3 Johnston Crescent Horsley Logistics Park

Air Quality Impact Assessment

ESR Developments

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Prepared by:

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SLR Project No.: 610.031907.00003

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Basis of Report

This report has been prepared by SLR Consulting Australia (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with ESR Developments (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

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Table of Contents

Tables in Text

Figures in Text

Appendices

1.0 Introduction

ESR Australia Pty Ltd (ESR) is seeking to construct a warehouse and distribution centre (the Project) at 3 Johnston Crescent, Horsley Park (the Site). SLR consulting Australia (SLR) has been engaged by ESR to prepare an air quality impact assessment (AQIA) for the construction and operation of the Project to support the State Significant Development (SSD) application.

1.1 Secretary's Environmental Assessment Requirements (SEARs)

The SSD application is being prepared in accordance with the requirements of the Planning Secretary's Environmental Assessment Requirements (SEARs), issued by the Department of Planning, Housing and Infrastructure (DPHI) on 29 May 2024. With respect to air quality, the requirements of the SEARs are as follows:

> ***"10. Air Quality***
>
> *Identify significant air emission sources at the proposed development (during construction and operation), assess their potential to cause adverse off-site impacts, and detail proposed management and mitigation measures that would be implemented. Where air emissions during operation have the potential to cause adverse off-site impacts, provide a quantitative air quality impact assessment prepared in accordance with the relevant NSW Environment Protection Authority (EPA) guidelines."*

1.2 Assessment Methodology

1.2.1 Construction Stage

A quantitative modelling assessment of potential dust emissions associated with the construction activities would require a number of assumptions to be made to enable the estimation of particulate emission rates for input into the models. The uncertainty associated with the output of such studies means it would be of limited value and would not (in itself) assist with the identification of air quality control measures to actively manage the risks. It is noted that the SEARs do not request a quantitative assessment of construction stage air quality impacts.

SLR has therefore performed a qualitative (risk-based) assessment of construction impacts, based on the information available, to identify those activities that have the potential for off-site air quality impacts if not adequately controlled, so that appropriate mitigation measures can be identified and incorporated into the project design and relevant environmental management plans.

For the assessment of construction phase impacts, the *IAQM Guidance on the Assessment of Dust from Demolition and Construction,* developed in the United Kingdom by the Institute of Air Quality Management (IAQM 2024), has been used to provide a qualitative assessment method (see **Appendix A** for full methodology). The IAQM method uses a four-step process for assessing potential dust impacts from construction activities:

- **Step 1** is to screen the requirement for a more detailed assessment. No further assessment is 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 take account of:
    - Potential dust emission magnitude (**Step 2A**)

    - The sensitivity of the area (**Step 2B**)
- **Step 3** is to determine site-specific mitigation (in addition to basic project controls) for each of the four potential activities in **Step 2**.
- **Step 4** is to examine the residual effects and to determine whether these are significant.

1.2.2 Operational Stage

To estimate potential peak impacts associated with vehicle movements generated by the Project, a quantitative assessment in general accordance with the NSW EPA's *Approved Methods for Modelling and Assessment of Air Pollutants in NSW* publication (NSW EPA 2022) (hereafter referred as the Approved Methods), has been prepared.

Section 2.1 of the Approved Methods outlines a two-tiered approach to Air Quality Impact Assessments (AQIA):

- Level 1, which is a basic screening using worst-case assumptions, and
- Level 2, a more detailed assessment with refined techniques and site-specific data.

If a Level 1 assessment shows that adverse impacts are unlikely, there is no need to proceed to Level 2.

For this assessment the Roadside Air Quality Screening Tool (RAQST) is employed. RAQST, developed by Transport for NSW (TfNSW), is a simplified version of a road vehicle emission model used for initial air quality impact screening. It employs worst-case scenarios to determine if a detailed Level 2 assessment is necessary, providing conservative predictions of incremental impacts. TfNSW recommends its use as a Level 1 equivalent for near-field ground-level pollutant concentration prediction from traffic.

2.0 Project Overview

2.1 Site Location

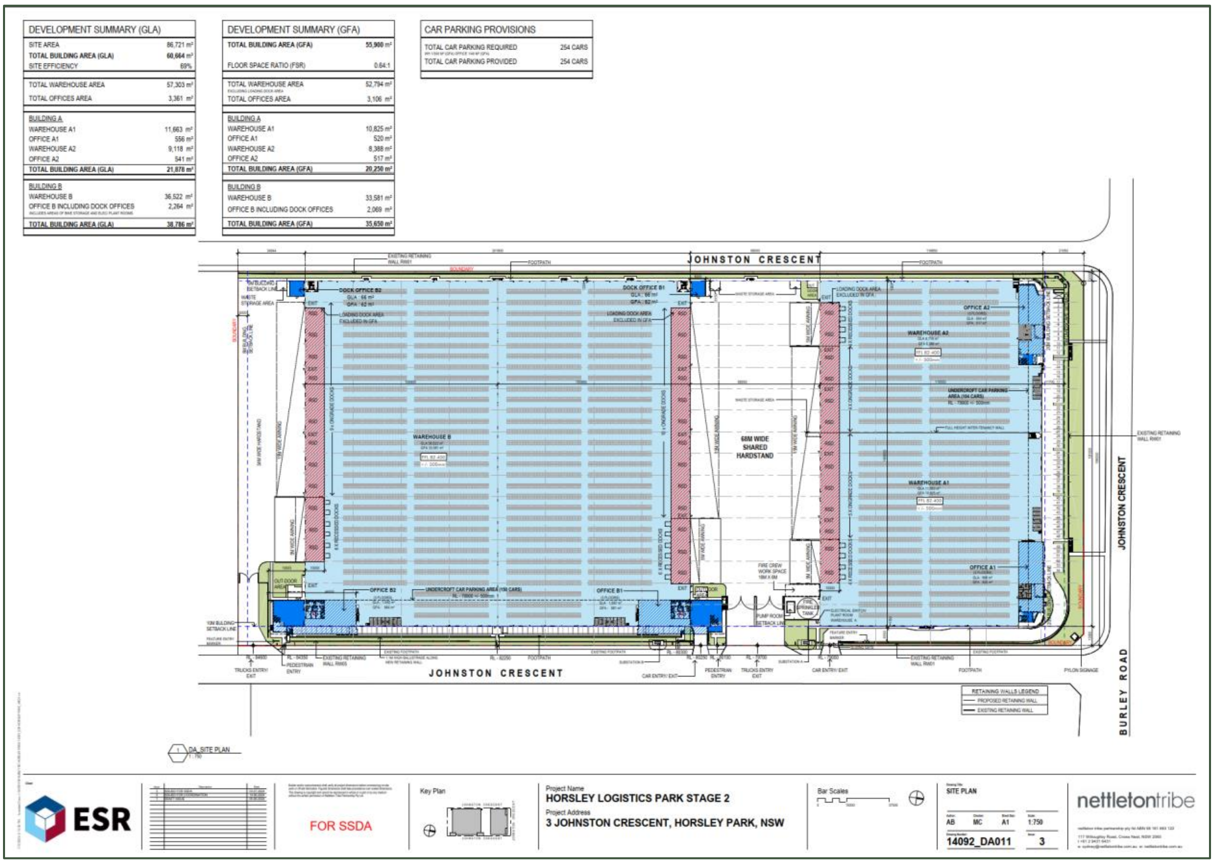
The Project is proposed to be located at 3 Johnston Crescent, Horsley Park, approximately 16 km west of Parramatta Central Business District (CBD) and 36 km west of Sydney CBD. As presented in **Figure 1**, the Site is bordered by Johnston Crescent to the north, south and west.

Figure 1 Site Location

2.2 Project Layout Overview

As presented in **Figure 2**, two multi-level warehouses including warehouse area (52,794 m^2), offices (3,106 m^2), and a total of 254 carparks are proposed to be constructed at the Site.

Figure 2 Site Plan



2.3 Project Emission Sources

2.3.1 Project Construction Works

The main air quality issues associated with construction works relate to emissions of fugitive dust. The potential for dust to be emitted during the construction works will be directly influenced by the nature of the activities being performed at any given time. Generally, the activities that are most likely to lead to short-term emissions of dust, include:

- Grading.
- Loading and unloading of materials.
- Wheel-generated dust and combustion emissions from construction equipment.
- Wheel-generated dust from trucks travelling on unpaved surfaces.
- Wind erosion of exposed surfaces.

Temporary elevations in local dust levels are most likely to occur when construction activities are undertaken during periods of low rainfall and/or windy conditions. The impact of elevated dust emissions is dependent upon the potential for particulates to become and remain airborne prior to being deposited as dust or experienced as an ambient particulate concentration.

A number of environmental factors may affect the generation and dispersion of dust emissions, including:

- Wind direction - determines whether dust and suspended particles are transported in the direction of the sensitive receptors.
- Wind speed - determines the potential suspension and drift resistance of particles.
- Surface type - more erodible surface material types have an increased soil or dust erosion potential.
- Surface material moisture - increased surface material moisture reduces soil or dust erosion potential; and
- Rainfall or dew - rainfall or heavy dew that wets the surface of the soil reduces the risk of dust generation.

Where diesel-powered mobile machinery and vehicles are used, localised elevations in ambient concentrations of combustion-related pollutants may also occur, however the potential risk of the relevant impact assessment criteria for these pollutants to be exceeded at surrounding sensitive areas is considered to be low. Fugitive dust emissions are generally considered to have the greatest potential to give rise to downwind air quality impacts at construction sites.

2.3.2 Project Operations

During the operational phase, the main source of air emissions would be emissions of products of fuel combustion and particulate matter (from brake and tyre wear as well as re-entrainment of road dust) associated with the trucks and other vehicles entering and leaving or idling at the Site during loading/unloading operations.

Emissions associated with the combustion of fuel (diesel, petrol, etc.) in road vehicles will include carbon monoxide (CO), oxides of nitrogen (NO_x), particulate matter (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2) and volatile organic compounds (VOCs).

The rate and composition of air pollutant emissions from road vehicles is a function of a number of factors, including the type, size and age of the vehicles, the type of fuel combusted, number and speed of vehicles and the road gradient.

2.4 Pollutants of Concern

As identified in **Section 2.3.1** and **Section 2.3.2**, the key air pollutants of interest are considered to be particulate matter from construction works, and traffic emissions (products of fuel combustion and wheel-generated particulate matter) from operations.

2.4.1 Particulate Matter

Airborne contaminants that can be inhaled directly into the lungs can be classified on the basis of their physical properties as gases, vapours or particulate matter. In common usage, the terms “dust” and “particulates” are often used interchangeably. The health effects of particulate matter are strongly influenced by the size of the airborne particles. Smaller particles can penetrate further into the respiratory tract, with the smallest particles having a greater impact on human health as they penetrate to the gas exchange areas of the lungs. Larger particles primarily cause nuisance associated with coarse particles settling on surfaces.

