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Charter Hall

Flagstone Logistics Estate Lot 101, North Maclean

Air Quality Report

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

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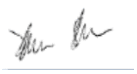
Issued By:	Samir Sidhu 31 Jan 2025		Project Scientist

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Rev. 03		05 Aug 2024	SS
Rev. 04		20 Aug 2024	SS
Rev. 05		22 Aug 2024	SS
Rev. 06	Updated Plans and Site Operation	31 Jan 2025	SS

Executive Summary

This Air Quality Assessment has been prepared on behalf of CH Hydrangea Pty Ltd (Applicant) in support of a development application over land at 4499 – 4651 Mount Lindesay Highway, North Maclean QLD 4280 and described as Lot 39 on SP258739 (site). This PDA Development Application seeks approval from the Minister of Economic Development Queensland for the following aspects of development:

- Development Permit for Reconfiguring a Lot -1 into 8 Lots, plus access easements; and
- Development Permit for a Material Change of Use for Warehouse (Distribution Centre).

This Air Quality Assessment has also been prepared on behalf of the Applicant to support a development application over part of the site (Proposed Lot 101).

The proposed warehouse development is designed to suit the operational requirements of the proposed warehouse (distribution centre).

A previous assessment was conducted for a speculative tenancy as the future tenant was unknown. This revised report incorporates tenant-specific operational details, including the proposed 24/7 operation of the warehouse. The primary activities with the potential to generate air emissions are vehicle movements and operations.

A screening-level air quality assessment was undertaken to evaluate potential impacts on the closest sensitive receptors. The assessment concludes that air emissions from the site will be negligible and are not expected to result in any unreasonable impacts on the nearest rural residential receptors, located more than 200 metres from the site.

The proposed warehouse is considered an appropriate use within the Greater Flagstone Priority Development Area (PDA).

Overall, Vipac therefore considers that potential air quality impacts should not be a constraint to the proposed development.

Table of Contents

1 Introduction

This Air Quality Assessment has been prepared on behalf of CH Hydrangea Pty Ltd (Applicant) in support of a development application over land at 4499 – 4651 Mount Lindesay Highway, North Maclean QLD 4280 and described as Lot 39 on SP258739 (site). This PDA Development Application seeks approval from the Minister of Economic Development Queensland for the following aspects of development:

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This Air Quality Assessment has also been prepared on behalf of the Applicant to support a development application over part of the site (Proposed Lot 101). A previous assessment was conducted for a speculative tenancy as the future tenant was unknown. This report version reassesses the site with the inclusion of tenant specific operation information. The assessment consisted of the following:

The assessment consisted of the following:

- Review of relevant legislation
- Regional meteorology;
- Terrain features;
- Land use;
- Nearest sensitive receptors e.g. based on aerial imagery.
- Proposed site layout and emission sources
- Estimation of a worst-case emissions scenario
- Potential Impacts
- Recommendations for further assessment and/or mitigation, where applicable.

2 Project Context and Surrounding Environment

2.1 Proposed Operations

The proposed warehouse development is designed to meet the operational requirements of a distribution centre. The facility is intended to operate 24 hours a day, 7 days a week. The proposed layout of the development is provided in Figure 2-1.

The operations of the facility are anticipated to align with those of a typical warehouse (distribution centre). Emission-generating activities are not expected to be significant, as the facility will not include manufacturing or processing operations. The primary activity with the potential to generate air emissions is vehicle movement and operations, which may produce small quantities of vehicle combustion emissions.

Further details regarding the anticipated vehicle operations for the proposed facility are provided in Section 5.

