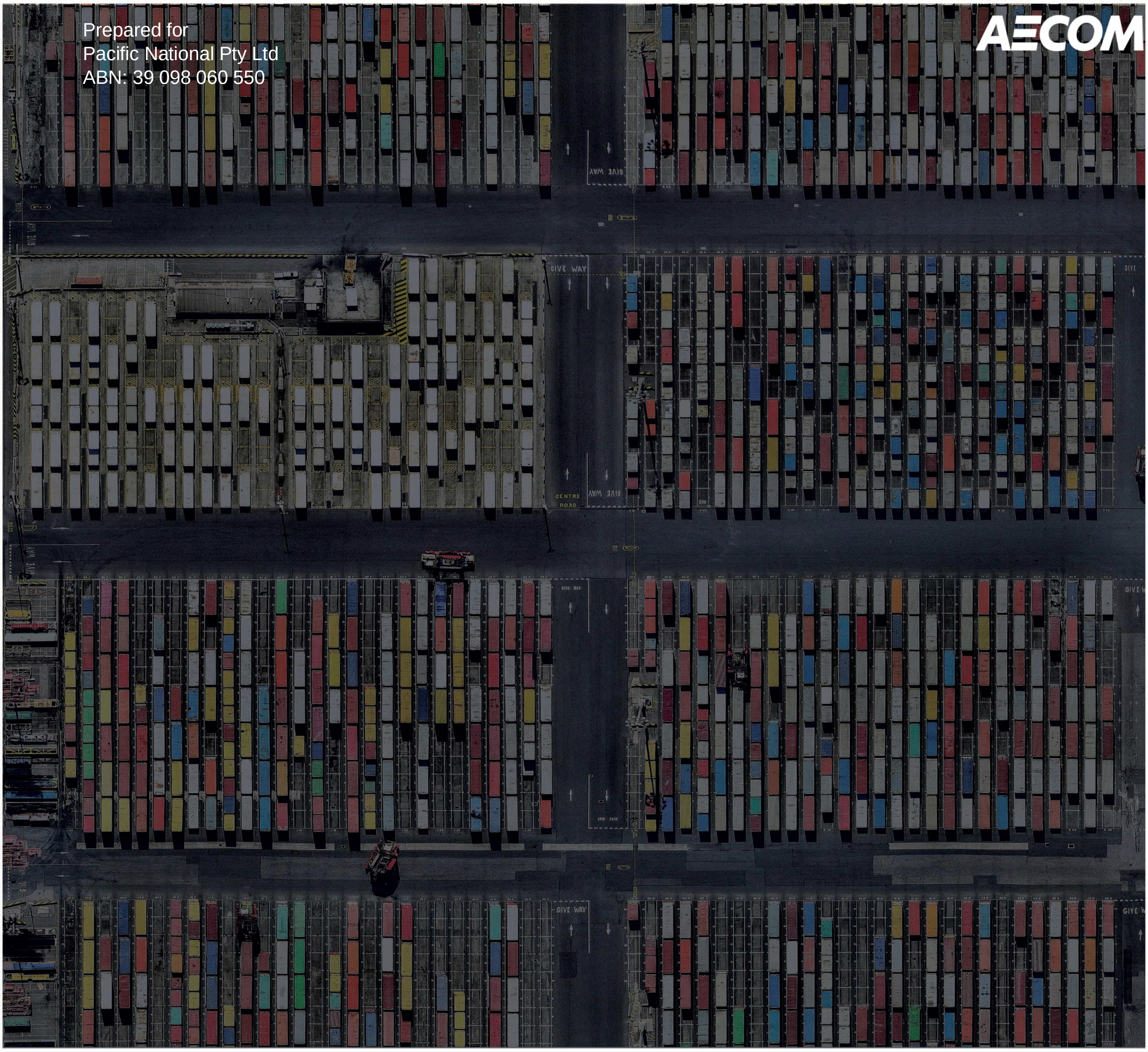
Attachment G

AECOM

Prepared for
Pacific National Pty Ltd
ABN: 39 098 060 550



Little River Logistics Precinct

Air Quality Assessment

31-May-2023
Air Quality Impact Assessment
Commercial-in-Confidence

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Little River Logistics Precinct

Air Quality Assessment

Client: Pacific National Pty Ltd

ABN: 39 098 060 550

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Executive Summary

AECOM Australia Pty Ltd (AECOM) has been commissioned by Pacific National Pty Ltd (PN) to undertake an Air Quality Impact Assessment (AQIA) to assess the impacts of a proposed planning scheme amendment for an intermodal freight terminal and warehousing precinct in Little River, Victoria (the Little River Logistics Precinct (the Precinct)).

The master planning was informed by a range of constraints and design principles. This air quality report represents one of a number of specialist technical assessments used to identify site constraints and provide a desktop assessment of the concept design.

An indicative 'study area' of approximately one kilometre around the proposed Precinct and 150 metres around potential road and rail connections has been considered in this assessment. These distances have been considered for the initial screening assessment to determine how many sensitive receptors are in locations at higher risk of impacts.

Pollutants of interest for the construction of the project are primarily related to vehicle movements, earthworks and materials handling. Given the expected sources of pollution during construction, the pollutants considered for this assessment are particulates (dust). Pollutants of interest for the operation of the project are primarily related to exhaust emissions (CO, NO_2, SO_2, particulate matter (PM_{10} and $PM_{2.5}$) and hydrocarbons) from mobile equipment such as train locomotives, forklifts and trucks.

Impacts on air quality need to be considered within the context of the receiving environment and specifically, the existing conditions. Of particular importance to the assessment are meteorology, local topography, background air pollution and location of nearby sensitive land uses. Based on the surrounding areas analysis, existing air quality constraints near the proposed Precinct are unlikely.

The Precinct masterplan has considered existing and potential future uses of the land and sensitive receptors that may be affected by air quality impacts associated with the construction and operation of the precinct. Mitigation measures recommended in this air quality report:

- Design considerations to avoid potential onsite amenity impacts
- Preparation of a detailed Construction Air Quality Management Plan to minimise potential air emissions during construction
- Measures to minimise vehicle and locomotive air quality impacts along transport connections corridors.

Air quality impacts during construction are expected to be short term and managed through common mitigation methods. Following confirmation of design and appointment of a contractor, a construction phase Traffic Management Plan will be required. This will reconfirm the construction phase findings of this report and document any required controls or mitigations, including traffic management, restrictions on hours of operation etc.

Air quality impacts beyond the boundary of the proposed Precinct during operation are expected to be '**negligible**' and remain below relevant air quality standards. Based on the proposed transport routes, buffer distances to sensitive receptors and expected emissions from mobile emission sources (locomotives, vehicles etc), the potential impact of traffic connections is expected to be '**low**' and remain below relevant air quality standards.

The potential for extensive or major effects on the health, safety or well-being of a human community, due to air emissions from the Project is expected to be '**low**' to '**negligible'**. Furthermore, freight precincts operate throughput Australia and globally with a good understanding of potential adverse effects and high likelihood of effective avoidance and mitigation measures. Based on the findings in this assessment, air quality impacts from the Project are **unlikely** to trigger the requirement for referral under the Environment Effects Act.

Glossary

Term	Definition
CO	Carbon monoxide
EPA	Environment Protection Authority Victoria
IMEX Terminal	Import-Export Terminal
NO_2	Nitrogen dioxide
NO_x	Oxides of Nitrogen
OMR	Outer Metropolitan Ring
PAHs	Polycyclic Aromatic Hydrocarbons
$PM_{2.5}$	Particulate Matter ≤ 2.5 microns in diameter ($PM_{2.5}$)
PM_{10}	Particulate Matter ≤ 10 microns in diameter (PM_{10})
SO_2	Sulphur dioxide
$\mu g/m^3$	Micrograms per metre cube
VOCs	Volatile Organic Compounds

1.0 Introduction

1.1 Context

AECOM Australia Pty Ltd (AECOM) has been commissioned by Pacific National Pty Ltd (PN) to undertake an Air Quality Impact Assessment (AQIA) to assess the impacts of a proposed planning scheme amendment for an intermodal freight terminal and warehousing precinct in Little River, Victoria (the Little River Logistics Precinct (the Precinct)).

The new open access Precinct will serve as the future Victorian terminal for Pacific National and the development will support the future growth and development of the Victorian economy.

The core components of the concept design are:

- Terminal designs
- Rail infrastructure and connections
- Road infrastructure and connections
- Integrated and general warehousing and commercial areas (able to cater for large lots, typically in range of 20,000 – 80,000m^2)
- Supporting infrastructure and services.

The master planning was informed by a range of constraints and design principles. This air quality report represents one of a number of specialist technical assessments used to identify site constraints and provide a desktop assessment of the concept design. In addition, the concept design was informed by the following considerations:

- Commercial – Maximising the land available for commercial use near the intermodal terminals and reducing the costs associated with supply chains
- Rail connections – Designing to meet the operating standards of the Victorian Rail system
- Staged Development – Designing to enable staging as terminal demand increases over time and the market demand for industrial development.

Site constraints combined with the need for operational efficiency (e.g. limiting the need for train movements to access the terminals) will influence the ultimate concept design. Figure 2 shows the proposed concept design and site access roads.

1.2 Purpose of this Report

This report forms part of the land use planning and environment issues consideration for the project. The purpose of this report is to undertake a high-level desktop assessment of air quality impacts during construction and operation for the Little River Logistics Precinct and potential road and rail connections, including an understanding of the implications of any constraints on the development of a preferred concept layout for the Precinct.

The intent of this report is to provide a background analysis and preliminary assessment of the concept design and the potential air quality impacts associated with the project. The report also supports the identification of project land use planning and environment approval processes, and where possible, approvals related risk.

The assessment has looked at the proposed activity and considered its potential to impact on surrounding sensitive receptors. This report seeks to:

- Review local, state and interstate air quality planning legislation and guidance material to identify with regards to separation distances between industrial land uses.
- Investigate the existing air emission sources in the area and estimate of the current state of the air shed in terms of existing pollutants.
- Identify the existing surrounding land uses and surrounding sensitive receivers and collect publicly available data, where applicable, such as local air quality monitoring and NPI data.
- Identify potential sources of air emissions proposed for each of the project options.
- Discuss any opportunities and constraints associated with the Precinct.
- Draft project-specific limits and processes that would be followed to achieve an acceptable outcome for the project. These items may be used to develop quantitative performance criteria.
- Provide input into impact avoidance or mitigation measures during the design process.
- Provide a qualitative assessment of potential mitigation measures required to meet the quantitative performance criteria.

2.0 Project Description

2.1 Project Overview

Pacific National Pty Ltd (Pacific National) is proposing to develop a 'state-of-the-art' intermodal freight terminal and warehousing precinct in Little River, Victoria (the Little River Logistics Precinct (the Precinct)) to replace its existing terminal facilities at the Melbourne Freight Terminal (MFT) in South Dynon and handle the projected growth for containerised interstate freight services.

Pacific National's lease at the MFT expires in 2031 and a new terminal is essential for Pacific National's freight and logistics business to meet the short, medium and long-term freight movement needs of customers in Victoria, and across Australia. The Precinct will support an international best practice, integrated freight terminal combined with warehousing and commercial facilities which will generate greater mode shift to rail and offer market competitive services.