The term “particulate matter” refers to a category of airborne particles, typically less than 30 microns (μm) in diameter and ranging down to 0.1 μm and is termed total suspended particulate (TSP). Particulate matter with an aerodynamic diameter of 10 microns or less is referred to as PM_{10}. The PM_{10} size fraction is sufficiently small to penetrate the large airways of the lungs, while $PM_{2.5}$ (2.5 microns or less) particulates are generally small enough to be drawn in and deposited into the deepest portions of the lungs. Potential adverse health impacts associated with exposure to PM_{10} and $PM_{2.5}$ include increased mortality from cardiovascular and respiratory diseases, chronic obstructive pulmonary disease and heart disease, and reduced lung capacity in asthmatic children.

2.4.2 Nuisance Dust

In addition to the health effects of suspended particulate matter, nuisance impacts also need to be considered, mainly in relation to deposited dust. Dust can cause nuisance by settling on surfaces and possessions, affecting visibility and contaminating tank water supplies. High rates of dust deposition can also adversely affect vegetation by blanketing leaf surfaces.

2.4.3 Products of Combustion

Emissions associated with road traffic and the combustion of fossil fuels (diesel, petrol, AVGAS etc.) will include CO, NO_x, particulate matter, SO_2 and VOCs.

CO is an odourless, colourless gas formed from the incomplete burning of fuels in motor vehicles. It can be a common pollutant at the roadside and highest concentrations are found at the kerbside with concentrations decreasing rapidly with increasing distance from the road. CO in urban areas results almost entirely from vehicle emissions and its spatial distribution follows that of traffic flow. The incomplete combustion of fuel in diesel powered vehicles can generate particulate in the form of black soot.

NO_X is a general term used to describe any mixture of nitrogen oxides formed during combustion. In atmospheric chemistry, NO_X generally refers to the total concentration of nitric oxide (NO) and nitrogen dioxide (NO_2). NO is a colourless and odourless gas that does not significantly affect human health. However, in the presence of oxygen, NO can be oxidised to NO_2 which can have significant health effects including damage to the respiratory tract and increased susceptibility to respiratory infections and asthma. NO will be converted to NO_2 after being emitted from engine exhausts.

Engine exhausts can contain emissions of SO_2 due to impurities in the fuel. The sulfur content of diesel fuel in Australia has been significantly reduced over the years and ambient SO_2 concentrations in Australian cities are typically well below regulatory criteria.

VOCs are organic chemicals that have a high vapour pressure at ordinary room temperature. Their high vapour pressure results from a low boiling point, which causes large numbers of molecules to evaporate or sublimate from the liquid or solid form of the compound and enter the surrounding air, a trait known as volatility. They include both human-made and naturally occurring chemical compounds.

The potential impacts of emissions of VOCs into the ambient environment include:

- human health impacts due to the toxicity of some individual VOCs.
- odour nuisance impacts due to the odorous nature of some VOCs even at very low concentrations.
- visibility and health impacts due to their contribution to the creation of photochemical smog under certain conditions.

VOCs that are often typical of combustion of fossil fuels include benzene, toluene, ethylbenzene and xylenes (often referred to as ‘BTEX’).

3.0 Air Quality Criteria

State air quality guidelines adopted by the NSW EPA are published in the Approved Methods.

The Approved Methods lists the statutory methods for modelling and assessing air pollutants from stationary sources and specifies criteria that reflect the environmental outcomes adopted by NSW EPA. The Approved Methods are referred to in the *POEO (Clean Air) Regulation 2002* for assessment of impacts of air pollutants.

State air quality impact assessment criteria specified by NSW EPA for the pollutants identified in **Section 2.3** are published Approved Methods. The ground level air quality impact assessment criteria listed in Section 7 of the Approved Methods have been established by NSW EPA to achieve appropriate environmental outcomes and to minimise risks to human health. They have been derived from a range of sources and are the defining ambient air quality criteria for NSW and are considered to be appropriate for use in this assessment.

The impact assessment criteria listed in the Approved Methods for particulate matter, nuisance dust, and products of combustion are provided in **Table 1**.

Table 1 NSW EPA Impact Assessment Criteria for Pollutants of Concern

Pollutant	Averaging Period	Ambient Air Quality Criterion	
		µg/m³	pphm
Total suspended particulate (TSP)	Annual	90	-
Particulate matter less than 10 microns (PM_{10})	24-Hour	50	-
	Annual	25	-
Particulate matter less than 2.5 microns ($PM_{2.5}$)	24-Hour	25	-
	Annual	8	-
Nitrogen dioxide (NO_2)	1-hour	164	8
	Annual	31	1.5
Carbon monoxide (CO)	15-minutes	100,000	8,700
	1-hour	30,000	2,500
	8-hour	10,000	900
Sulfur dioxide (SO_2)	1-hour	286[a]	10
	24-hour	57	2
Benzene	1-hour	29	0.9
Toluene	1-hour	360	9
Ethylbenzene	1-hour	8,000	180
Xylenes	1-hour	190	4
Deposited dust	Annual	2 g/m²/month (maximum increase in deposited dust level) 4 g/m²/month (maximum total deposited dust level)	

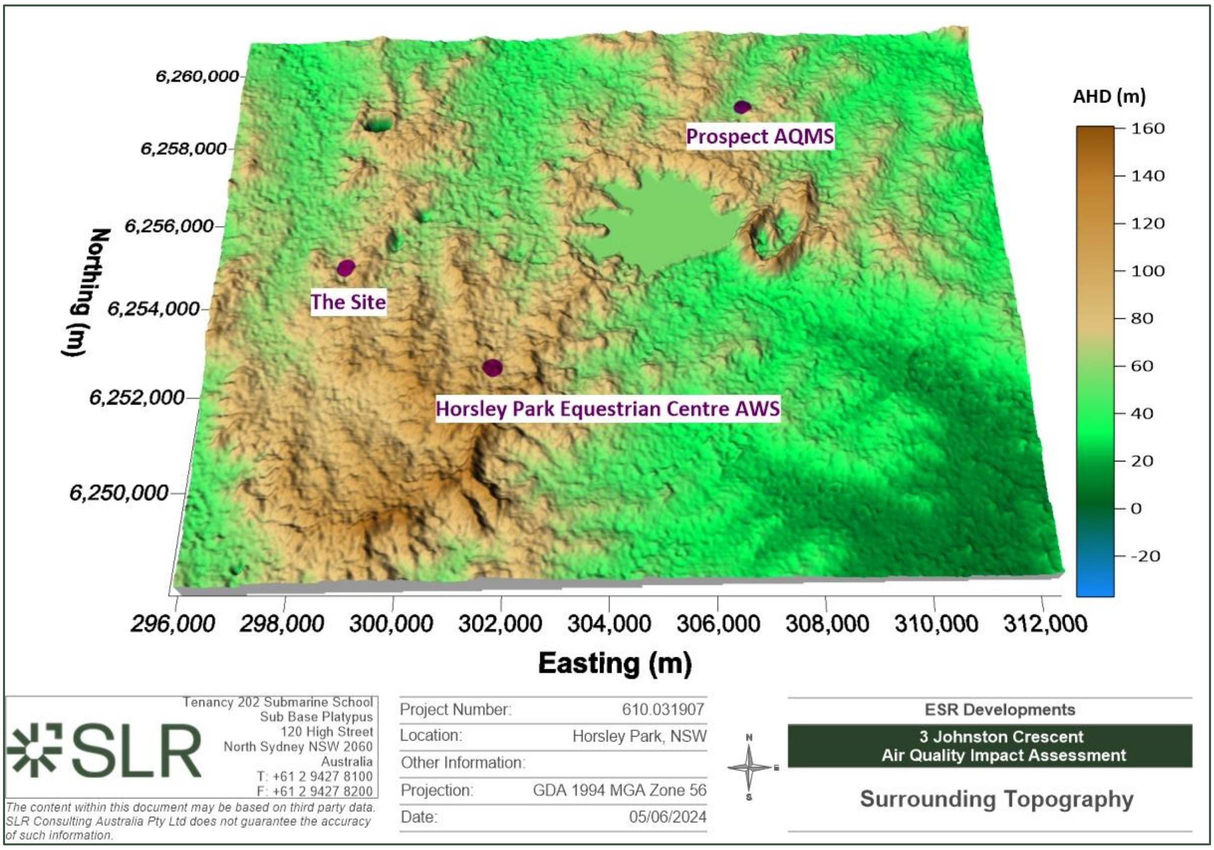
4.0 Existing Environment

4.1 Surrounding Topography

Local topography is important in air quality studies as local atmospheric dispersion can be influenced by night-time katabatic (downhill) drainage flows from elevated terrain or channelling effects in valleys or gullies.

The topography of the Site is relatively flat with an approximate elevation of 80 Australian Height Datum (AHD). A three-dimensional representation of the area surrounding the Site is presented in **Figure 3**. The location of Horsley Park Equestrian Centre automatic weather station (AWS; refer **Section 4.3**) and Prospect Air Quality Monitoring Station (AQMS; refer **Section 4.4**) are also indicated.