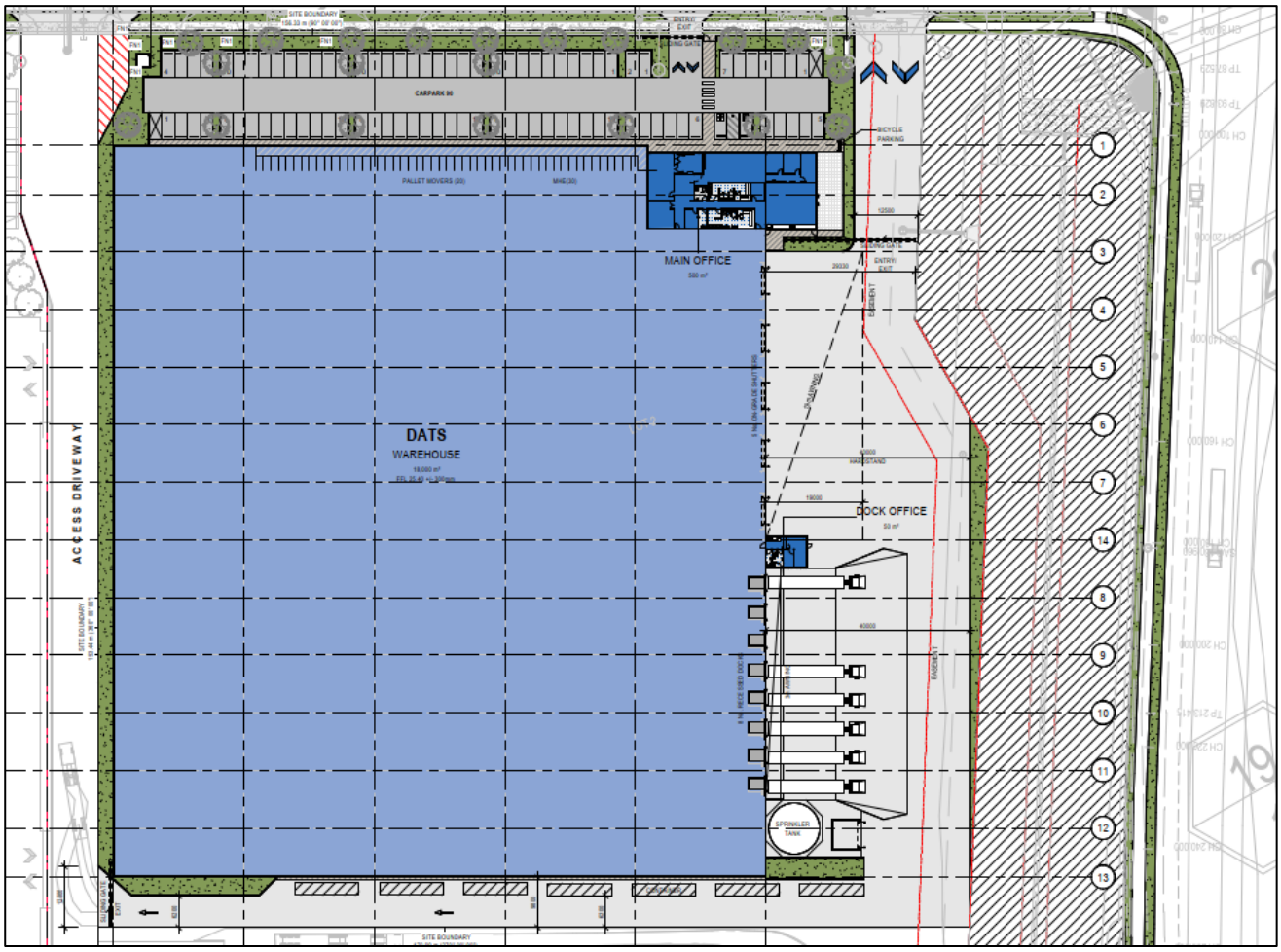


Figure 2-1 - Layout of the Project Facility

2.2 Site Location and Surrounding Environment

The proposed development is located within the Flagstone Logistics Estate (4499-4651 Mount Lindesay Highway, North Maclean) to the western side of the Mount Lindesay Highway and is formally described as the proposed Lot 101 (subject site). The subject site and is located within the Logan City Council (Council) Local Government Area (LGA) and the Greater Flagstone Priority Development Area (PDA) and as such is under the jurisdiction of Economic Development Queensland (EDQ).

The Flagstone Logistics Estate has a previous Masterplan approval (DEV2018/961) for an industrial subdivision. As part of the proposed Estate development, the approved subdivision is expected to be further divided into additional industrial lots. This assessment addresses the potential air quality impacts from the proposed warehouse at the subject site. The approximate location of the subject site and Flagstone Logistics Estate is shown in Figure 2-2. Figure 2-3 shows the zoning of the site and surrounding area.

As shown in Figure 2-2, the closest sensitive receptors to the subject site are rural residential located approximately:

- 220m to the east;
- 310m to the north; and
- 700m to the west.

There are no topographical features (e.g. elevated terrain) in the immediate vicinity or separating the subject site from the nearest sensitive receptors, which may affect pollutant transportation to the surrounding environment.