The project is seeking to achieve the following objectives:

- Provide intermodal capacity options to meet Pacific National's Melbourne intermodal freight demand forecasts to 2050 and beyond.
- Deliver a cost-competitive and efficient rail supply chain, including delivering the outcomes of Inland Rail, for our customers that generate increased rail mode share, and help to meet Pacific National's Intermodal Growth Strategy.
- Maximise the options for the co-location of complementary functions including maintenance facilities and warehousing.
- Achieve optimum integration with the surrounding community, the broader transport network, and the environment.
- Deliver enhanced safety outcomes

The Precinct will form part of an Australia wide terminal and rail network.

The Precinct is located at 132A Old Melbourne Road and well-located in relation to existing and future transport infrastructure. The site has approximately 3.9km of rail frontage to the existing Melbourne/Geelong rail corridor, which contains a dedicated freight line operated by ARTC, and is 1.5 km from the Princes Freeway (M1), part of Victoria's arterial road network which is part of the State's Principal Freight Network (PFN). The site is also located adjacent to the future Outer Metropolitan Ring Corridor (a future multi-modal corridor for both road and rail) which will provide direct double stacked access to the broader interstate rail network upon its completion, the future Avalon Airport Precinct and potential future Bay West port (see Figure 1).

The site is well-located to Melbourne's major freight catchment zone in the west, where more than 70 per cent of PN's existing, and future, containerised rail volumes are concentrated. It is strategically located between Melbourne and Geelong to capitalise on existing and future economic growth in this region. The proximity to the ARTC's Freight Mainline enables the quick transfer of containers and goods to and from the facility.

The ARTC interstate network will connect the Precinct to other terminals across Australia, including a direct connection through to Brisbane via the Commonwealth Government's Inland Rail Project, a freight rail line under construction to link Melbourne and Brisbane, improve freight supply chains and connect into the broader regional rail network. The Federal Government is investing more than $14 billion in the Inland Rail Project between Melbourne and Brisbane which will ultimately allow for double stacked 1,800m long trains to operate on this corridor.

Figure 1 Future Associated Infrastructure

MFT cannot handle double stacked 1,800m long trains efficiently and effectively as these trains cannot access the terminal due to network constraints and 1,800m long trains require breaking up into shorter lengths, which requires shunting and double-handling, to be loaded and unloaded at MFT. Currently there is no freight terminal in Melbourne capable of accommodating the Inland Rail train service outcome. The national rail freight network is gearing towards 1,800 metre trains and it is therefore a key imperative for the new terminal to have capacity to handle 1,800m long, double stacked trains to futureproof freight handling operations. This will significantly improve efficiency in the freight supply chain and align terminal operations with the capacities of Australia's Inland Rail network.

The Precinct has capacity to co-locate logistics warehousing which provides further time, certainty and cost efficiencies in the supply chain. 'Cargolink' warehousing can be located either side of the main terminal. This allows containers to be transferred directly between the terminal and the warehouse for loading/unloading and direct dispatch to the customers. This removes a road transport leg from the supply chain, which provides the efficiency improvements and has further benefits in reducing heavy vehicle movements on the public road network. The Cargolink warehousing and other logistics warehousing are integrated activities with the rail terminal that grouped together provide these multiple benefits.

The Precinct is planned to include an import/export (IMEX) terminal which would be a separate terminal designed to handle containers travelling between the Port of Melbourne (and potentially the ports of Bay West and Geelong in the future) and the Melbourne metropolitan area and regional Victoria. Containers with imported goods will be shuttled by rail from the ports to be dispatched by road to customers in Melbourne and throughout Victoria. The IMEX terminal can also transfer export containers back to the ports by rail to be shipped overseas. A direct rail connection to the future Bay West Port has also been allowed for in the design.

The project will create a significant economic growth and additional jobs in the region and is integral to improving the movement of freight throughout Victoria and delivery Australia-wide. The project is the largest integrated rail and logistics facility in Australia and is essential to realising the outcomes of the new rail infrastructure being delivered by the Australian and Victorian governments.

Pacific National is progressing a Planning Scheme Amendment (PSA) to rezone the site to enable the intermodal freight terminal and warehousing precinct. The site is located outside of the Urban Growth Boundary within Green Wedge Land. The PSA will amend the City of Wyndham Planning Scheme and Ministerial intervention is being sought due to the significance of the project.

Prior to lodgement of the PSA, referrals under the Environment Effects and Environment Protection and Biodiversity Conservation acts will be submitted to State and Commonwealth departments respectively to obtain the necessary environmental approvals.

2.2 Project Details

The Little River Logistics Precinct will cover approximately 363 hectares with rail terminals, freight handling, warehousing and ancillary facilities, along with 205 hectares of biodiversity offset land as shown in the Little River Masterplan in Figure 2.

The Precinct includes:

- An interstate intermodal terminal with an ultimate capacity of more than 2 million TEU per annum.
- An IMEX terminal with a capacity of approximately *500,000* TEU per annum.
- Holding tracks, staging lines and arrival/ departure tracks.
- Terminal Administration/Operations Centre – Offices located in Interstate Terminal providing management and security, rail and container handling equipment control centres, maintenance and other business services.
- Access to the ARTC Interstate Freight Network Via rail bridges (flyovers) over the Melbourne-Geelong passenger railway
- Locomotive provisioning facility – part of PN’s nationwide network to provision locomotives
- Wagon maintenance facility – part of PN’s nationwide network to maintain wagons
- Warehousing and commercial precinct
- External road network upgrades
- Biodiversity Offset area

The Little River Intermodal Freight Terminal and warehousing precinct will operate 24 hours a day seven (7) days a week.

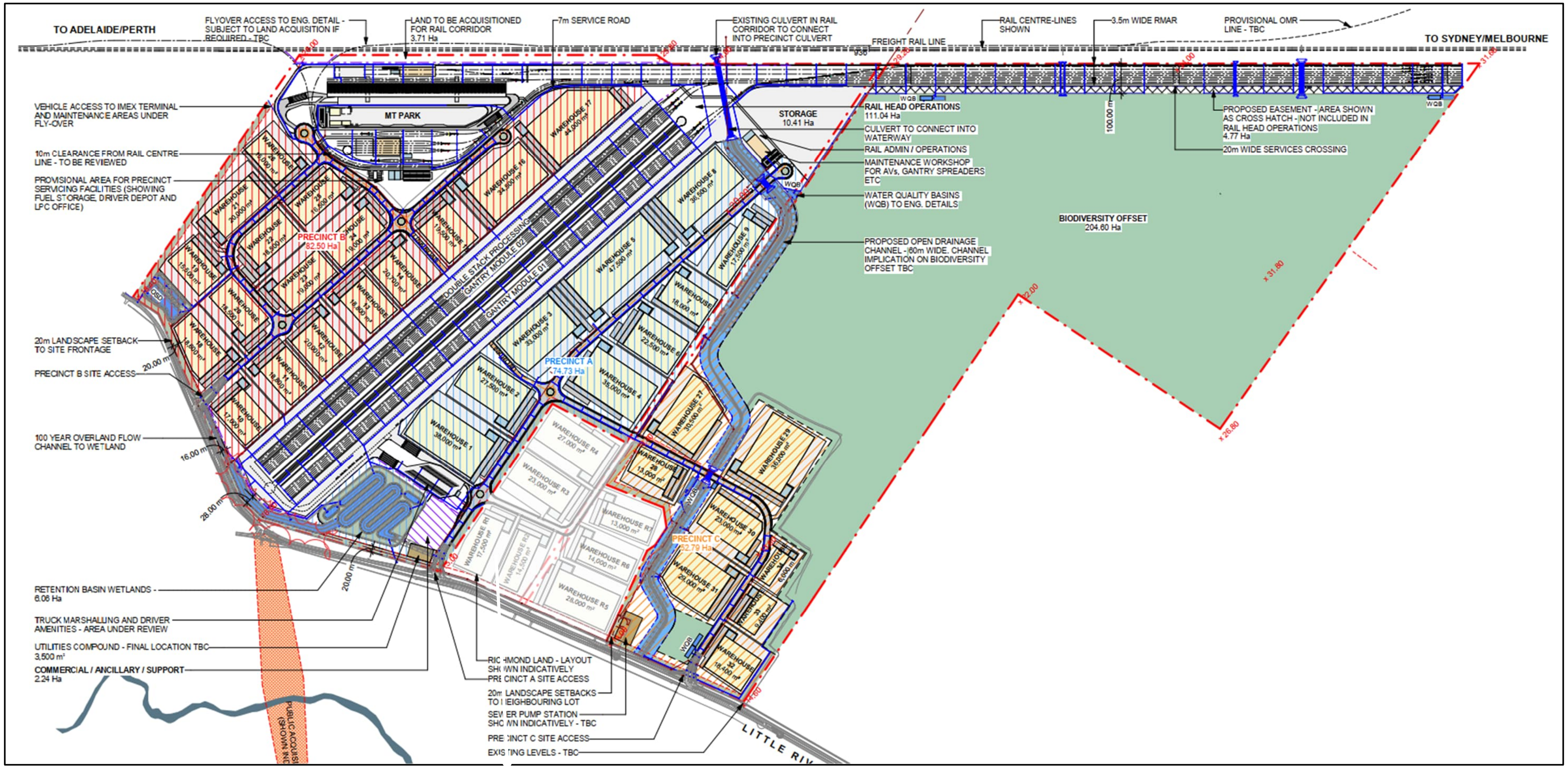


Figure 2 Little River Masterplan

2.3 Site Description

The site of the proposed Little River Logistics Precinct is located approximately 50 km south-west of the Melbourne CBD and 39 km by rail to the Port of Melbourne. It will be close to Melbourne's major freight catchment zone, where more than 70 per cent of containerised rail volumes are concentrated.

The land at 132A Old Melbourne Road comprises of 580 hectares (see Figure 3). The property and parcel information is provided in Table 1.

Table 1 Property and Parcel Details

Property	Lot and Plan Number:	Land Area (ha)
Part of 132A Old Melbourne Road, Little River	Lot 2\TP820002	104.4147
	Lot 4\TP820002	2.8375
	Lot 5\TP820002	13.6242
	Lot 2\LP146084	133.9394
	Lot 1\TP820002	11.3854
	Lot 2\PS513032	122.9874
	Lot 6\TP820002	155.4701
425 Little River Road, Little River	Lot 1\PS449895	4.4753
471 Little River Road, Little River	Lot 1\PS513032	26.6281
Government Road (Allot. 2032 PARISH OF COCOROC)	2032\PP2401	4.5 (approx.)
TOTAL:		**580.2621**

Note: Land Areas subject to survey

The site includes a Government Road that is 20 metres in width and is part of an unmade road. Application for the land to be incorporated into the Project site will be made as part of the Project approvals.