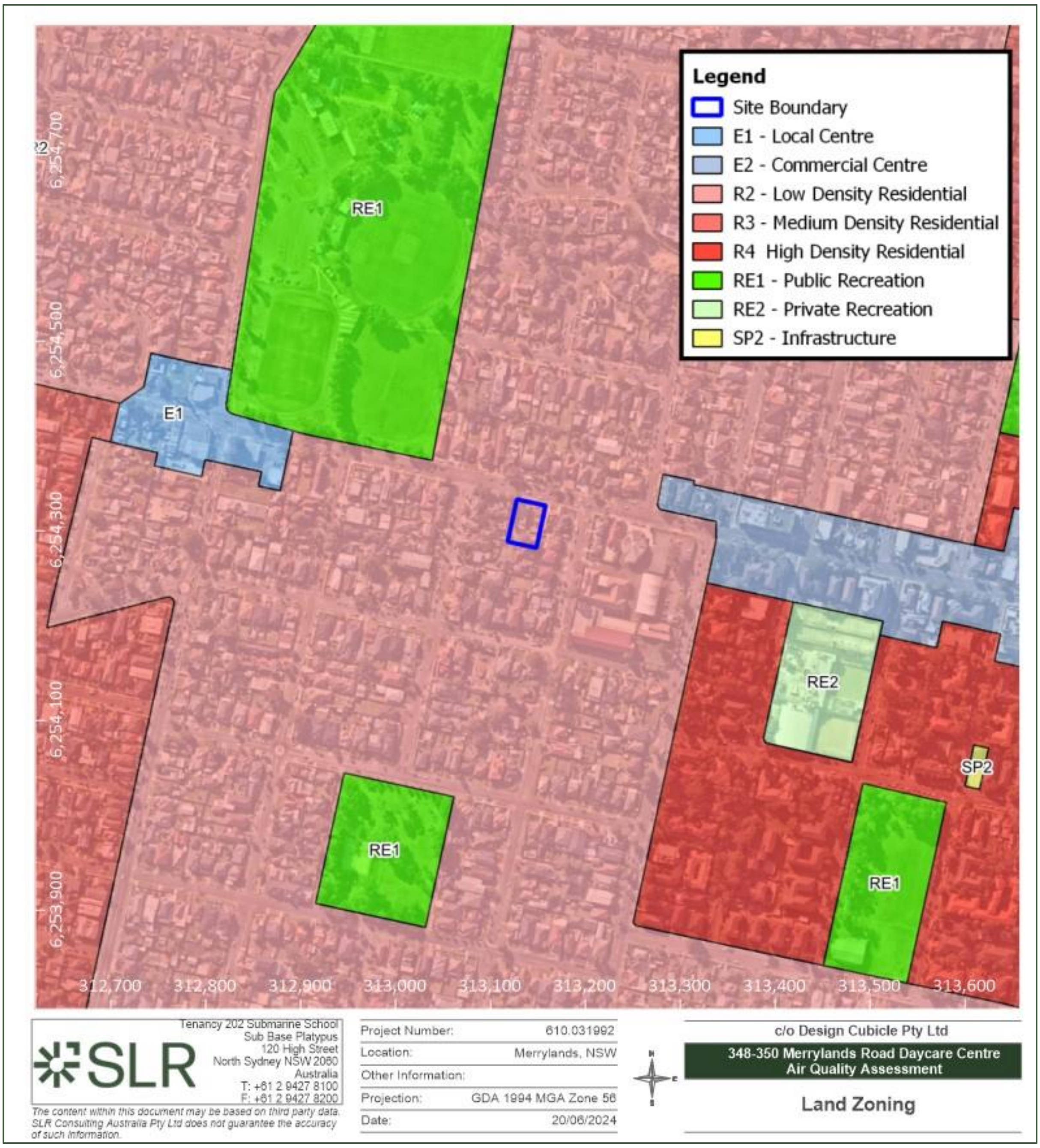
Figure 3 Regional Topography



4.2 Surrounding Land Zoning and Sensitive Receptors

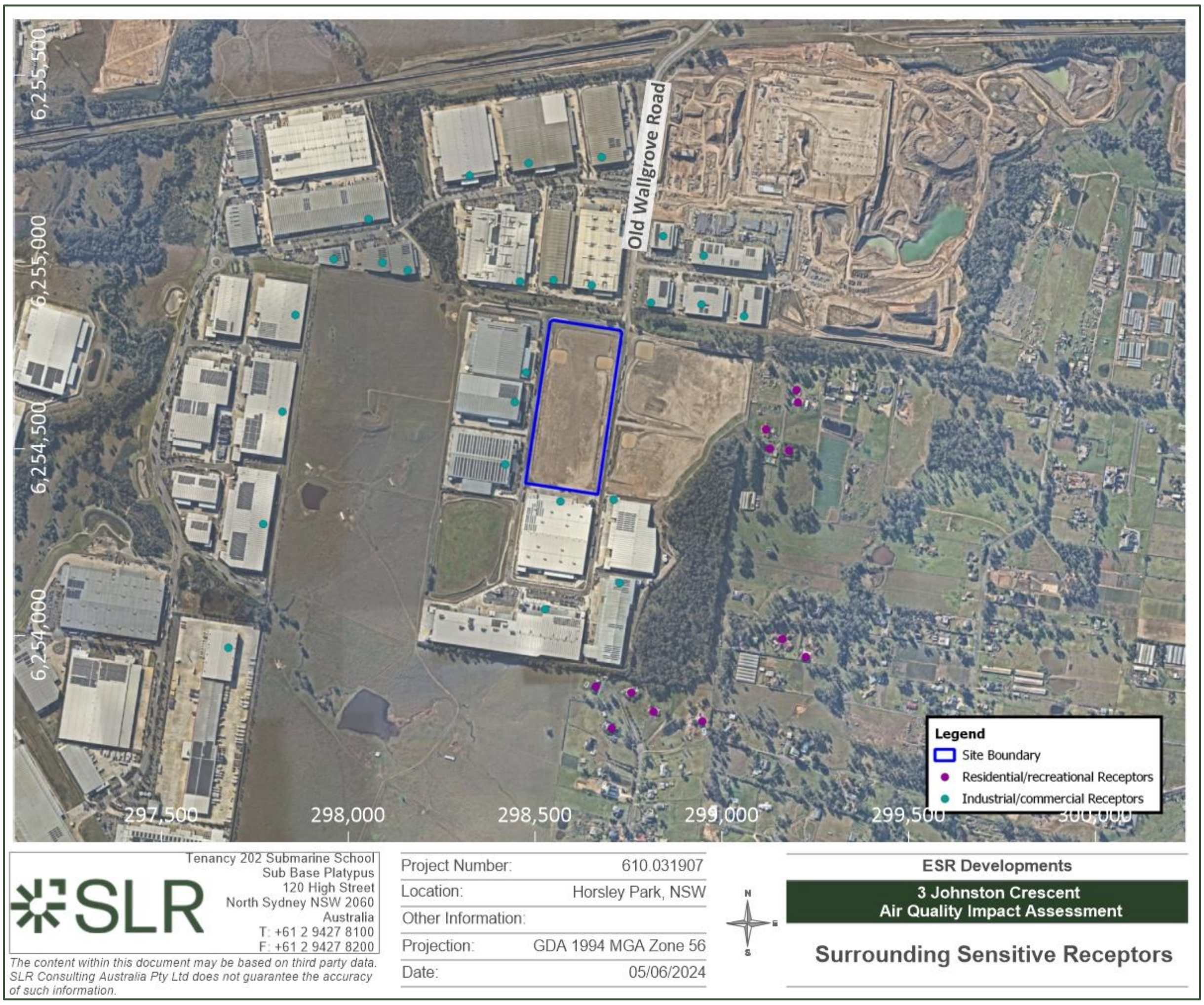
As illustrated in **Figure 4**, the Site, as well as the lands surrounding it in all directions are zoned General Industrial (IN1). There are lands zoned Infrastructure (SP2) to the north and Environmental Conservation (C2) and Primary Production Small Lots (RU4) to the east of the Site.

Figure 4 Surrounding Land Zoning



As per the Approved Methods, a sensitive receptor is a location where people are likely to work or reside; this may include a dwelling, school, hospital, office, or public recreational area. Per this definition and as presented in **Figure 5**, the closest sensitive receptors to the Site are the industrial/commercial facilities located adjacent to its northern, southern, and western boundaries. The closest residential receptors to the Site are the residences approximately 400 m to 500 m to its east and south.

Figure 5 Surrounding Sensitive Receptors



4.3 Local Meteorological Conditions

The Bureau of Meteorology (BoM) maintains and publishes data from weather stations across Australia. The closest such station recording long term wind speed and wind direction data is the Horsley Park Equestrian Centre AWS (Station ID 67119), located approximately 4 km southeast of the Site. It is noted that considering the terrain between the Site and Horsley Park Equestrian Centre AWS, wind conditions at the AWS are likely to be a reasonable representation of those at the Site.

Local wind speed and direction influence the dispersion of air pollutants. Wind speed determines both the distance of downwind transport and the rate of dilution as a result of ‘plume’ stretching. Wind direction, and the variability in wind direction, determines the general path pollutants will follow and the extent of crosswind spreading. Surface roughness (characterised by features such as the topography of the land and the presence of buildings, structures and trees) will also influence dispersion.

Annual and seasonal wind roses for the five-year period from 2019 to 2023, compiled from data recorded by the Horsley Park Equestrian Centre AWS are presented in **Figure 6**. Wind roses show the frequency of occurrence of winds by direction and strength. The bars correspond to the 16 compass points (degrees from North). The bar at the top of each wind rose diagram represents winds blowing from the north (i.e. northerly winds), and so on. The length of the bar represents the frequency of occurrence of winds from that direction, and the widths of the bar sections correspond to wind speed categories, the narrowest representing the lightest winds. Thus, it is possible to visualise how often winds of a certain direction and strength occur over a long period, either for all hours of the day, or for particular periods during the day.

The annual wind rose indicates that winds blow from all directions, with the least frequent winds coming from the northeastern quadrant and the most frequent winds coming from the southwestern quadrant. Calm wind conditions (wind speed less than 0.5 m/s) were recorded to occur 19.5% of the time throughout the investigated period. The average seasonal wind roses for the year 2019-2023 indicate that:

- In summer, winds blow from all directions except the northwestern quadrant, where winds occur infrequently. Calms were recorded approximately 13% of the time during the summer months.
- In autumn, winds predominantly blow from the southwestern quadrant, with the least frequent winds originating from the northeastern quadrant. Calms were recorded approximately 25% of the time during the winter months.
- In winter, winds predominantly blow from the northwestern and southwestern quadrants, with the least frequent winds originating from the northeastern quadrant. Calms were recorded 23% of the time during the winter months.
- In spring, winds blow almost evenly from all directions. Calms were recorded approximately 17% of the time during spring.

Wind erosion of dust from exposed surfaces is usually initiated when wind speeds exceed the threshold friction velocity for a given surface or material, however a general rule of thumb is that wind erosion can be expected to occur above approximately 5.5 m/s. The frequency of wind speeds for the period of 2019 – 2023 is presented in **Figure 7**. The plot shows that the frequency of wind speeds exceeding 5.5 m/s for the period 2019 – 2023 at Horsley Park Equestrian Centre AWS was approximately 2%.