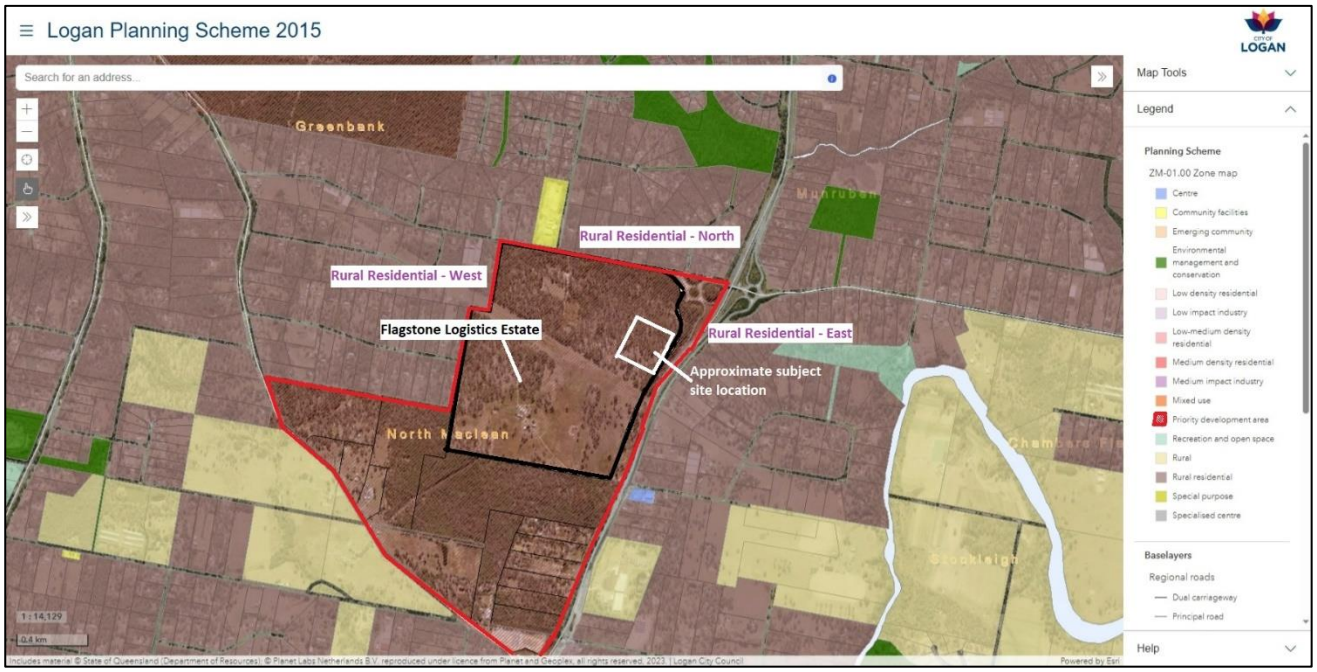


Figure 2-2 – Approximate Subject Site Location

Figure 2-3 - Site Location - Surrounding Zoning

2.3 Air Pollutants of Concern

The proposed development incorporates warehouses and work stores, where emission generating activities are not typical and it does not include any manufacturing or processing facilities. It is however common for warehouse activities to involve materials handling vehicles such as heavy vehicles and trucks, which do have the potential to generate small quantities of vehicle combustion emissions.

Therefore, potential air emissions are generated by vehicles. The primary pollutants of concern generated by vehicles are products of combustion including:

- Particulate matter as PM10 and PM2.5;
- Nitrogen Dioxide (NO_2);
- Carbon Monoxide (CO);
- Volatile organic compounds (VOCs); and
- odour.

3 Relevant Legislation

3.1 Logan City Council Planning Scheme

Section 10.1 of the Logan City Council Planning Scheme stipulates 'Development schemes for priority development areas' including the Greater Flagstone PDA. The following requirements are specified which include impacts upon air quality:

- The development responds to the constraints of the land and delivers minimal emissions to land, water and the atmosphere; and
- The design, siting and layout of the development manages air quality, noise and hazardous materials according to current standards.

The SC6.2.3 Planning scheme policy 3 - Environmental management sets out the standards and acceptable outcomes related to air quality for the Logan City Council region. Regarding air quality objectives, the purpose of this planning scheme policy is to assist with the implementation of the Logan Planning Scheme 2015 by identifying:

c. the standards for noise emission and absorption, air, light, radiation and vibration to protect:
i. the amenity and character of a zone and precinct;
ii. the health and safety of the community;

This planning scheme policy applies to assessable development:
where a code has a performance outcome relating to noise emission and noise immission, air, light, radiation and vibration emissions, in:
i. the Extractive resources overlay code;
ii. the Greenbank Training Area buffer overlay code;
iii. all zone codes.