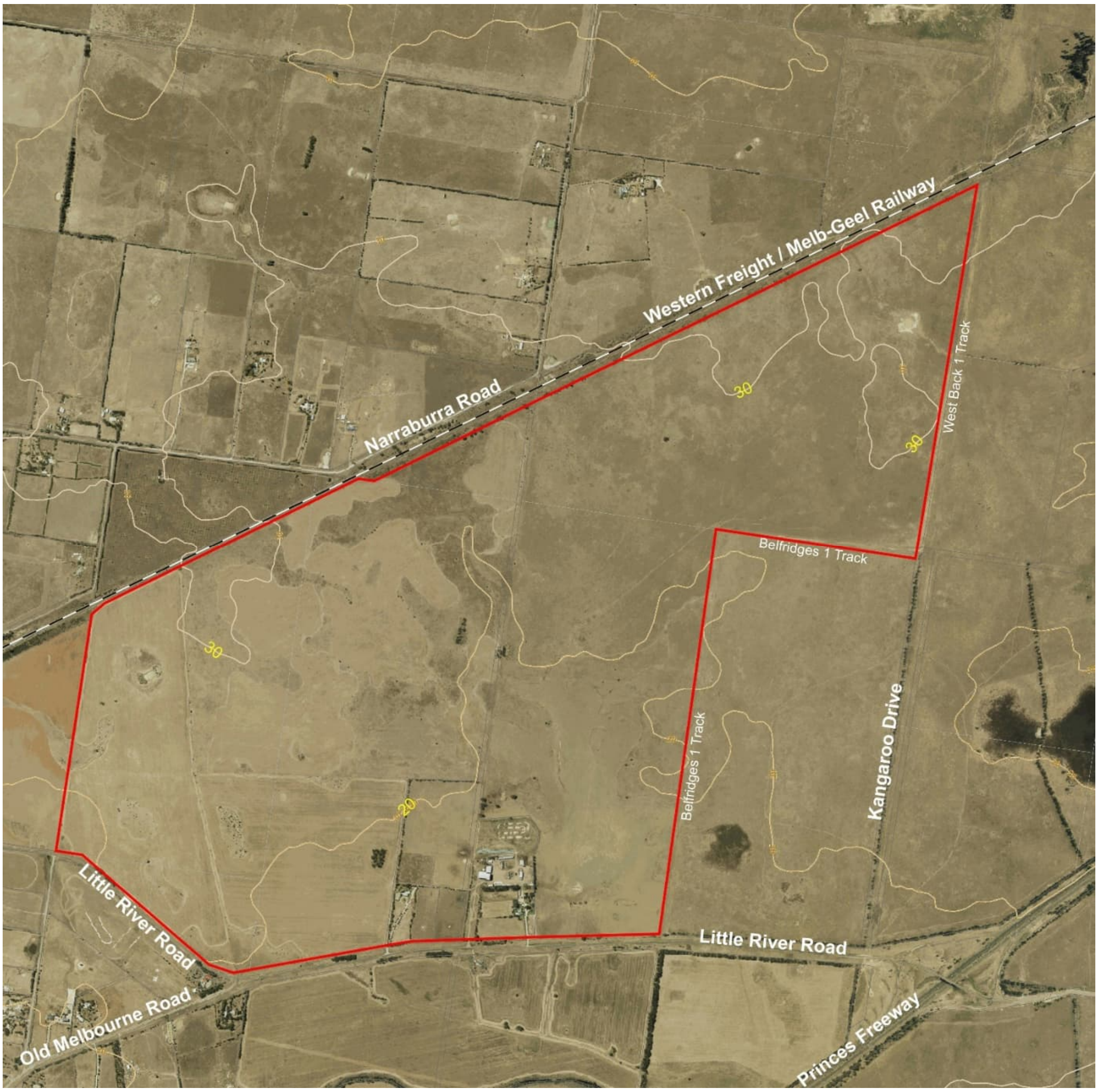


Figure 3 Little River Site Overview

Located outside the Melbourne Urban Growth Boundary and within the City of Wyndham, the site is predominantly zoned 'Green Wedge Zone' and a smaller portion in the northeast is zoned 'Special Use Zone' for quarrying purposes. There are also numerous overlays that are summarised below. A Planning Scheme Amendment is required to enable the delivery of a rail terminal and associated warehousing. The site is strategically located between the Princes Freeway and the Melbourne-Geelong Rail Corridor.

The City of Wyndham Planning Scheme applies the following planning controls to the Land and zoning is shown in Figure 4.

- Green Wedge Zone and Schedule (GWZ)
- Special Use Zone and Schedule 6 (SUZ6)
- Environmental Significance Overlay and Schedule 1 (ESO1)
- Heritage Overlay and Schedule (HO133)
- Public Acquisition Overlay and Schedule 5 (PAO5)
- State Resource Overlay and Schedule 1 (SRO1)

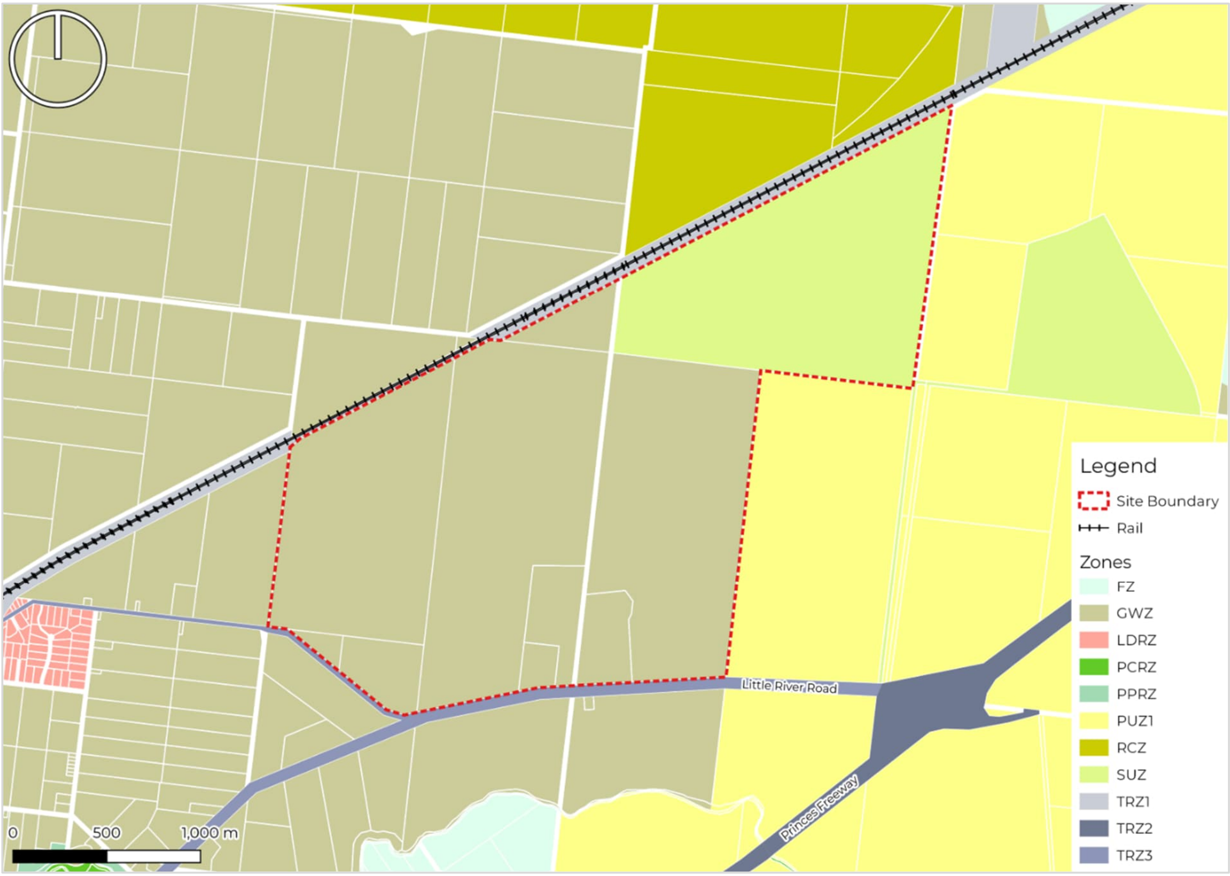


Figure 4 Zoning Plan

2.4 Proposed Construction and Operation

The development would comprise the following:

- Construction of hardstand areas for container storage and laydown and loading/unloading areas
- Construction of new internal roads for light and heavy vehicles
- Construction of buildings such as warehouses, IMEX Terminal
- Installation of services and ancillary works.

Earthworks proposed works to be carried out in the Project area include:

- Installation/relocation of utilities
- Levelling of the site
- Construction of asphalt pavement hardstand areas for container storage and laydown
- Construction of rail infrastructure
- Construction of new access roads from Little River Road.

3.0 Potential Sources of Air Emissions

3.1 Study Area

An indicative ‘study area’ of approximately one kilometre around the proposed Precinct and 150 metres around potential road and rail connections has been considered in this assessment. These distances have been considered for the initial screening assessment to determine how many sensitive receptors are in locations at higher risk of impacts.

Additionally, a wider study area was applied in response to the separation distances recommended by the Environmental Protection Authority (EPA) of between 250m and 500m (see section 4.2.6). While a separation distance of 500m is recommended by the EPA, to understand local influences on air pollutant concentrations within the airshed, a radius of 10km from the proposed Precinct has been examined as discussed in Section 5.3.

3.2 Construction pollutants of interest

Pollutants of interest for the construction of the project are primarily related to vehicle movements, earthworks and materials handling. Given the expected sources of pollution during construction, the pollutants considered for this assessment are particulates (dust), which may cause visible dust plumes and elevated PM_{10}[1] concentrations.

Dust containing crystalline silica may be present in sandy soils and become mobilised in construction dust. When workers chip, cut, drill, or grind objects such as concrete, crystalline silica may become respirable. Respirable crystalline silica (RCS) has been classified as a human lung carcinogen and breathing RCS dust can cause silicosis.

Exhaust emissions from plant, equipment and vehicles such as CO, NO_2, SO_2, particulate matter (PM_{10} and $PM_{2.5}$) and hydrocarbons are expected to be a minor contributor to the environment and would be controlled through typical construction mitigation measures (EPA Victoria, 2020). Mitigation measures include ensuring vehicles are fitted with appropriate emission control equipment, maintained frequently and serviced to the manufacturers’ specifications.

3.3 Operation pollutants of interest

Pollutants of interest for the operation of the project are primarily related to exhaust emissions (CO, NO_2, SO_2, particulate matter (PM_{10} and $PM_{2.5}$) and hydrocarbons) from mobile equipment such as train locomotives, forklifts and trucks.

[1] Particulate matter 10 micrometres or less in diameter

4.0 Legislation and Policy

4.1 Commonwealth Legislation and Policy

4.1.1 National Environment Protection (Ambient Air Quality) Measure

The *National Environment Protection (Ambient Air Quality) Measure* (AAQ NEPM) was formed in 1998 under the *National Environment Protection Council Act 1994 (Cth)* ('NEPC Act'). It was designed to create a nationally consistent framework for monitoring and reporting on common ambient air pollutants. For the purpose of the operational assessment, pollutants of interest are carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2) and particulate matter with a diameter less than 10 micrometres (PM_{10}). The AAQ NEPM was varied in 2003 to include particulate matter with a diameter of less than 2.5 micrometres ($PM_{2.5}$) and is therefore also considered in this assessment. The AAQ NEPM was recently updated (May 2021) with new standards for NO_2 and SO_2 which are based on the latest scientific knowledge on health impacts of these pollutants.