Figure 6 Average Annual and Seasonal Wind Roses for Horsley Park Equestrian Centre AWS – 2019-2023

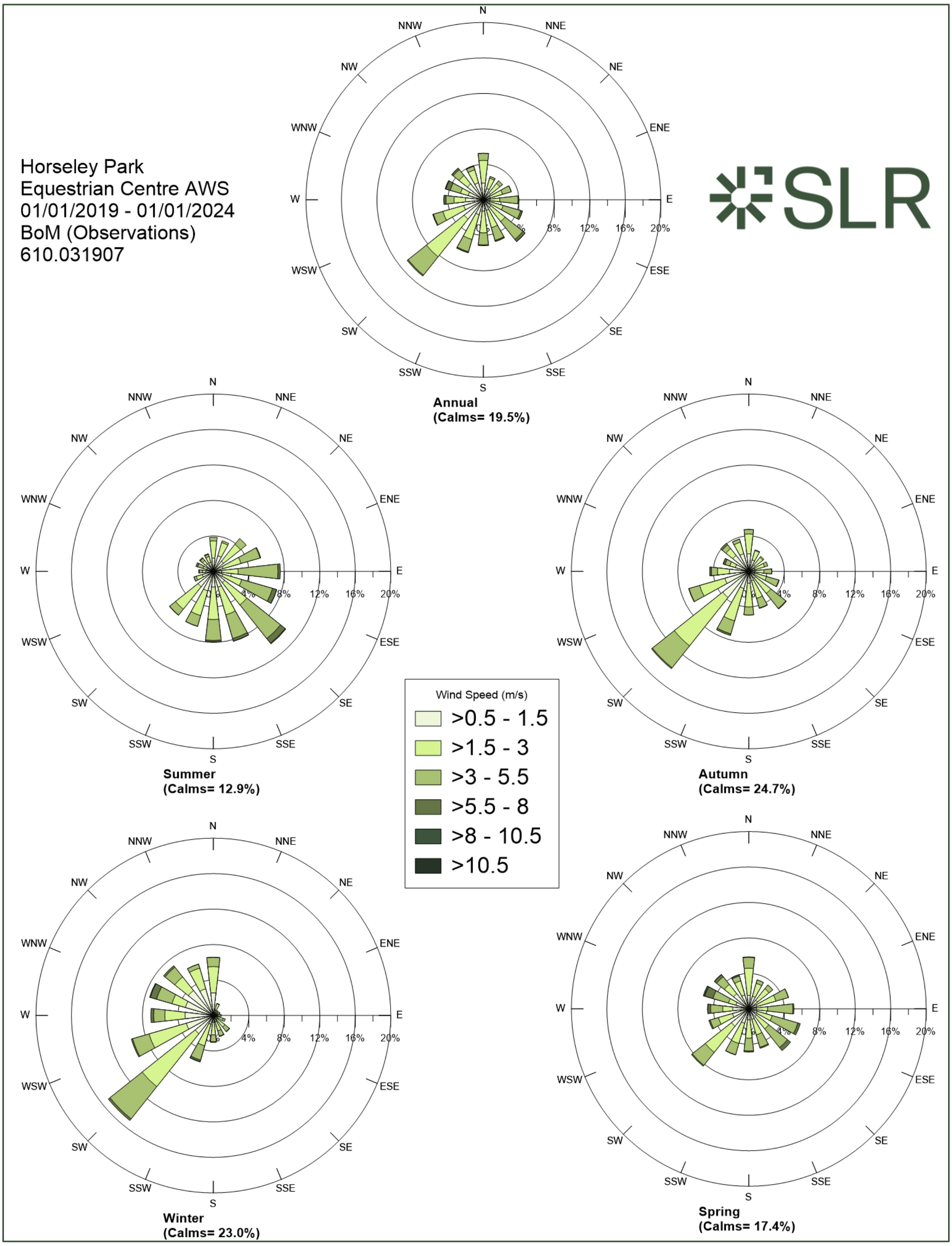
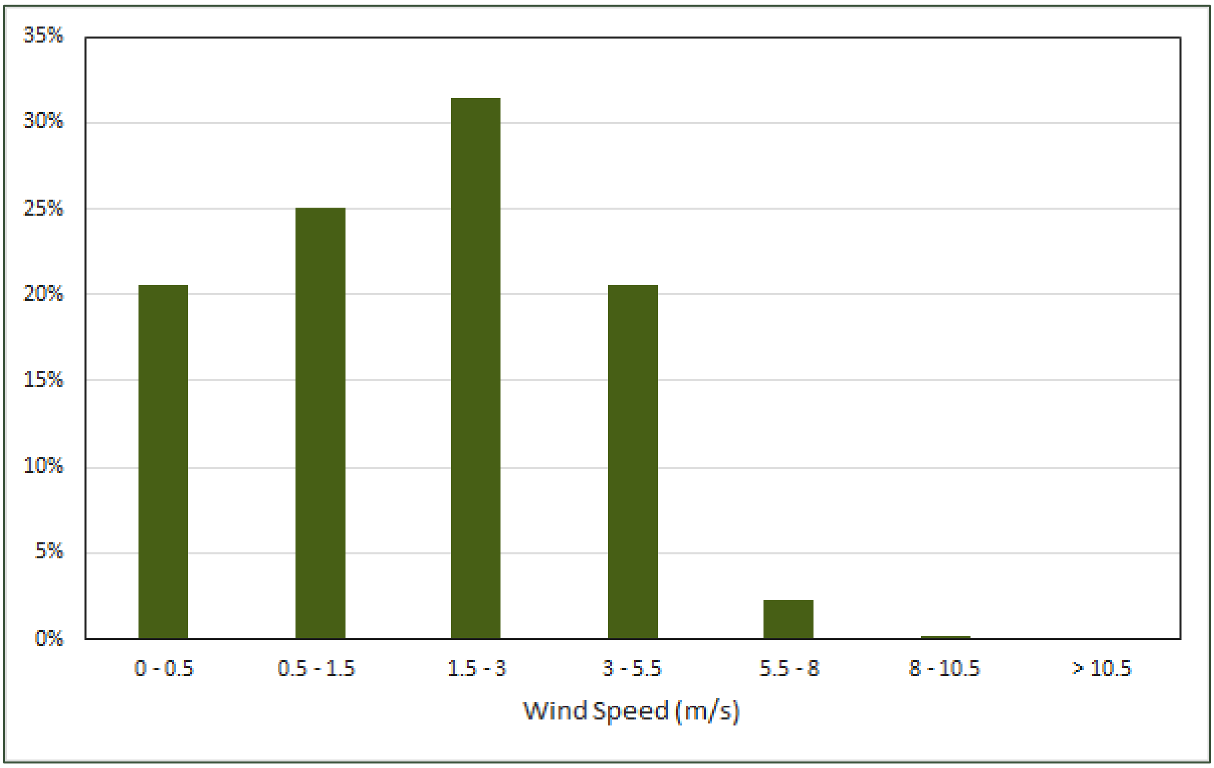


Figure 7 Wind Speed Frequency Chart for Horsley Park Equestrian Centre AWS – 2019-2023



4.4 Baseline Air Quality

Air quality monitoring is performed by the NSW Department of Environment and Heritage (DEH) at a number of monitoring stations across NSW. The nearest such station is the Prospect AQMS located on Ramsay Road, approximately 9 km northeast of the Site. The Prospect AQMS was commissioned in 2007 at an elevation of 64 m. The Prospect AQMS monitors the concentration levels of following air pollutants:

- Oxides of nitrogen (NO, NO_2 and NO_X).
- Sulfur Dioxide (SO_2).
- Carbon Monoxide (CO); and
- Fine particles ($PM_{2.5}$ and PM_{10}).

A summary of the monitored pollutant concentrations for the last five years (2019-2023) is presented in **Table 2** and the data are presented graphically in **Figure 8** to **Figure 13**.

The monitoring data for NO_2, SO_2, and CO indicate that the respective air quality criteria (short term and long term) for these pollutants are easily achieved at the Prospect AQMS. Other points to note are:

- Exceedances of the 24-hour average PM_{10} and $PM_{2.5}$ criteria were recorded by the Prospect AQMS in all years between 2019 and 2023, except in 2022; and
- Exceedances of the annual $PM_{2.5}$ criterion were recorded in 2019 and 2020.

A review of the available compliance monitoring reports indicates that the recorded exceedances were primarily due to exceptional events such as bushfires, dust storms or hazard reduction burns. Very elevated PM_{10} and $PM_{2.5}$ concentrations were recorded along the east coast of Australia in late 2019 and early 2020 during the 'Black Summer' bushfire event.

Table 2 Summary of Prospect AQMS Data (2019-2023)

Pollutant	PM_{10}		$PM_{2.5}$		NO_2		SO_2		CO
Averaging Period	Maximum 24-hour	Annual	Maximum 24-hour	Annual	Maximum 1-hour	Annual	Maximum 1-hour	Maximum 24-hour	Maximum 1-hour
Units	µg/m³	µg/m³	µg/m³	µg/m³	pphm	pphm	pphm	pphm	ppm
2019	183	26.0	134	12	4.9	0.9	2.1	0.4	5.5
2020	246	20.2	70.8	8.6	4.3	0.7	1.8	0.4	2.1
2021	44.6	17.2	37.3	6.9	4.3	0.7	1.5	0.3	1.3
2022	29.2	13.4	18.2	5.3	4.2	0.6	1.7	0.3	1.3
2023	44.4	16.8	29.6	7.4	4.9	0.8	2.4	0.4	1.4
Average	109	18.7	58.0	8.0	4.5	0.8	1.9	0.4	2.3
Criterion	50	25	25	8	8	1.5	10	2	25

Figure 8 Measured 24-Hour Average PM_{10} Concentrations at Prospect AQMS (2019-2023)

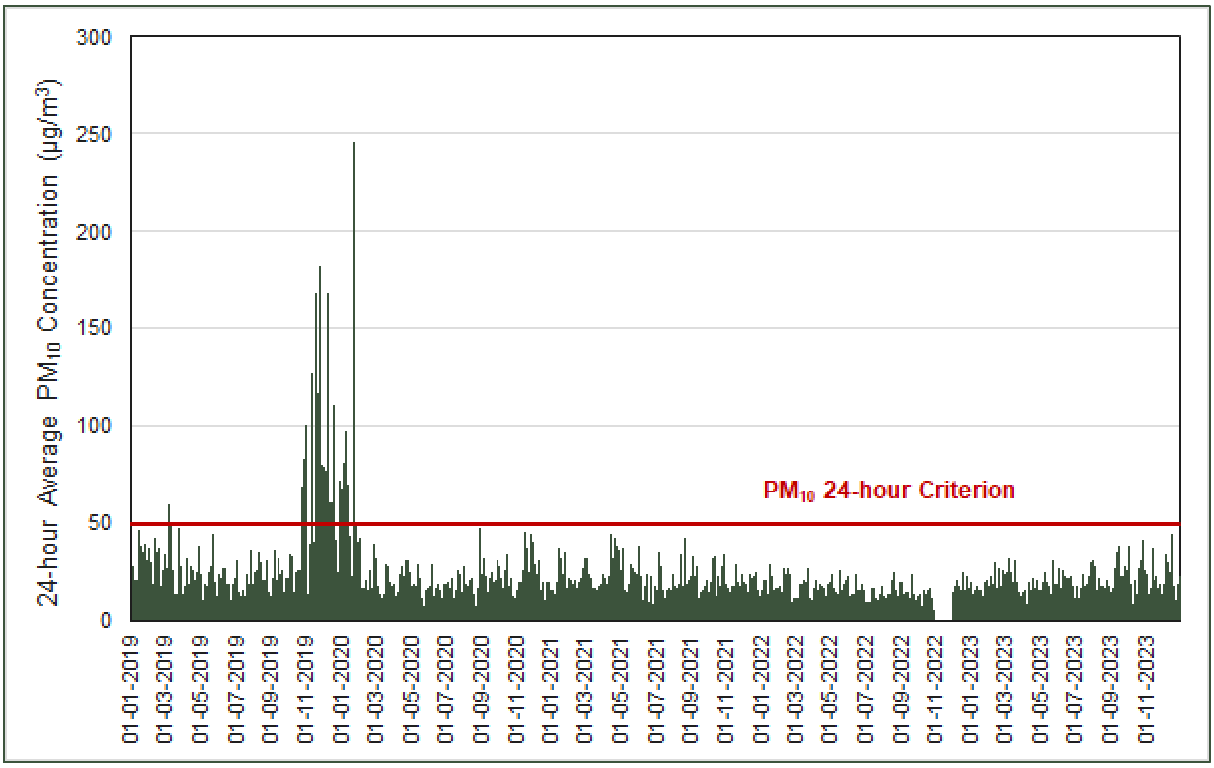


Figure 9 Measured 24-Hour Average $PM_{2.5}$ Concentrations at Prospect AQMS (2019-2023)

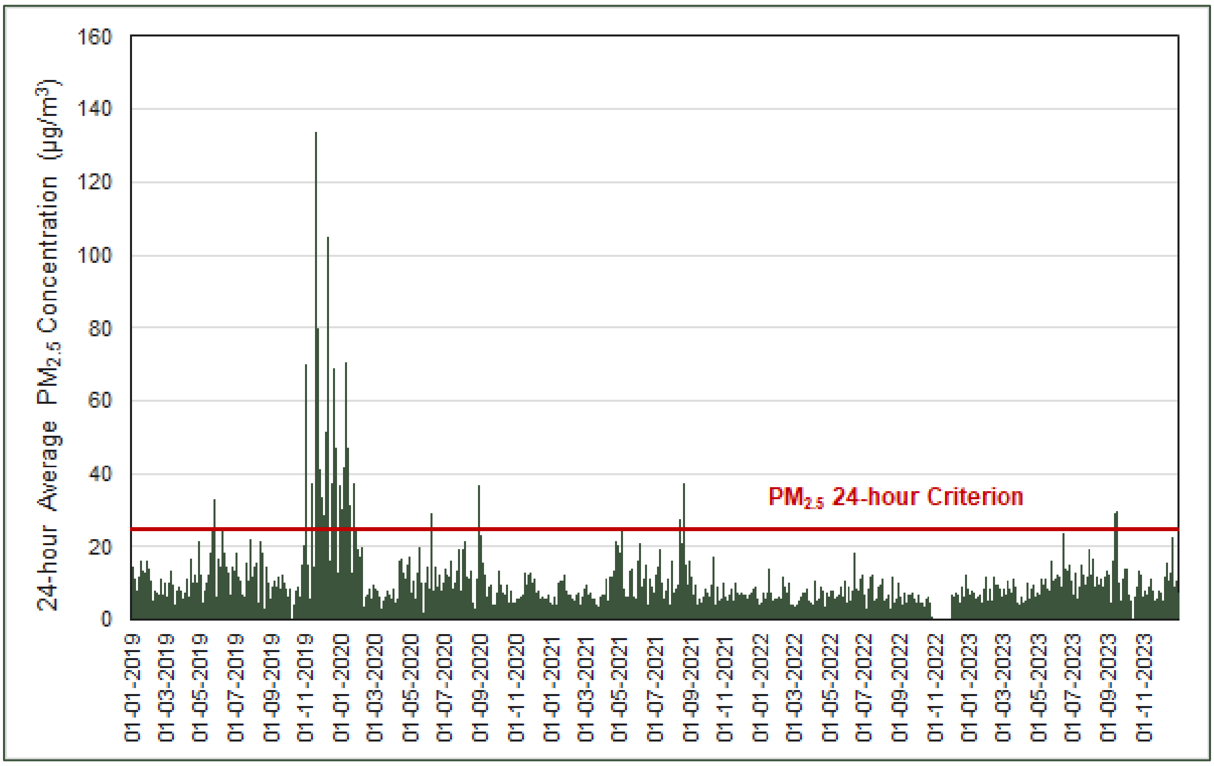


Figure 10 Measured 24-Hour Average SO_2 Concentrations at Prospect AQMS (2019-2023)

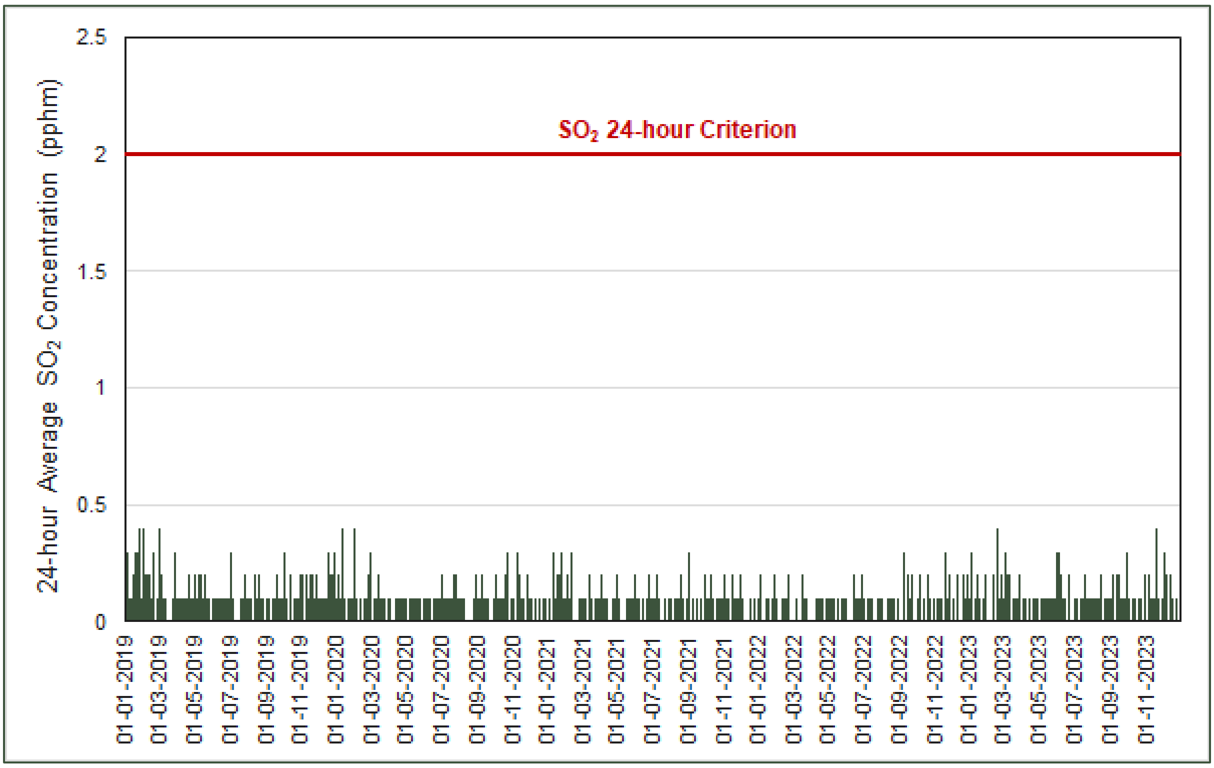


Figure 11 Measured 1-Hour Average NO_2 Concentrations at Prospect AQMS (2019-2023)

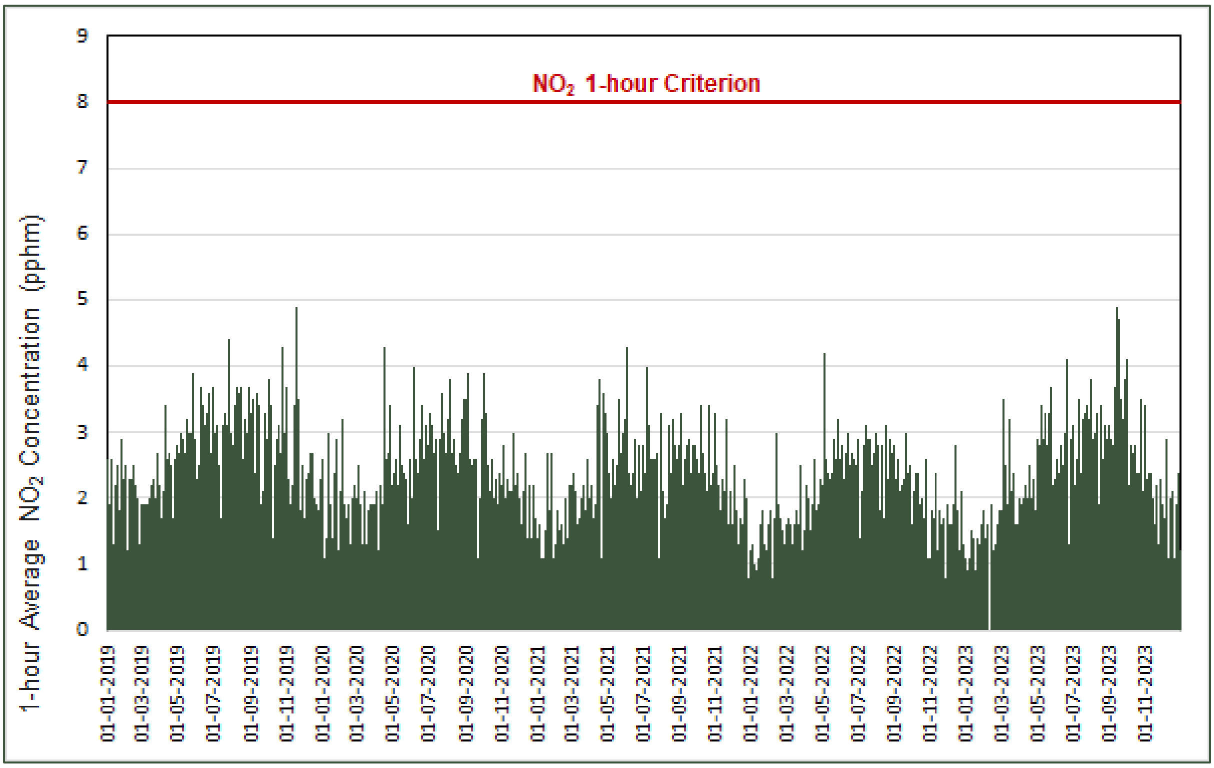


Figure 12 Measured 1-Hour Average SO_2 Concentrations at Prospect AQMS (2019-2023)