The standards in the AAQ NEPM are not intended to be applied as an environmental standard by regulators without consideration of regulatory impacts in their jurisdictions. The Explanatory Statement clarifies this intent of the AAQ NEPM as a standard for reporting representative ambient air quality within an airshed, and not as a regulatory standard. The AAQ NEPM does not constrain a jurisdiction's ability to manage local or regional air quality issues. Therefore, Environment Reference Standard (ERS) criteria has been adopted for this assessment (see section 4.2.3). It is expected that ERS criteria will be amended to align with the new NO_2 and SO_2 AAQ NEPM standards.

4.2 State Legislation

4.2.1 Environment Protection Act 2017

Air quality in Victoria is managed primarily through the *Environment Protection Act 2017* (EP Act) and associated regulations. The EP Act applies to noise emissions and the air, water and land to protect the environment in Victoria.

The EP Act requires a development licence and operating licence for prescribed permission activities. The *Environment Protection Regulations 2021* classifies activities that discharge or emit to the atmosphere.

4.2.2 Environment Protection Regulations 2021

Schedule 1 of the *Environment Protection Regulations 2021* requires a development licence for facilities with the potential to significantly impact on the environment. An EPA Victorian licence may be required to operate and include conditions relating to discharge limits, monitoring and reporting requirements.

Freight Terminals are not listed as a permission activity under the *Environment Protection Regulations 2021* and air emissions are expected to be below the general discharge limits to air. As such are development licence should not be required for the proposal.

4.2.2.1 General environmental duty

The General Environmental Duty (GED) requires proactive steps to be taken to eliminate or reduce the risk of harm to human health and the environment from pollution or waste.

The GED applies at all times, during construction and operation of the project, for any activities posing a risk of harm to human health and the environment. The following sections of the EP Act apply to the GED:

- Section 25(1) of the EP Act states that a person who is engaging in an activity that may give rise to risks of harm to human health or the environment from pollution must minimise those risks so far as reasonably practicable.
- Section 6 of the EP Act states that minimising risks of harm to human health and the environment requires the duty holder to eliminate risks of harm to human health and the environment so far as reasonably practicable and, if it is not reasonably practicable to eliminate those risks, then reduce those risks as far as reasonably practicable.
- Section 6(2) of the EP Act states factors to give regard to when determining what is reasonably practicable in relation to the minimising of risks to harm to human health and the environment.

4.2.3 Environmental Reference Standard objectives

The ERS sets out the environmental values of the ambient air that are sought to be achieved or maintained in Victoria. Environmental values are the uses, attributes and functions of the environment that Victorians value, such as being able to breathe clean air.

The ERS replaced *State Environment Protection Policy (Air Quality Management)* (SEPP AQM) on 1st July 2021 and generally adopts the objectives in the AAQ NEPM with some modifications. The ERS also contains other environmental values, indicators and objectives that are not in the AAQ NEPM. Environmental values of the ambient air environment listed in the ERS are set out in Table 2.

Table 2 Environmental values of the ambient air environment (Table 2-1, ERS)

Environmental value	Description of environmental value
Life, health and well-being of humans	Air quality that sustains life, health and well-being of humans
Life, health and well-being of other forms of life, including the protection of ecosystems and biodiversity	Air quality that sustains life, health and well-being of other forms of life, including the protection of ecosystems and biodiversity
Local amenity and aesthetic enjoyment	Air quality that supports lifestyle, recreation and leisure
Visibility	Air quality with low levels of particulate matter and very good visible range
The useful life and aesthetic appearance of buildings, structures, property and materials	Air quality that does not cause physical and structural damage to buildings, structures, property and materials
Climate systems that are consistent with human development, the life, health and well-being of humans, and the protection of ecosystems and biodiversity	Air quality that is not undermined, or at risk, by a warming and drying climate together with increasing population and economic growth

The indicators and objectives provide a basis for assessment and reporting on environmental conditions in Victoria. Although it is not a compliance standard, the Environment Protection Act requires the Authority to consider this ERS when assessing development, operating and pilot project licences. The ERS must also be taken into account by the Minister when recommending the making of regulations and compliance codes and deciding whether to declare an issue of environmental concern.

If not otherwise specified, the environmental values in this ERS apply to the whole of Victoria. ERS indicators and objectives (as amended 29 March 2022) for the ambient air environment are presented in Table 3.

Table 3 ERS indicators and objectives for the ambient air environment

Pollutant	Objective	Averaging period
Carbon monoxide (max. concentration)	9.0 ppm	8 hours
Nitrogen dioxide (max. concentration)	0.08 ppm	1 hour
	0.015 ppm	1 year
Sulfur dioxide (max. concentration)	0.075 ppm	1 hour
	0.02 ppm	1 day
Particulate matter as PM_{10} (max. concentration)	50 µg/m^3	1 day
	20 µg/m^3	1 year
Particulate matter as $PM_{2.5}$ (max. concentration)	25 µg/m^3	1 day
	8 µg/m^3	1 year

4.2.4 Air Quality Assessment Criteria (AQACs)

The EPA Victoria Publication 1961 *Guideline for Assessing and Minimising Air Pollution in Victoria* (EPA 2021b) provides a framework to assess and control risks associated with air pollution. The guideline addresses potential human health and environmental impacts associated with outdoor air pollution emitted from commercial, industrial, agricultural, transport, mining and extractive activities.

The guideline provides a tiered approach to the assessment of risks from air pollution, with three levels of assessment in order of increasing complexity.

- **Level 1** assessments are qualitative or semiquantitative. They are used to assess risks from activities that either have intrinsically low risks, or have common, well-understood risks that can be controlled without extensive assessment.
- **Level 2** assessments are the most common type of risk assessment. They usually involve the use of dispersion modelling or monitoring. Predicted or measured pollutant concentrations are benchmarked against pre-defined air pollution assessment criteria (APACs) to understand risks.
- **Level 3** assessments are detailed risk assessments. These are only used when a simple comparison of a pollutant's concentration to an APAC cannot adequately assess risks.

A Level 1 assessment (qualitative or semiquantitative) was deemed appropriate for the project as described in the guideline "*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."*

Air Quality Assessment Criteria (AQACs) are concentrations of pollutants in air that provide a benchmark to understand potential risks to human health or the environment. They are risk-based concentrations that can help identify when or if an activity is likely to pose an unacceptable risk to the receiving environment.

Exceedance of one or more AQACs indicates that the activity has the potential to pose an unacceptable risk to human health or the environment. This prompts the need either for additional risk controls to be implemented, or for further investigation if there is reason to believe that the inputs used the model were unreasonably conservative.

AQACs are not designed to evaluate risks from highly elevated single exposures of very short duration (in the order of minutes) such as might occur during an incident or emergency. In these instances, alternative assessment criteria should be considered that are designed for that purpose (for example acute exposure guideline levels from the US EPA, or the emergency response planning guidelines from the American National Oceanic and Atmospheric Administration).

4.2.5 Planning and Environment Act 1987

The *Planning and Environment Act 1987* (P&E Act) is the primary legislative framework used to guide and regulate land use, planning and development related matters within Victoria. In particular, the P&E Act provides the framework for planning schemes, which contain State and Local Government policy, together with a suite of zone, overlay and particular provisions that apply to each municipality in Victoria and which manage land use and development.

4.2.6 EPA Recommended Separation Distances for Industrial Residual Air Emissions Guidelines (IRAE) 2013

EPA has published Recommended Separation Distances for Industrial Residual Air Emissions Guidelines (IRAE) 2013. This guideline provides minimum separation distances with focus on unintended industry generated emission of odour and dust only, and aims to support effective decision making regarding land uses, to:

- Protect human health and wellbeing, local amenity and aesthetic enjoyment
- Protect existing industry from encroachment by sensitive uses
- Prevent land adjacent to industry from being underutilised.

The IRAE is directly related to Clause 53.10 (previously Clause 52.10 prior to amendment VC148) of the Victorian Planning Provisions (VPPs) under the *Planning and Environment Act 1987 (VIC)*. Clause 53.10 of the VPPs deals with those uses which have adverse amenity potential and specifies the minimum threshold distance for various industry types between the proposed use and a sensitive land use zone.

The Department of Environment, Land, Water and Planning (DELWP) recently updated (March 2021) Clause 53.10 of the VPPs to improve the way the planning system addresses buffers for amenity, human health and safety impacts.

This Clause seeks to guide decision making on the appropriate separation distances for ‘uses with the potential for adverse amenity potential’. The stated purpose of the clause is ‘*to define those types of industries and warehouses which, if not appropriately designed and located may cause offence or unacceptable risk to the neighbourhood*’. Separation distances for identified industries within the 10km radius of the proposed precinct have been discussed in Section 5.4.2.

5.0 Existing Conditions

Impacts on air quality need to be considered within the context of the receiving environment and specifically, the existing conditions. Of particular importance to the assessment are meteorology, local topography, background air pollution and location of nearby sensitive land uses.

5.1 Meteorology and climate

Meteorology in the area surrounding the Precinct is affected by several factors such as terrain and land use. Wind speed and direction are largely affected by topography at the small scale, while factors such as synoptic scale winds affect wind speed and direction on the larger scale. Wind speed and direction are important variables in assessing potential air quality impacts, as they dictate the direction and distance air pollutant plumes travel.

The closest Bureau of Meteorology (BoM) Station is located at Avalon Airport (Station number 087113) 10 km southwest of the Precinct. Avalon Airport is situated in similar terrain to the Precinct and is near enough to provide an indication of wind conditions. However, there will be some differences due to the distance between the two locations.

Long term climate data has been recorded at the Avalon Airport BoM since 1965. Temperature (1995-2022), precipitation (1971-2022), humidity (1995-2010), wind speed and wind direction (1965-2010) records are summarised in Table 4.

As shown in Table 4, the warmest temperatures occur during the summer months, with the highest mean maximum temperature (26.6°C) occurring in January. July is the coldest month, with a recorded mean minimum temperature of 5.2°C. The annual mean rainfall is 457mm over 60 days per year. November is the wettest month with a mean rainfall of 49.5 millimetres, while March is the driest month with a mean rainfall of just under 28 millimetres. Humidity follows a diurnal cycle, with higher humidity in the morning compared to the afternoon.