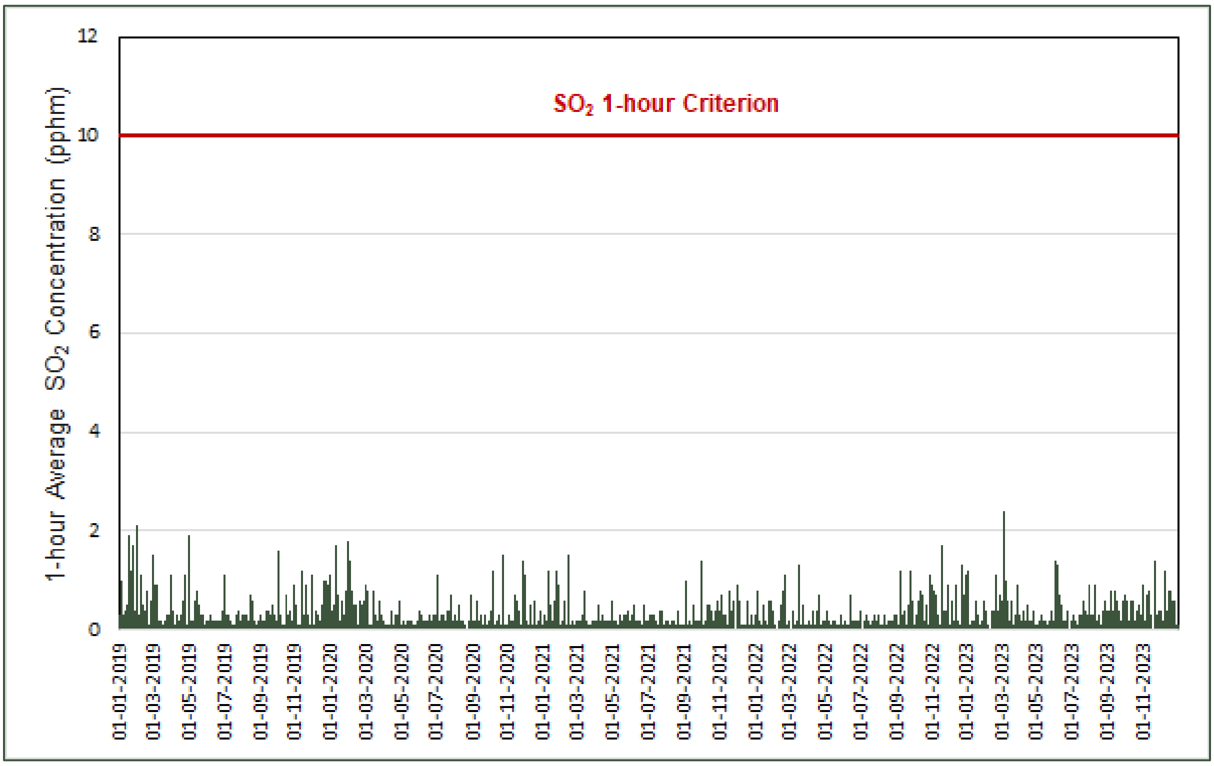
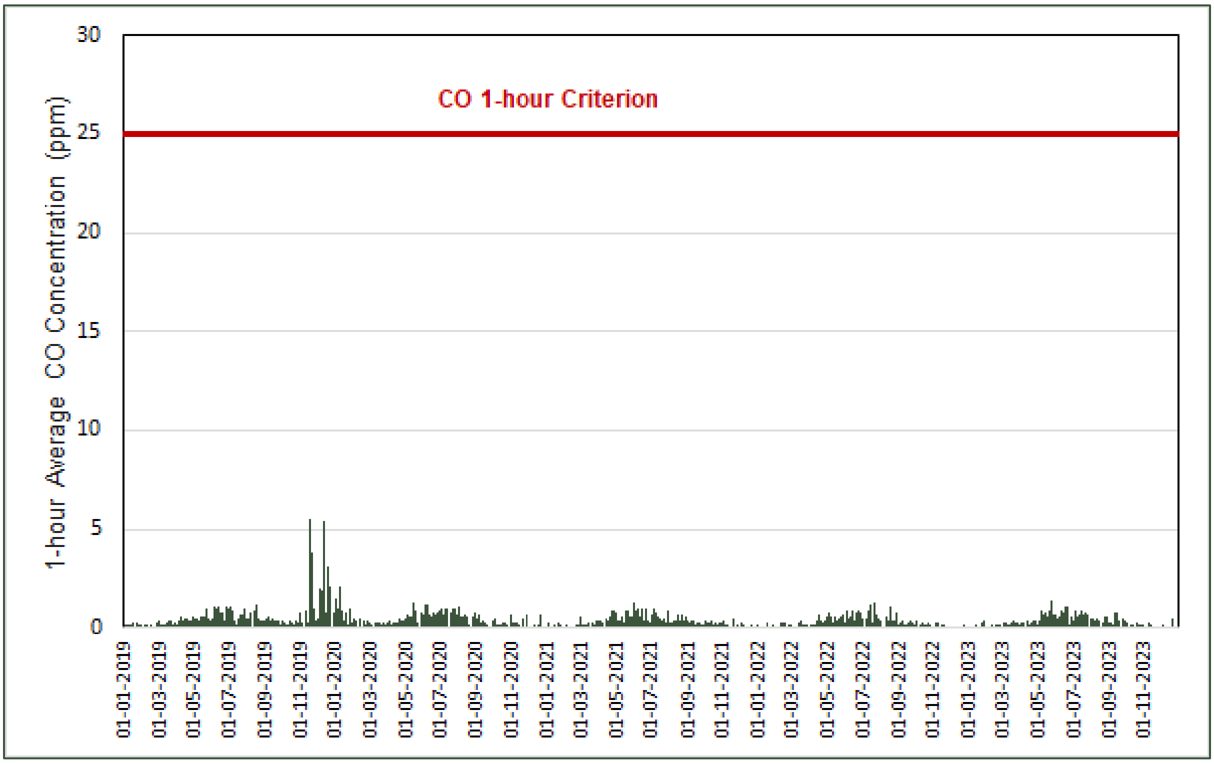


Figure 13 Measured 1-Hour Average CO Concentrations at Prospect AQMS (2019-2023)



5.0 Assessment of Potential Impacts – Construction Phase

The key potential air pollution and amenity issues associated with fugitive dust emissions from the proposed construction activities at the Site are:

- Annoyance due to dust deposition (soiling of surfaces) and visible dust plumes
- Elevated suspended particulate concentrations ($PM_{2.5}$, PM_{10}, and TSP).

As noted in **Section 1.2.1**, modelling of dust from construction activities is generally not considered appropriate, as emission rates can vary significantly depending on a combination of the activity and prevailing meteorological conditions (i.e. rainfall and wind speed), which cannot be reliably predicted. The following sections therefore present a qualitative assessment of the potential risks to air quality associated with dust from construction activities at the Site. Details of the IAQM methodology used to perform the risk assessment are provided in **Appendix A**.

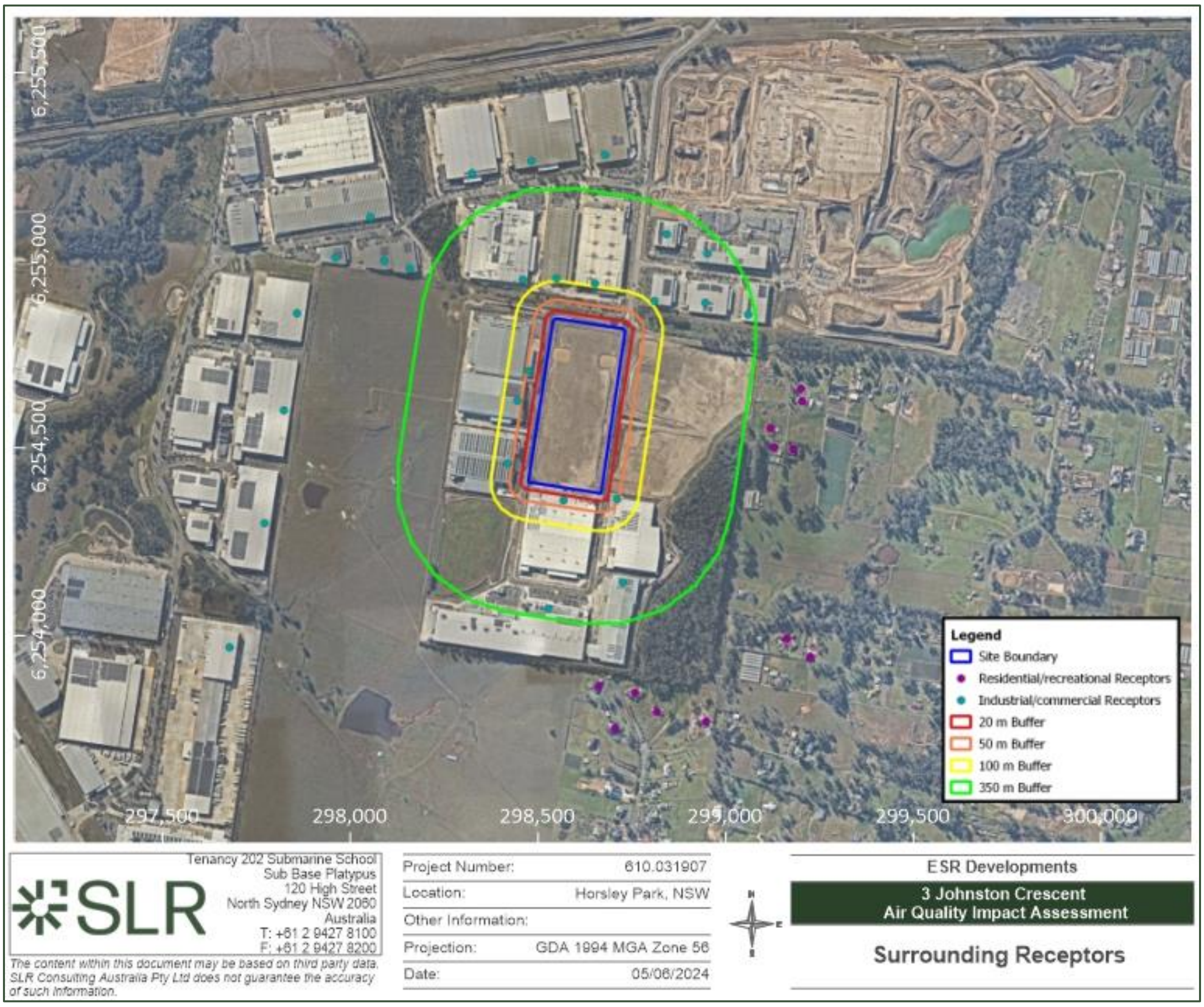
5.1 Step 1 – Screen the Need for a Detailed Assessment

Based on IAQM methodology, an assessment will normally be required where there is:

- A ‘human receptor’ within:
  - 250 m of the boundary of the site; or
  - 50 m of the route(s) used by construction vehicles on the public highway, up to 250 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 250 m from the site entrance(s).

As noted in **Section 4.1**, a number of industrial/commercial receptors are located within 50 m from the nearest Site boundary and thus, further assessment is required. For the purpose of this assessment, the number of industrial/commercial receptors is estimated to be between 10 – 100 within 50 m of the Site boundary (see **Figure 14**). There are no residential receptors located within 250 m of the Site boundary.

Figure 14 Density of Sensitive Receptors in the Vicinity of the Site



5.2 Step 2a – Define the Potential Dust Emission Magnitude

Based upon the above assumptions and the IAQM definitions presented in **Appendix A**, the dust emission magnitudes for each phase of the construction works have been categorised as presented in **Table 3**. It should be noted that no demolition is planned as part of the development of the Site.

Table 3 Categorisation of Dust Emission Magnitude

Activity	Dust Emission Magnitude	Basis
Earthworks	Medium	**IAQM Definition:** Total site area 18,000 m^2 – 110,000 m^2, moderately dusty soil type (e.g., silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 3 m – 6 m in height. **Relevance to this Project:** *Total area of the Site is estimated to be approximately 86,000 m^2.*
Construction	Large	**IAQM Definition:** Total building volume >75,000 m^3, on site concrete batching, sandblasting **Relevance to this Project:** *The total building GFA is 55,900 sqm with a height of 14.6 m. Therefore, the total building volume is approximately 816,000 m^3.*
Trackout	Large	**IAQM Definition:** 20-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 m – 100 m **Relevance to this Project:** *It is estimated that more than 50 outward movements along unpaved roads with length of more than 100 m will occur per day during the peak construction period.*

5.3 Step 2b – Define the Sensitivity of the Area

5.3.1 Receptor Sensitivity

Based on the criteria listed in **Table A1** in **Appendix A**, the sensitivity of the industrial/commercial receptors in this study is concluded to be ***medium*** for both health impacts and dust soiling.

5.3.2 Sensitivity of an Area

Based on the classifications shown in **Table A2** and **Table A3** in **Appendix A**, the sensitivity of the area to dust soiling and health effects may be classified as ***low*** for the surrounding industrial/commercial receptors. This categorisation has been made taking into account the individual receptor sensitivities derived above, the 5-year mean background PM_{10} concentration of 18.7 µg/m^3 recorded at Prospect AQMS (see **Section 4.3**) and the existing number of sensitive receptors present in the vicinity of the Site (i.e. between 10 – 100 industrial/commercial receptors within 50 m).

5.4 Step 2C – Define the Risk of Impacts

Given the sensitivity of the general area is classified as '***low***' for dust soiling and for health effects, and the dust emission magnitudes for the various construction phase activities as shown in **Table 3**, the resulting risk of air quality impacts is as presented in **Table 4**.

Table 4 Preliminary Risk of Air Quality Impacts from Construction Activities (Uncontrolled)

Impact	Sensitivity of Area	Dust Emission Magnitude			Preliminary Risk with no mitigation			
		Earthworks	Construction	Trackout	Earthworks	Construction	Trackout	Maximum
Dust Soiling	Low	Medium	Large	Large	Low	Low	Medium	**Medium**
Human Health	Low				Low	Low	Medium	**Medium**

The results indicate that the risk of dust soiling and human health effects is ***low*** during earthworks and construction phases and ***medium*** during trackout phase. Based on the IAQM methodology, the overall air quality risk from the project construction activities is rated as ***medium*** for the surrounding receptors.

5.5 Step 3 - Mitigation Measures

A reappraisal of the predicted unmitigated air quality impacts on sensitive receptors has been performed to demonstrate the opportunity for minimising risks associated with the use of mitigation strategies. These are termed 'residual impacts'.

Appendix B lists the relevant general mitigation measures designated by the dust IAQM method for a development shown to have a low risk of adverse impacts.

Table 5 provides the mitigation measures targeting the potential impacts from earthworks, construction and trackout. Implementing these measures may reduce the risk of these impacts from ***medium*** to ***low*** for the surrounding receptors. These measures are designated as highly recommended (H) or desirable (D) by the dust IAQM method.

Table 5 Mitigation Measures Specific to Construction and Trackout

Activity	Highly recommended or Desirable
Earthworks	
Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.	D
Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.	D
Only remove the cover in small areas during work and not all at once.	D
Construction	
Avoid scabbling (roughening of concrete surfaces) if possible.	D
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.	H
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.	D
For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.	D
Trackout	
Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.	H
Avoid dry sweeping of large areas.	H
Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	H
Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.	H
Record all inspections of haul routes and any subsequent action in a site log book.	H
Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.	H
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	H
Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.	H
Access gates to be located at least 10 m from receptors where possible.	H

5.6 Step 4 - Residual Impacts

A reappraisal of the predicted unmitigated air quality impacts on sensitive receptors has been performed to demonstrate the opportunity for minimising risks associated with the use of mitigation strategies. These are termed ‘residual impacts’.

For surrounding receptors, the mitigated dust deposition and human health impacts are anticipated to be ***low*** with the implementation of the recommended management measures.

6.0 Assessment of Potential Impacts - Operational Phase

6.1 Pollutants Assessed

RAQST provides predictions of NO_2, PM_{10} and $PM_{2.5}$ concentrations at various distances from the road kerb. It does not provide predictions of the other traffic-related pollutants identified in **Section 2.3**, namely CO, SO_2 and VOCs. Given the low level of CO and SO_2 emissions from vehicles and the low ambient concentrations recorded in the region (see **Section 4.1**), it is reasonable to assume that CO and SO_2 emissions from road traffic are unlikely to result in any exceedances of the relevant criteria at locations beyond the road kerb. SLR's experience in modelling VOC emissions from roads has also shown that kerbside concentration of VOCs is typically well below the relevant air quality guidelines.

Given the above, CO, SO_2 and VOC traffic emissions have not been considered further in this assessment.

6.2 Modelling Assumptions

Details of the traffic movements were provided by ASON for the Project (ASON 2024). While the detailed tenant-specific information yet to be finalised, the traffic generation of the site during network peak periods was estimated based on surveys undertaken on similar surrounding operational facilities.

The estimated peak hour traffic generation of the Project along with the heavy vehicle (HV) and light vehicle (LV) splits are presented in **Table 6**.

Table 6 Project Traffic Generation

Peak Hour	Peak hour traffic volume (vph[1])	%LV	%HV
AM Peak (7:30 am to 8:30 am)	75	74%	26%
PM Peak (3:00 pm to 4:00 pm)	54		

[1] vehicles per hour

Assuming vehicles access the Site via Johnston Crescent, the predicted pollutant concentrations are estimated based on the distances between nearby sensitive receptors and the kerb of Johnston Crescent. It is noted that the traffic volume related to the project passing through Johnston Crescent and Old Wallgrove Road is equal. Given the identical road gradient for both Johnston Crescent and Old Wallgrove Road, their impact on the surrounding receptors is considered equivalent.

6.3 Dispersion Model Configuration

RAQST requires a number of inputs to describe the Site environment and emissions to air, including:

- Background pollutant concentrations
- Daily or peak hour traffic volumes and vehicle speeds
- Traffic mix (heavy vehicle percentage)
- Road type, number of lanes and gradient

- Year of assessment (vehicle fleet).

The sources of the required data and assumptions made for the purpose of this assessment are summarised in **Table 7**.

Table 7 RAQST Input Data

Parameter	Value	Description
Assessment Year	2024	Assumed
Electric vehicle projections	Included	-
Number of Lanes	1 in each direction	-
Road type	Commercial Arterial	Based on land use of the area
Road gradient	2%	Average road gradients calculated based on terrain elevations.
Lane width (m)	3.5 m	Assumed
Level for traffic composition	Level 2	Traffic composition as per **Table 6**
Traffic speed	60 km/hr	Old Wallgrove Road speed limit
Traffic volume	**AM Peak:** 75 vph **PM Peak:** 54 vph	provided by ASON (ASON 2024)
Background Concentrations		
Background site	Prospect AQMS	Nearest air quality monitoring station
Background year	2023	-
1-hour metric for NO_x	Maximum below the criterion	-
24-hour metric for PM_{10} and $PM_{2.5}$	Maximum below the criterion	-

6.4 Modelling Results

As shown in **Figure 5**, the nearest residential receptor is approximately 400 m from the kerb of Johnston Crescent. RAQST estimates pollutant concentrations up to 200 m from the road's kerb. Therefore, the concentrations at this distance are considered indicative of the road's impact on these receptors. For industrial receptors, emissions predicted at 15 m from the kerb of Johnston Crescent, where the closest industrial receptor is located, were used as representative of the traffic impact on these receptors.

As shown in **Table 8**, the incremental predicted concentrations due to vehicles travelling along Johnston Crescent at the closest sensitive receptors are insignificant (less than 6% of the relevant criteria) and none of the predicted concentrations would be expected to contribute significantly to the potential for exceedances of the relevant criteria. Furthermore, all cumulative concentrations comply with the relevant criteria.

Table 8 RAQST Model Results

Pollutant and Averaging Period	Background Concentration (µg/m^3)	Incremental Impact (µg/m^3)		Cumulative Impact (µg/m^3)		Criteria
		AM Peak	PM Peak	AM Peak	PM Peak	
Residential Receptors						
Maximum 1-hour NO_2 concentrations	101[a]	2.1[a]	1.5[a]	103[a]	103[a]	**164**
Annual NO_2 concentrations	16.5	0.4	0.3	16.9	16.8	**31**
Maximum 24-hour PM_{10} concentrations	44.4	<0.1	<0.1	44.4	44.4	**50**
Annual PM_{10} concentrations	16.8	<0.1	<0.1	16.8	16.8	**25**
Maximum 24-hour $PM_{2.5}$ concentrations	23.7	<0.1	<0.1	23.7	23.7	**25**
Annual $PM_{2.5}$ concentrations	7.4	<0.1	<0.1	7.4	7.4	**8**
Industrial Receptors						
Maximum 1-hour NO_2 concentrations	101[a]	9.2[a]	7.1[a]	110[a]	108[a]	**164**
Annual NO_2 concentrations	16.5	1.8	1.4	18.4	17.9	**31**
Maximum 24-hour PM_{10} concentrations	44.4	0.2	0.2	44.6	44.6	**50**
Annual PM_{10} concentrations	16.8	0.1	0.1	16.9	16.9	**25**
Maximum 24-hour $PM_{2.5}$ concentrations	23.7	0.2	0.1	23.9	23.8	**25**
Annual $PM_{2.5}$ concentrations	7.4	0.1	<0.1	7.5	7.4	**8**

[a] RAQST does not allow for incremental 1-hour NO_2 concentrations. A conservative NO_2/NO_x conversion ratio of 100% was assumed in this case.

7.0 Discussion and Conclusion

The main potential sources of air emissions were identified as fugitive particulate matter during the construction phase and products of combustion from traffic during the operational phase of the Project.

The potential for off-site dust impacts were assessed using a qualitative risk-based approach. The results of this assessment indicate that dust impacts due to the construction works can be adequately managed with the implementation of site-specific mitigation measures. The residual impacts are likely to be of negligible risk for the nearest sensitive receptors.

The Level 1 assessment of operational stage emissions found that the incremental impact associated with the vehicles travelling along the surrounding roads was negligible at the closest receptors such that project vehicles are unlikely to result in any significant measurable increase in cumulative air quality impacts at these locations. Given this, a detailed assessment was not deemed to be required.

In summary, with proper mitigation measures in place, air quality at the surrounding receptors should not be considered as a constraint during the construction and operation of the Project.

8.0 References

ASON. 2024. "Transport and Accessibility Impact Assessment State Significant Development Application." *3 Johnston Crescent, Horsley Park.*

IAQM. 2024. *Guidance on the assessment of dust from demolition and construction.* London: Institutre of Air Quality Management.