Table 4 BoM Climate Average Statistics at Avalon Airport

Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean maximum temperature (°C)	26.6	26.1	24.3	20.5	17.3	14.7	14.2	15.4	17.8	20.3	22.5	24.5	20.4
Mean minimum temperature (°C)	14.3	14.4	12.6	9.7	7.6	5.7	5.2	5.5	6.7	8.1	10.5	11.9	9.4
Mean rainfall (mm)	35.0	31.7	27.7	38.0	37.8	38.4	36.7	42.2	44.8	48.1	49.5	29.3	456.8
Decile 5 (median) rainfall (mm)	27.1	21.8	24.3	30.0	31.0	35.6	30.4	39.4	43.7	43.4	42.6	26.4	448.4
Mean number of days of rain ≥ 1 mm	3.0	2.4	3.1	4.5	5.8	6.2	6.6	6.9	6.7	6.3	5.2	3.6	60.3
Mean 9am temperature (°C)	18.9	18.5	16.3	14.4	11.6	9.1	8.3	9.8	12.4	14.4	15.9	17.4	13.9
Mean 9am relative humidity (%)	68	71	74	76	84	86	85	80	72	66	69	66	75
Mean 9am wind speed (km/h)	18.2	17.0	16.6	16.7	15.8	15.2	16.5	18.6	21.9	21.7	20.4	19.8	18.2
Mean 3pm temperature (°C)	24.0	24.2	22.4	18.8	15.8	13.6	12.9	14.1	15.9	17.9	20.3	21.8	18.5
Mean 3pm relative humidity (%)	50	49	49	56	64	68	66	62	58	53	54	53	57
Mean 3pm wind speed (km/h)	26.3	25.4	24.1	22.3	20.1	20.5	21.9	24.4	26.2	26.5	26.9	27.0	24.3
Latitude: 38°03"S Longitude: 144°48"E, Elevation: 11 m, Commenced: 1965 Status: Open, Latest available data: April 2022													

Seasonal wind roses for Avalon Airport are presented in Figure 5. Dominant winds generally range from the northwest, west and south during spring, summer and autumn. Winds tend more northerly during winter, ranging from the west to northeast.

Calm conditions occur more frequently during autumn and winter. Calm or very light conditions typically result in poorly dispersive conditions but as the main potential impact associated with construction of the project is wind generated dust, meteorology is not expected to cause increased risk of air quality impacts.

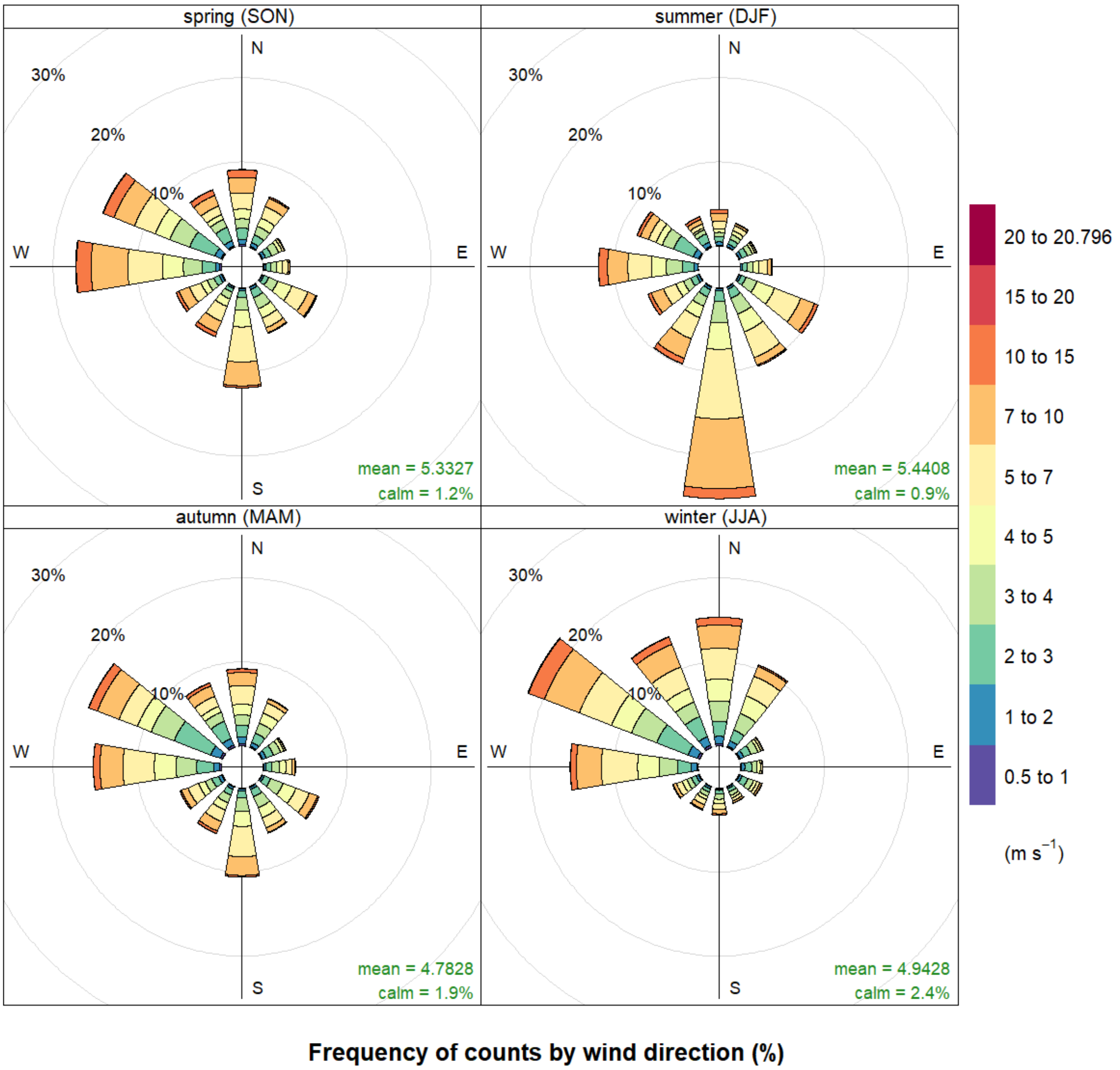


Figure 5 Comparison of seasonal wind roses for BoM Avalon Airport (2002 to 2021)

5.2 Topography

The topography in the area surrounding the project is dominated by Corio Bay to the southeast and a coastal hinterland of relatively flat terrain below 50 metres elevation to the north, south and west. A small mountain range with elevations up to approximately 400 metres runs northeast-southwest, approximately 10 kilometres west from the Precinct. Terrain elevations in the project area are presented in Figure 6. The local relief surrounding the Project area is minor and is not expected to greatly influence the dispersion of air pollutants potentially emitted during construction and operation activities.

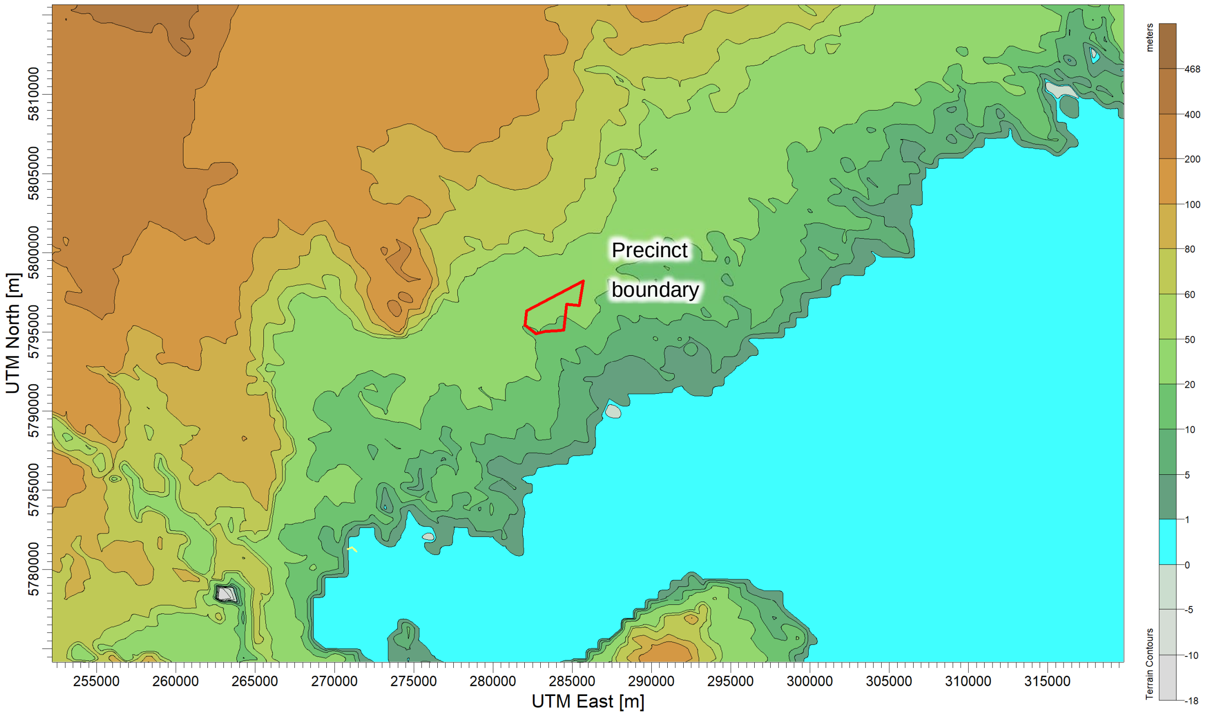


Figure 6 Terrain elevations of model grid

5.3 Existing Air Quality

The project is located in a semi-rural area where density of emissions such as NO_2, CO, SO_2, PM_{10} and $PM_{2.5}$ are expected to be significantly less than metropolitan areas. A review of the National Pollution Inventory Database for 2019-2020 identified four industrial sources that report emissions to air within 10km of the Precinct and are included in Table 5. Air emissions from these industrial sources include:

- Particulate Matter (PM_{10} and $PM_{2.5}$)
- Carbon Monoxide (CO)
- Sulphur Dioxide (SO_2)
- Oxides of Nitrogen (NO_x)
- Polycyclic Aromatic Hydrocarbons (PAHs)
- Heavy Metals
- Volatile Organic Compounds (VOCs).

Table 5 NPI Listed Emission Air Sources within 10km of proposed Precinct (2019/2020 NPI Database)

Facility Name	Location	Distance from site	Emissions to Air
Werribee Quarry (Holcim) Gravel and Sand Quarrying	Wests Rd Werribee, VIC, 3030	1.5km east of the site Precinct boundary	PM_{10}, $PM_{2.5}$, CO, SO_2, NO_x, PAHs, Heavy Metals, VOCs
Werribee Quarry (Hanson) Gravel and Sand Quarrying	Kirks Bridge Rd Mambourin, VIC, 3024	4.5km north of the Precinct boundary	PM_{10}, $PM_{2.5}$, CO, SO_2, NO_x, PAHs, Heavy Metals, VOCs
Mountain View Quarries - Little River Gravel and Sand Quarrying	250 Drysdale Rd, Little River, VIC, 3211	8km northwest of the site Precinct boundary	PM_{10}, $PM_{2.5}$, CO, SO_2, NO_x, PAHs, VOCs
Viva Energy Avalon Airport Petroleum Product Wholesaling	Avalon Airfield Beach Rd Lara, 3212	8km southwest of the site Precinct boundary	VOCs

The EPA operates air quality monitoring stations in Melbourne, Geelong and the Latrobe Valley, with the nearest to the project area being in Geelong South. Other locations are monitored on a less permanent basis depending upon the EPA's monitoring programme. EPA has monitored Geelong air quality since the 1970s. Air quality is generally good however, with a large population and industry base, it sometimes does not meet the regulatory standards. In addition, Geelong is situated in the Port Phillip Region airshed and so can be influenced by Melbourne's air quality under certain meteorological conditions. Air quality in Geelong generally meets the objectives specified in the AAQ NEPM except for visibility. The ozone objectives have not been exceeded since 1993.

The four most recently published years (2017 to 2020) of EPA monitoring data are presented in Table 6. Data is based on the nearest located monitoring data for NO_2, CO, SO_2, PM_{10} and $PM_{2.5}$. The nearest monitoring station is Geelong South located 27 km to the southwest of the proposed Precinct.

The data in Table 6 shows compliance with the NEPM standards across all averaging periods for NO_2, CO and SO_2 between 2017 to 2020. A review of particulates monitoring data for 2017 to 2020 shows compliance with PM_{10} and $PM_{.2.5}$ annual averages. The maximum 24-hour PM_{10} and $PM_{2.5}$ concentrations were in exceedance of the NEPM standard. The *EPA Victoria Compliance with the National Environment Protection (Ambient Air Quality) Measure* Air Monitoring Reports for 2017 to 2020 indicate that exceedances of the 24-hour PM_{10} and $PM_{2.5}$ criterion was largely attributed to woodfire smoke, backburning and windblown dust.

Table 6 EPA Monitoring Data, Geelong South (2017-2020)

Pollutant	Averaging Period	2017	2018	2019	2020	NEPM Criteria (ppm)
		Concentration (ppm)				
NO_2	1 Hour Maximum	0.042	0.051	0.038	0.045	0.080
	Annual Average	0.006	0.006	0.0055	0.0057	0.015
CO	8- Hour Maximum	1.1	1.1	1.54	2.9	9.0
SO_2	1 Hour Maximum	0.017	0.029	0.047	0.019	0.10
	24 Hour Maximum	0.002	0.003	0.005	0.002	0.015
Pollutant	**Averaging Period**	**Concentration (µg/m^3)**				**NEPM Criteria (µg/m^3)**
PM_{10}	24 Hour Maximum	**73.7**	**97.1**	**101.5**	**167.2**	50
	Annual Average	18.6	19.5	19.65	-	25
$PM_{2.5}$	24 Hour Maximum	**26.8**	**31.0**	**32.0**	**155.1**	25
	Annual Average	7.0	6.5	6.37	7.78	8

Based on the surrounding areas analysis, existing air quality constraints from industrial facilities near the proposed Precinct are unlikely.

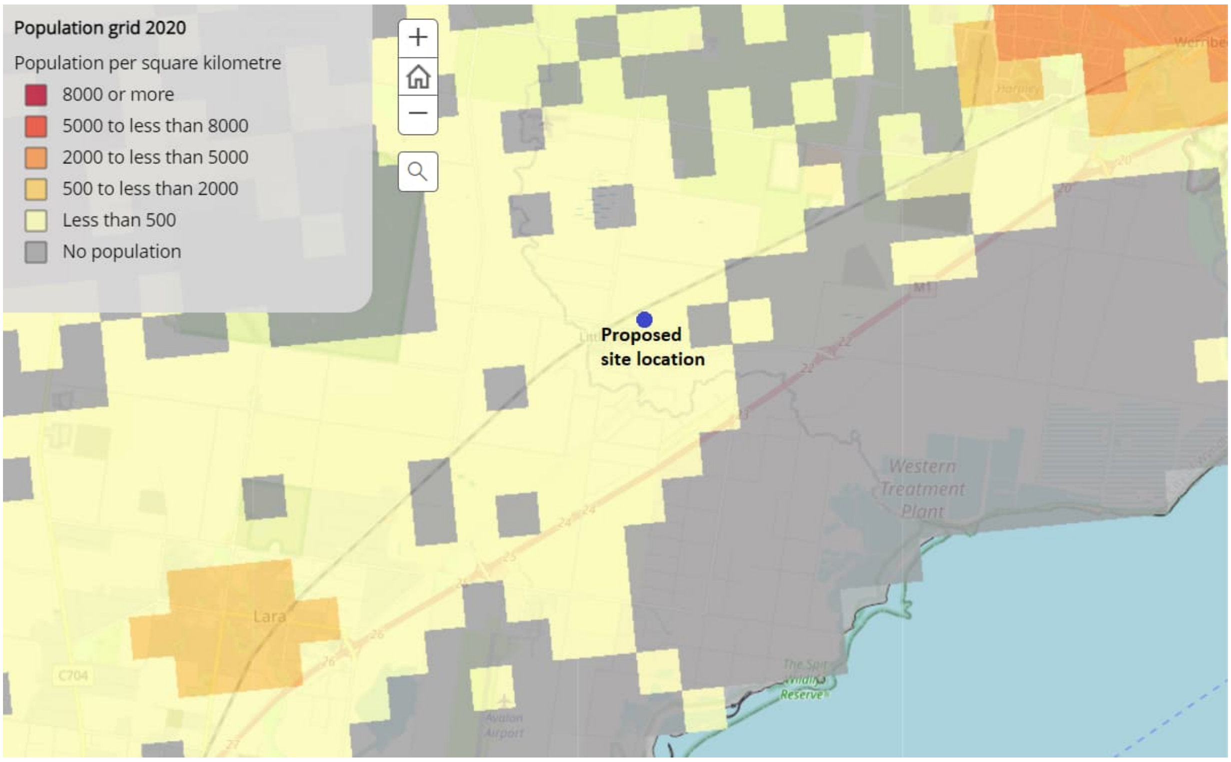
5.4 Land Use and Sensitive Receptors

5.4.1 Size and vulnerability of nearby population

In addition to the identification of sensitive receptors and land uses, EPA Victoria Guideline 1961 (EPA 2021b) recommends that population density and vulnerability be included to provide context for the impacts being assessed. In particular, potential impacts to health from air pollution are related to the location, size and vulnerability of the exposed population.

Australian Bureau of Statistics (ABS) data was accessed to map Figure 7 and Figure 8 which show population density and vulnerability in the vicinity of the project area. An approximate indicator of the vulnerability of a community is the index of relative socio-economic disadvantage (IRSD) for the Statistical Area Level 1 (SA1).

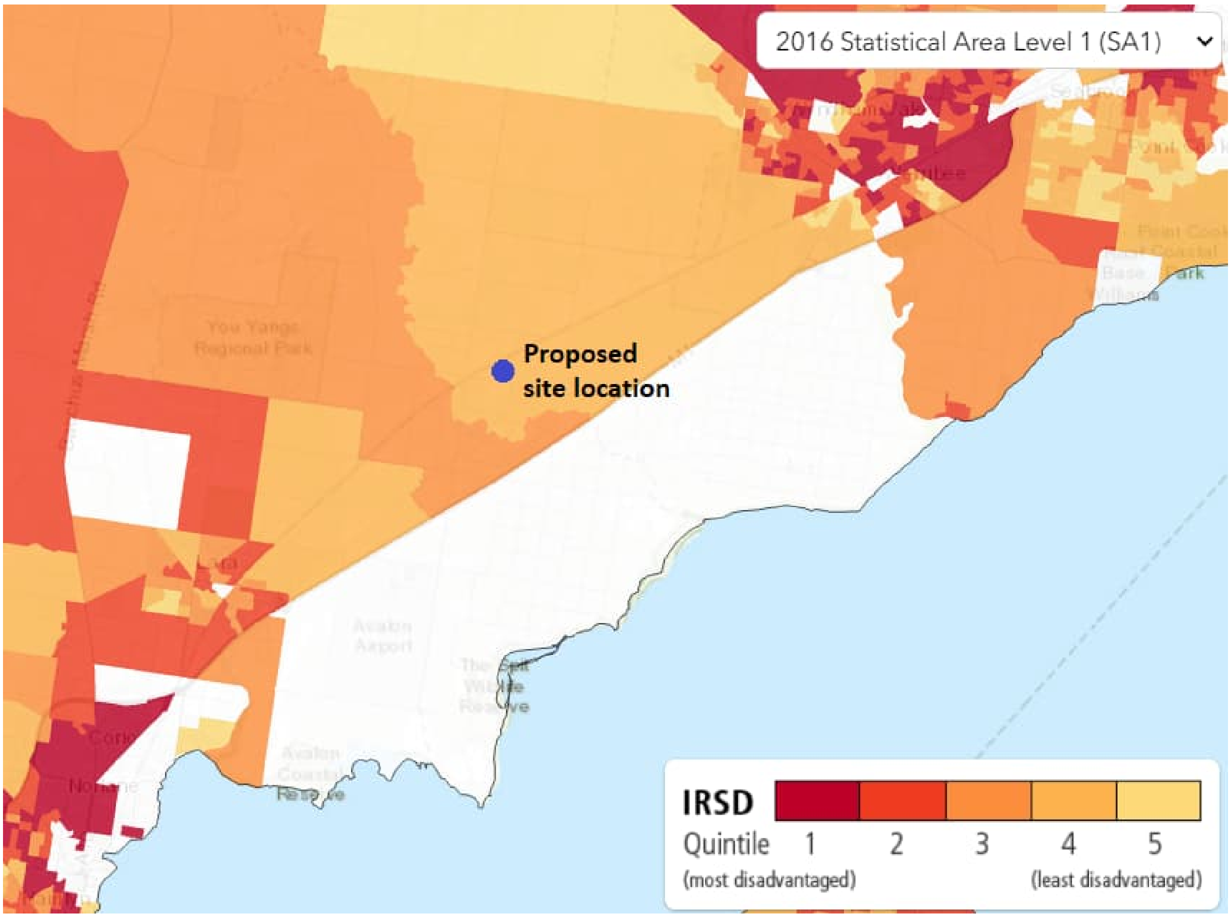
As shown in Figure 7, population density is less than 500 per square kilometre in the vicinity of the proposed Precinct.



Adapted from: https://www.abs.gov.au/ (accessed April 2022)

Figure 7 Population density in the vicinity of the proposed Precinct (blue circle)

Figure 8 shows the project is located in an area with an IRSD score of ‘4’ (low level of disadvantaged) The ‘most disadvantaged’ areas are located approximately 10 kilometres to the northeast (Werribee) and southwest (Corio).



Adapted from: https://www.abs.gov.au/ (accessed April 2022)

Figure 8 Population vulnerability in the vicinity of the proposed Precinct location (blue circle)

ABS information shows that the study area has low population density (less than 500 people per square kilometre) with ‘most disadvantaged’ areas located at least 10 kilometres from the proposed project location.

The combination of low population density and large buffer to vulnerable populations indicates that increased impacts on health from air pollution are unlikely in the study area.

5.4.2 Sensitive Receptors

Figure 9 identifies the location of the sensitive receptors in relation to the Precinct and study area.