NSW EPA. 2022. *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales.* New South Wales Environment Protection Authority.

Appendix A Construction Phase Risk Assessment Methodology

3 Johnston Crescent Horsley Logistics Park

Air Quality Impact Assessment

ESR Developments

SLR Project No.: 610.031907.00003

8 July 2024

Step 1 – Screen the Need for a Detailed Assessment

The Step 1 screening criteria provided by the IAQM guidance suggests screening out any assessment of impacts from construction activities where sensitive receptors are located more than 250 m from the boundary of the site, more than 50 m from the route used by construction vehicles on public roads up to 250 m from the site entrance. This step is noted as having deliberately been chosen to be conservative and will require assessments for most projects.

Step 2a – Define the Potential Dust Emission Magnitude

The dust emission magnitude is based on the scale of the anticipated works and should be classified as Small, Medium, or Large. The following are examples of how the potential dust emission magnitude for different activities can be defined. Note that, in each case, not all the criteria need to be met, and that other criteria may be used if justified in the assessment. Where relevant, multiple screening assessments may be completed for different development phases (or even sub-phases where demolition may be brief or there is a very short period of intense activity, for example). This may particularly be the case for linear schemes (i.e. new roads, railways).

Example definitions for Demolition are as follows. Alternative screening values may be used here this is justified based on a particular scheme:

- ***Large***: Total building volume >75,000 m^3, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >12 m above ground level
- ***Medium***: Total building volume 12,000 m^3 – 75,000 m^3, potentially dusty construction material, demolition activities 6-12 m above ground level
- ***Small***: Total building volume <12,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <6 m above ground, demolition during wetter months.

Earthworks will primarily involve excavating material, haulage, tipping and stockpiling. This may also involve levelling the site and landscaping. Example definitions for earthworks are:

- ***Large***: Total site area >110,000 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 >6 m in height
- ***Medium***: Total site area 18,000 m^2 – 110,000 m^2, moderately dusty soil type (e.g., silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 3 m – 6 m in height
- ***Small***: Total site area <18,000 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.

Construction: The key issues when determining the potential dust emission magnitude during the construction phase include the size of the building(s)/infrastructure, method of construction, construction materials, and duration of build. Example definitions for Construction are:

- ***Large:*** Total building volume >75,000 m^3, on site concrete batching, sandblasting
- ***Medium:*** Total building volume 12,000 m^3 – 75,000 m^3, potentially dusty construction material (e.g., concrete), on site concrete batching
- ***Small:*** Total building volume <12,000 m^3, construction material with low potential for dust release (e.g., metal cladding or timber).

Trackout: Factors which determine the dust emission magnitude are vehicle size, vehicle speed, vehicle numbers, geology and duration. As with all other potential sources, professional judgement must be applied when classifying trackout into one of the dust emission magnitude categories. Example definitions for trackout are:

- ***Large:*** >50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g., high clay content), unpaved road length >100 m
- ***Medium:*** 20-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g., high clay content), unpaved road length 50 m – 100 m
- ***Small:*** <20 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50 m.

Step 2b – Define the Sensitivity of the Area

Step 2b of the assessment process requires the sensitivity of the area to be defined. The sensitivity of the area takes into account:

- the specific sensitivities of receptors in the area
- the proximity and number of those receptors
- in the case of PM10, the local background concentration
- site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

The type of receptors at different distances from the site boundary or, if known, from the dust generating activities, should be included. Consideration also should be given to the number of ‘human receptors’. Exact counting of the number of ‘human receptors’, is not required. Instead, it is recommended that judgement is used to determine the approximate number of receptors (a residential unit is one receptor) within each distance band. For receptors which are not dwellings professional judgement should be used to determine the number of human receptors for use in the tables, for example a school is likely to be treated as being in the >100 receptor category.

The likely routes the construction traffic will use should also be included to enable the presence of trackout receptors to be included in the assessment. As general guidance, without site-specific mitigation, trackout may occur along the public highway up to 500 m from large sites (as defined in STEP 2A), 200 m from medium sites and 50 m from small sites, as measured from the site exit.

A number of attempts have been made to categorise receptors into high, medium and low sensitivity categories; however, there is no unified sensitivity classification scheme that covers the quite different potential effects on property, human health and ecological receptors.

Table A1 provides guidance on the sensitivity of different types of receptors to dust soiling, health effects, and ecological effects.

Table A1 IAQM Guidance for Categorising Receptor Sensitivity

Value	High Sensitivity Receptor	Medium Sensitivity Receptor	Low Sensitivity Receptor
Dust Soiling	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.	Users would expect a 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 a to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land.	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 a to be present only for limited periods of time as part of the normal pattern of use of the land.
	Indicative examples include dwellings, museums, and other culturally important collections, medium- and long-term car parks and car showrooms.	Indicative examples include parks and places of work.	Indicative examples include playing fields, farmland (unless commercially sensitive horticultural), footpaths, short term car parks and roads.
Health Effects	Locations where members of the public are exposed over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day).	Locations where the people exposed are workers, and exposure is over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day).	Locations where human exposure is transient
	Indicative examples include residential properties. Hospitals, schools, and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.	Indicative examples include office and shop workers but will generally not include workers occupationally exposed to PM_{10}, as protection is covered by Health and Safety at Work legislation.	Indicative examples include public footpaths, playing fields, parks, and shopping streets.

According to the IAQM methods, the sensitivity of the identified individual receptors (as described above) is then used to assess the *sensitivity of the area* surrounding the active construction area, taking into account the proximity and number of those receptors, and the local background PM_{10} concentration (in the case of potential health impacts) and other site-specific factors. Additional factors to consider when determining the sensitivity of the area include:

- any history of dust generating activities in the area
- the likelihood of concurrent dust generating activity on nearby sites
- any pre-existing screening between the source and the receptors
- any conclusions drawn from analysing local meteorological data which accurately represent the area; and if relevant.
- the season during which the works will take place.
- any conclusions drawn from local topography.
- duration of the potential impact, as a receptor may become more sensitive over time.
- any known specific receptor sensitivities which go beyond the classifications given in this document.

The IAQM guidance for assessing the sensitivity of an area to dust soiling is shown in **Table A2**. The sensitivity of the area should be derived for each of activity relevant to the project (ie construction and earthworks).

Table A2 IAQM Guidance for Categorising the Sensitivity of an Area to Dust Soiling Effects

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

Note: Estimate the total number of receptors within the stated distance. Only the *highest level* of area sensitivity from the table needs to be considered. For example, if there are 7 high sensitivity receptors < 20m of the source and 95 high sensitivity receptors between 20 and 50 m, then the total of number of receptors < 50 m is 102. The sensitivity of the area in this case would be high.

A modified version of the IAQM guidance for assessing the *sensitivity of an area* to health impacts is shown in **Table A3**. For high sensitivity receptors, the IAQM methods takes the existing background concentrations of PM_{10} (as an annual average) experienced in the area of interest into account and is based on the air quality objectives for PM_{10} in the UK. As these objectives differ from the ambient air quality criteria adopted for use in this assessment the IAQM method has been modified slightly.

Table A3 IAQM Guidance for Categorising the Sensitivity of an Area to Dust Health Effects

Receptor sensitivity	Annual mean PM_{10} conc.	Number of receptors [a,b]	Distance from the source (m)			
			<20	<50	<100	<250
High	>25 µg/m^3	>100	High	High	High	Medium
		10-100	High	High	Medium	Low
		1-10	High	Medium	Low	Low
	21-25 µg/m^3	>100	High	High	Medium	Low
		10-100	High	Medium	Low	Low
		1-10	High	Medium	Low	Low
	17-21 µg/m^3	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	<17 µg/m^3	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	>25 µg/m^3	>10	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	21-25 µg/m^3	>10	Medium	Low	Low	Low
		1-10	Low	Low	Low	Low
	17-21 µg/m^3	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
	<17 µg/m^3	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low

Notes:

(a) Estimate the total within the stated distance (e.g. the total within 350 m and not the number between 200 and 350 m); noting that only the highest level of area sensitivity from the table needs to be considered.

(b) In the case of high sensitivity receptors with high occupancy (such as schools or hospitals) approximate the number of people likely to be present. In the case of residential dwellings, just include the number of properties.

Step 2c – Define the Risk of Impacts

The dust emission magnitude from Step 2a and the receptor sensitivity from Step 2b are then used in the matrices shown in **Table A4** (Demolition), **Table A5** (earthworks and construction) and **Table A6** (track-out) to determine the risk category with no mitigation applied.

Table A-4 Risk Category from Demolition Activities

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

Table A5 Risk Category from Earthworks and Construction Activities

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

Table A6 Risk Category from Track-out Activities

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

Appendix B General Air Quality Mitigation Measures for Construction Sites

3 Johnston Crescent Horsley Logistics Park

Air Quality Impact Assessment

ESR Developments

SLR Project No.: 610.031907.00003

8 July 2024

Table B-1 lists the relevant general mitigation measures designated as *highly recommended* (H) or *desirable* (D) by the dust IAQM method for a development shown to have a low risk of adverse impacts. Not all these measures would be practical or relevant to the Project therefore a detailed review of the recommendations should be performed, and the most appropriate measures be adopted as part of the Construction Environmental Management Plan (CEMP).

Table B -1 Site-Specific Management Measures Recommended by the IAQM

Mitigation measure	Medium Risk
1. Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	H
2. Display the name and contact details of person(s) account-able for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.	H
3. Display the head or regional office contact information	H
4. Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Council. The level of detail will depend on the risk and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. The DMP may include monitoring of dust deposition, dust flux, real-time PM_{10} continuous monitoring and/or visual inspections.	H
Site Management	
5. Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.	H
6. Make the complaints log available to the Local Council when asked.	H
7. Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the logbook.	H
8. 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.	N
Monitoring	
9. Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the Local Council when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100 m of site boundary, with cleaning to be provided if necessary.	D
10. Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the Local Council when asked	H
11. Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.	H
12. Agree dust deposition, dust flux, or real-time PM continuous monitoring locations with the Local Council. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.	H
Preparing and maintaining the site	
13. Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	H
14. Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.	H

Mitigation measure	Medium Risk
15. Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period	H
16. Avoid site runoff of water or mud.	H
17. Keep site fencing, barriers and scaffolding clean using wet methods.	H
18. 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.	H
19. Cover, seed or fence stockpiles to prevent wind whipping.	H
Operating vehicle/machinery and sustainable travel	
21. Ensure all vehicles switch off engines when stationary - no idling vehicles.	H
22. Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.	H
23. Impose and signpost a maximum-speed-limit of 25 kph on surfaced and 15 kph on un-surfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the Local Council, where appropriate)	D
24. Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	N
25. Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing)	D
Operations	
26. 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.	H
27. Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	H
28. Use enclosed chutes and conveyors and covered skips.	H
29. Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	H
30. Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	H
Waste management	
31. Avoid bonfires and burning of waste materials.	H

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