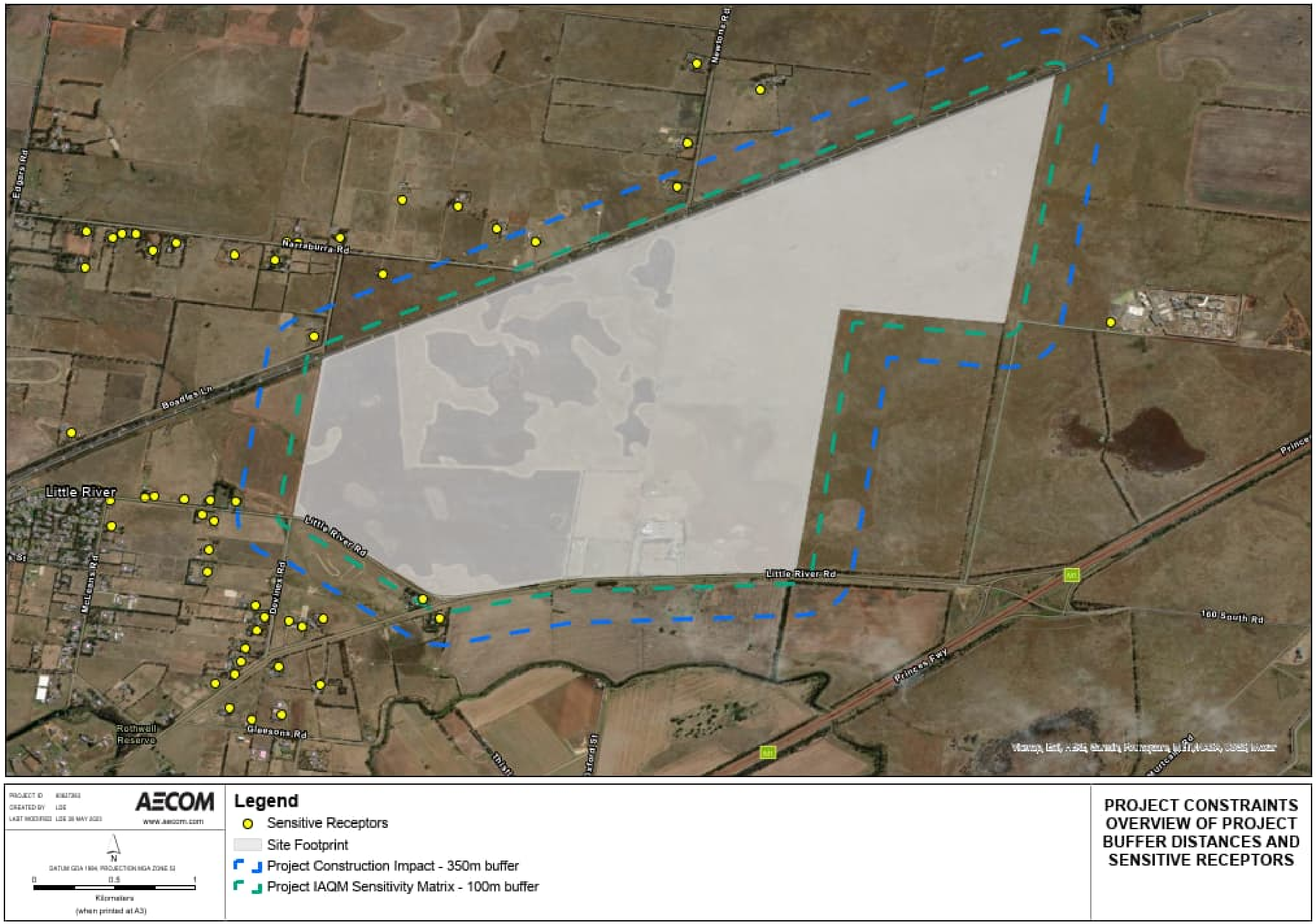


Figure 9 Location of sensitive receptors and Air Quality buffer areas

6.0 Risk assessment

6.1 Methodology

A risk-based approach is adopted for assessment of the potential impacts of the Project. A risk assessment was carried out using an approach that is consistent with Australian/New Zealand Standard AS/NZS ISO 31000:2018 *Risk Management Process*.

The risk assessment process provides a method for:

- facilitating a consistent approach to risk assessment across the various specialist studies
- identifying key Project risks to inform where detailed investigations are required
- ensuring the level of investigation is proportionate to the relative environmental risk
- assessing the effectiveness of proposed mitigation measures and whether additional measures may be required.

Risk can be defined as a combination of:

- the magnitude of potential consequences of an event
- the likelihood of the event occurring.

The risk assessment process developed for the Project involved the assignment of consequence and likelihood ratings which were combined to give an overall risk level for each identified risk.

The initial findings of the impact assessment were used to identify and describe cause-and-effect pathways for the Project to determine links between Project activities and their subsequent environmental consequences (known as risk pathways). These risk pathways were identified considering the assets, values and uses requiring protection identified during the existing conditions assessment. Further detail regarding the methodology used to assess risk for this report has been included within Appendix A.

6.2 Application of mitigation measures

An initial set of mitigation measures have been developed as part of this impact assessment. These mitigation measures are based on compliance with legislation and standard requirements that are typically incorporated into the delivery of infrastructure projects of similar type, scale and complexity.

As the operation strategies were well progressed at the commencement of this impact assessment, mitigating measures that were already incorporated in the design were included as initial mitigation measures.

Initial risk ratings were applied to each identified risk pathway assuming that these initial mitigation measures were in place. Additional mitigation measures were developed where the initial risk ratings were categorised as medium or higher.

The risk and impact assessment process is iterative. Potential impacts were reassessed after the risk assessment and after mitigation measures were refined. The level of residual risk was reassessed using the same methodology to confirm the mitigation measure is effective in mitigating or managing potential impacts.

6.3 Risk assessment

A risk assessment of project activities was performed as a screening tool to prioritise the focus of the impact assessments and development of mitigation measures. The risk pathways link project activities (causes) to their potential effects on the environmental assets, values or uses that are considered in more detail in the impact assessment. Risks were assessed for the construction, operation and decommissioning phases of the project. The identified risks and associated residual risk ratings are listed in Table 7.

Table 7 AQ risk pathway table

Risk name	Risk pathway	Initial mitigation measure	Initial risk			Additional mitigation measure	Residual risk		
			Consequence	Likelihood	Risk		Consequence	Likelihood	Risk
Air emissions during operation of the Precinct	Impacts to ambient air quality and human health as a result of combustion emissions associated rail and road transportation.	Precinct and access roads to be designed with appropriate buffers between combustion emission sources and sensitive receptors. Plant and equipment would be maintained in good condition to minimise spills and air emissions that may cause nuisance.	Moderate	Possible	Medium	Traffic management plan to mitigate significant increases in traffic numbers near sensitive receptors	Minor	Unlikely	Low
Air emissions during construction	Impacts to ambient air quality and human health at sensitive receptors due to dust associated with the construction. Climatic conditions result in the generation of dust (particulates) resulting in deterioration of the existing air quality environment.	Construction Environmental Management Plan (CEMP) incorporating mitigation methods listed in EPA Victoria Publication 1834, *Civil Construction, Building and Demolition Guide*.	Moderate	Possible	Medium	Restricted vehicle movements. Crushed rock on access tracks. Speed restrictions. Dust monitoring. Weather conditions would be monitored for extreme heat and/or wind events and works would be modified.	Minor	Unlikely	Low
Reverse amenity air quality impacts on the Precinct	Air Quality impacts on project construction or operation from existing or future air pollution sources in the vicinity of the project	Precinct and road to be designed with appropriate buffers between combustion emission sources and sensitive receptors	Moderate	Unlikely	Low	Review of existing and potential future emissions sources in the project vicinity and changes to project design	Minor	Rare	Very Low

7.0 Air Quality Impact Assessment

7.1 The Precinct

7.1.1 Construction

As detailed in Section 2.3, pollutants of interest during construction and operation of the project are primarily related vehicle movements, earthworks, materials handling and exhaust emissions (CO, NO_2, SO_2, particulate matter (PM_{10} and $PM_{2.5}$) and hydrocarbons) from mobile equipment such as train locomotives, forklifts and trucks.

A risk based semiquantitative method has been used to assess potential air quality impacts. The IAQM methodology (*IAQM 2014 Guidance on the assessment of dust from demolition and construction*) is widely used in Australia to assess emissions from construction projects and has been accepted by many regulatory authorities as a suitable approach in the absence of any Australian-based guidance.

Assessment of potential air quality impacts are based on:

- Scale and nature of the works, which determines the potential dust emission magnitude; and
- Sensitivity of the area.

The IAQM methodology classifies the sensitivity of an area to dust soiling and human health impacts due to particulate matter effects as high, medium, or low. The classification is determined by a matrix for both dust soiling and human health impacts. Based on information in Figure 9, there are expected to be less than 10 sensitive receptors (residences) within 100m of the project boundary, therefore the sensitivity of the area would be rated as 'Low'. In an area with a low number of sensitive receptors, the potential of unmitigated dust impacts is also expected to be '**low**'.

Air quality impacts during construction are expected to be short term and managed through common mitigation methods. Following confirmation of design and appointment of a contractor, a construction phase Traffic Management Plan will be required. This plan should reconfirm the construction phase findings related to air quality and document any required controls or mitigations, including traffic management, restrictions on hours of operation etc.

7.1.2 Operation

Air emissions due to the increased rail and road traffic is expected to be very localised (less than 100 metres from source) and short in duration as trains and vehicles move past receptors quickly and vehicle engines are switched off soon after arrival at the destinations.

By 2050, fifteen trains per day are estimated to enter and exit the Precinct via the rail flyover (total of thirty train movements per day). Thirty trains per day is unlikely to cause a discernible increase of air quality pollutants (CO, NO_2, SO_2, particulate matter (PM_{10} and $PM_{2.5}$) and hydrocarbons) at any sensitive receptors. The nearest receptor (R42 in Figure 9) is located approximately 150 metres from the flyover. Buffer distances between sensitive receptors and emission sources during operation are greater than 100 meters and considered appropriate for the potential emission sources.

Emissions from Locomotives in Australia are managed through adherence to the *Management of Locomotive Exhaust Emissions Code of Practice* (CoP) published by the Rail Industry Safety and Standards Board and through individual State regulatory body regulations.

The purpose of the CoP document is to describe "recommended practices for the management and improvement of exhaust emissions of diesel freight locomotives in the Australian railway industry" and to provide guidance on the improvement of emissions through a range of measures, including the use of Upgrade kits and through fuel / emissions optimisation measures.

Pacific National are currently meeting the CoP and existing locomotives will be fitted with the Tier 0+ upgrade kit at the next major overhaul / CCO, in accordance with the Code of Practice.

Air quality impacts beyond the boundary of the proposed Precinct during operation are expected to be '**negligible**' and remain below relevant air quality standards.

7.1.2.1 Representative Air Quality modelling

Based on the findings in Section 7.1.2, a Level 1 qualitative or semiquantitative screening assessment (Level 1) has been used as specified in EPA 2021b due to the operational activities being:

- intrinsically low risk, and
- common, well understood and can be effectively controlled without the need for extensive assessment work.

To further assess potential impacts, a comparison has been made to air dispersion modelling conducted by AECOM for a similar Pacific National site located in St Marys, NSW (AECOM 2019). From an air quality perspective, the St Marys site is located in a higher sensitive area (than the proposed Little River Precinct) as it has a higher number of sensitive receptors (>100) within 350 metres of the site boundary.

Modelling was undertaken using the CALPUFF modelling suite with prognostic meteorological data derived from The Air Pollution Model (TAPM). Operational emission rates for locomotives, forklifts and trucks were estimated for inclusion in the model.

Emissions from the St Marys facility were assumed to be dominated by:

- Idling Locomotives (idling while being unloaded or waiting to move into the unloading area)
- Emissions from the Locomotives moving through the site under a low notch setting (assumed to be Notch 2).

Air quality impacts from ongoing operations, predominantly associated with road and rail traffic operations was predicted to be low with no adverse impacts on surrounding receptors expected as a result of the construction and operation of the freight hub.

Provided appropriate mitigation measures are implemented, air dispersion modelling in AECOM (2019) concluded no significant air quality impacts will occur during operation of the St Marys Freight Hub.

Modelling results from the St Marys reference site support the semiquantitative air quality assessment findings in Section 7.1.2 that the risk of impacts beyond the proposed Project boundary is expected to be ‘**negligible**’.

7.2 Potential Connections

7.2.1 Construction

The potential connections to the Precinct as shown in Figure 2 include the planned OMR connections to the north and road transportation to Princes Freeway in the south. Air quality impacts on nearby receptors include increased PM_{10}, $PM_{2.5}$, NO_x, CO and VOCs from transport related sources including both road and rail.

Vehicle emissions from construction of the OMR are expected to be a minor contributing factor to local ground level PM_{10}, $PM_{2.5}$, NO_x, CO and VOCs concentrations within the local airshed. Some emissions from the OMR would be directly associated with the proposed Precinct, including emissions from both lightweight vehicles and from trucks transporting goods and materials. The potential impact of construction traffic is expected to be ‘**low**’ and remain below relevant air quality standards.

7.2.2 Operation

Once operational, the rail connection would result in potential air emissions from diesel locomotives travelling along the rail connection to and from the Precinct and idling at the Precinct contributing to local ground level PM_{10}, $PM_{2.5}$, NO_x, CO and VOCs concentrations. At this stage, potential impacts from locomotives are unable to be quantified as detailed information regarding locomotive movements including; frequency; notch speed, locomotive type and idling times would be required to establish an emission inventory for air dispersion modelling.

The Traffic Impact Assessment (AECOM 2022) determined generation and distribution for the construction and operational phases of the project. Traffic forecasts were developed for each of the following future years:

- 2029 – Opening Year, representing the opening of the terminal
- 2035 – Interim Year, representing operations after completion of the Outer Metropolitan Ring Road (OMR)
- 2050 – Ultimate Year, representing full build out of the terminal

The Traffic Impact Assessment determined that:

- The existing local road network is operating well under capacity
- During the construction phase, the existing road network has sufficient capacity to accommodate the forecast traffic volumes
- In 2029, the existing road network has sufficient capacity to accommodate the forecast traffic volumes
- In 2035, the existing road network will require upgrades to accommodate the forecast traffic volumes
- In 2050, further upgrades will be required to accommodate the forecast traffic volumes.

Subsequent assessments are recommended upon finalisation of the internal operations and traffic distribution at the access points of the precinct. Updated traffic assessment will also be required in the event of changes to the wider network and upon further consultation with DoT regarding Princes Freeway performance, and OMR staging and timeline as traffic volume distribution will be significantly affected.

Based on the proposed transport routes, buffer distances to sensitive receptors and expected emissions from mobile emission sources (locomotives, vehicles etc), the potential impact of traffic connections is expected to be '**low**' and remain below relevant air quality standards. Additional studies and investigations may be required to further assess potential air quality impacts during construction and operation of the proposed Precinct as described in Section 9.0.

8.0 Avoidance and Mitigation Measures

The Precinct masterplan has considered existing and potential future uses of the land and sensitive receptors that may be affected by air quality impacts associated with the construction and operation of the precinct.

Mitigation measures of relevance are outlined below:

- Where possible, design considerations have been made to avoid potential onsite amenity impacts including:
  - Set back distances within close proximity to nearby receptors (residences, roads, public areas)
  - Use of vegetative buffers to mitigate dust amenity impacts
  - Locating air emission sources (where feasibly possible) towards the centre of the Precinct to minimise impacts to nearby sensitive receptors. This includes maximising local road network distances from the Precinct boundary, placement of areas where vehicle and/or locomotive idling is to occur and where mobile equipment would be operating.
- A detailed Construction Air Quality Management Plan will be prepared to minimise potential air emissions during construction
- Additional mitigation strategies for operational impacts from the Precinct could include:
  - Use of electric powered RMG cranes for lifting containers in the storage area and to/from working tracks
  - Use of clean fuel (i.e. LNG) ITV vehicles to transport containers between operating areas within the terminal and to/from adjacent warehousing
  - Implementation of a vehicle booking system to control the arrival and departure of trucks which will decrease idling time at the truck access gate and inside the terminal

The Precinct may include a number of uses that could be classified as “uses with adverse amenity potential” in accordance with Clause 53.10 of the Planning Scheme. Clause 53.10 identifies minimum required threshold distances for various uses from sensitive land uses (such as land in a residential zone or land used for a hospital or education centre). Future occupiers of proposed integrated and general warehousing are not yet known however those with a threshold distance of greater than 500m will require more specific siting considerations to be taken into account.

Potential measures to minimise vehicle and locomotive air quality impacts along transport connections corridors include (where feasible):

- The use of vegetative buffers between road and rail connections and sensitive receptors to maximise potential for pollutants to disperse.
- The use of noise walls along the Precinct boundary to minimise site noise emissions to noise sensitive receiver areas. Noise walls also have the added benefit of reducing air quality impacts and improving visual impacts to nearby receptors;
- Avoidance of steep road gradients to minimise vehicle emissions; and
- Avoidance of the need for vehicles to accelerate, brake or idle near residential areas by locating intersections and access points away from residential areas.

9.0 Approvals, Additional Studies and Investigations

Assessment of air quality impacts at the concept design phase should be considered preliminary. Additional information may be received as the project progresses to the detailed design phase; including road and rail alignments and both vehicle and locomotive numbers and other associated input data that are required to quantitatively assess potential air quality impacts from the project.

A *Level 2* air quality impact assessment (refer to Section 4.2.4) **may be required** to assess potential construction and operational impacts from the proposed Precinct in accordance with the requirements of the Environment Protection Act. The scope of the assessment would need to include the following:

- Identification of relevant ambient air quality criteria
- Discussion of existing background air quality based on available data
- Discussion of local meteorology and climatic conditions based on available Bureau of Meteorology (BoM) data
- Identification of potential sources of air emissions from surrounding land uses including those identified Section 5.3
- Identification of sensitive receptors; including those identified in Section 5.4.2
- An assessment of construction impacts from dust and combustion. It is recommended that a semi-quantitative risk assessment of potential dust impacts be undertaken for the construction phase of the project; based on the methodology described in the UK Institute of Air Quality Management (IAQM) document, *Guidance on the assessment of dust from demolition and construction* (2014)
- A quantitative air quality impact assessment of combustion emissions associated with road and rail activities associated with terminal operations; including air dispersion modelling
- Assessment of any potential amenity impacts from dust emissions from the adjacent quarrying and landfill activities
- Provision of recommendations including suggestion of potential safeguards.

Assessment of air quality impacts from the proposal including air dispersion modelling of the terminal and connections may need to be undertaken at a later stage in the design process. It is also noted that the background air quality data would be required to undertake an assessment of cumulative impacts from the project. Currently as discussed in Section 5.3 there are no EPA monitoring stations within a 10km radius of the proposed Precinct.

While representative ambient air quality data from the nearest monitoring stations at Geelong South, Altona North and Footscray can be utilised in the assessment. It may be prudent to undertake air quality monitoring within the study area for NOx, PM_{10} and $PM_{2.5}$ to provide background concentrations more representative of the local air shed. Particularly given background concentrations of NOx and particulates are likely to be higher at Altona North and Footscray; as they are located within areas of high-density development.

10.0 Conclusion

The potential for extensive or major effects on the health, safety or well-being of a human community, due to air emissions from the Project is expected to be '**low**' to '**negligible'**.

Freight Precincts operate throughput Australia and globally with a good understanding of potential adverse effects and high likelihood of effective avoidance and mitigation measures. Based on the findings in this assessment, air quality impacts from the Project are **unlikely** to trigger the requirement for referral under the Environment Effects Act.

Freight Terminals are not listed under Schedule 1 of the *Environment Protection (Scheduled Premises and Exemptions) Regulations 2017* therefore a development licence is **unlikely to be required**.

11.0 References

AAQ NEPM, *National Environment Protection Council Act 1994* (NEPC Act) – National Environment Protection Measure (Ambient Air Quality).

AECOM 2019, St Marys Freight Hub, Air Quality Impact Assessment, 11 Oct 2019

AECOM 2022, Project Tasman Traffic Impact Assessment, AECOM, 2022

EPA Victoria (2013), EPA Victoria Publication 1518, *Recommended Separation Distances for Industrial Residual Air Emissions.*

EPA Victoria (2018), Air monitoring report 2017 – Compliance with the National Environment Protection (Ambient Air Quality) Measure, July 2018.

EPA Victoria (2020), EPA Victoria Publication 1834, *Civil construction, building and demolition guide.*

EPA Victoria (2022), EPA Victoria Publication 1961, *Guideline for Assessing and Minimising Air Pollution in Victoria.*

IAQM (2014), *Guidance on the assessment of dust from demolition and construction*, Version 1.1, Institute of Air Quality Management, London.

SEPP (AQM), Victoria Government, *State Environment Protection Policy (Air Quality Management)*, Victoria Government Gazette, SPECIAL No. S 240, 21 December 2001.

Appendix A

Risk Assessment

Appendix A Risk Assessment

Assigning consequence of risks

In this risk assessment, the consequences of a risk occurring were assigned using a consequence guide. Specific consequence categories were developed considering existing conditions in the study area. The consequence rating criteria used in the risk assessment specifically for risks relating to air quality is shown below.

Level	Qualitative or quantitative description of air quality consequence
Negligible	No detectable change to local air quality
Minor	Short-term, reversible changes, within natural variability range, to local air quality
Moderate	Medium-term but limited changes to local air quality that are able to be managed
Major	Long-term, significant changes resulting in risks to human health and/or the environment beyond the local environmental setting
Severe	Irreversible, significant changes resulting in widespread risks to human health and/or the environment at a regional scale or broader

Assigning likelihood of risks

A likelihood rating for each identified risk pathway was assigned using the guide in the following table. The likelihood criteria in the risk assessment range across a scale from ‘almost certain’ where ‘the event is expected to occur in most circumstances or is planned to occur’ to ‘rare’ where ‘the event may occur only in ‘exceptional circumstances’.

Level	Description
Rare	The event may occur only in exceptional circumstances
Unlikely	The event could occur but is not expected
Possible	The event could occur
Likely	The event will probably occur in most circumstances
Almost Certain	The event is expected to occur in most circumstances or is planned to occur

Risk assessment matrix and risk rating

The consequence and likelihood were combined to arrive at a risk rating, using the risk assessment matrix shown in the following table. The complete risk register for air quality is presented in Section 6.0.

		Consequence ratings				
		Negligible	Minor	Moderate	Major	Severe
Likelihood rating	Rare	Very Low	Very Low	Low	Medium	Medium
	Unlikely	Very Low	Low	Low	Medium	High
	Possible	Low	Low	Medium	High	High
	Likely	Low	Medium	Medium	High	Very High
	Almost Certain	Low	Medium	High	Very High	Very High

When risks were rated as medium or above, the impacts associated with the risk pathway were assessed in an increasing level of detail and prompted further exploration of potential mitigation and management actions to reduce the overall impact.