Table 3.2.2.1 of the code sets out air emission standards for the ground level concentrations at and beyond the premise's boundary.

Table 3-1 displays the acceptable ground level concentrations for the pollutants of potential concern, as set out in the planning scheme.

Table 3-1: Acceptable Ground Level Concentrations for Relevant Pollutants

Air emission indicator	**Design ground level concentrations at and beyond the premises boundary**		**Averaging time**
	ppm	**mg/m³**	
Nitrogen dioxide	0.1	0.19	1 hour
Particles (deposited)[c]	4g/m²/month[b]	2g/m²/month[a]	30 days
Particles (as TSP) (Nuisance dust)	- -	0.09 * 0.33	1 year 3 minutes
Particles (as PM10)[1]	- -	0.05 * 0.080	24 hours 1 hour
Particles (as PM2.5)	- -	0.050 0.025	1 hour 24 hours
Carbon monoxide	25 9	29 -	1 hour 8 hours
	Design concentration at the premises boundary	**Design concentration at the premises boundary to an air emission sensitive land use**	
General Odour Emission	10 OU	1 OU	3 minutes

Note - Criteria are generally sourced from the Victorian Government Gazette S240 21 Dec 2001 unless otherwise indicated.
Note - * Sourced from Approved Methods for Modelling and Assessment of Air Pollutants in New South Wales.
Note - ^ Sourced from Logan Planning Scheme 2006 and Guideline: Odour Impact Assessment from Developments (DEHP).
Note - # Sourced from Schedule 1 Environmental Protection (Air) Policy 2008.
Note - Odour units to be determined using Australian Standard Method DR99306 Air Quality - determination of odour concentration by dynamic olfactometry.
Note - a maximum increase in deposited dust levels
Note - b Maximum total deposited dust level
Note - c Deposited particles are assessed as insoluble solids as defined by AS/NZS 3580.10.1:2003

4 Regional Meteorology

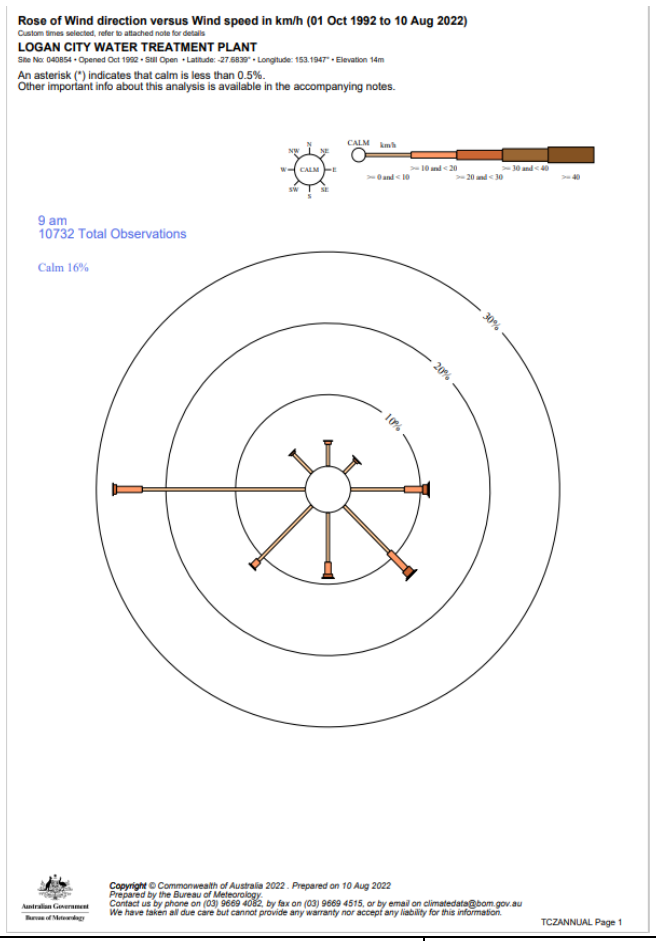
Data recorded by the nearest relevant Bureau of Meteorology (BoM) long term weather station at Logan City Water Treatment Plant (located approximately 17 km north east of the subject site) was reviewed to describe the meteorological and climatic influences in the region. Long term weather data obtained from the BOM weather station at Logan City Water Treatment Plant is presented in Table 4-1.

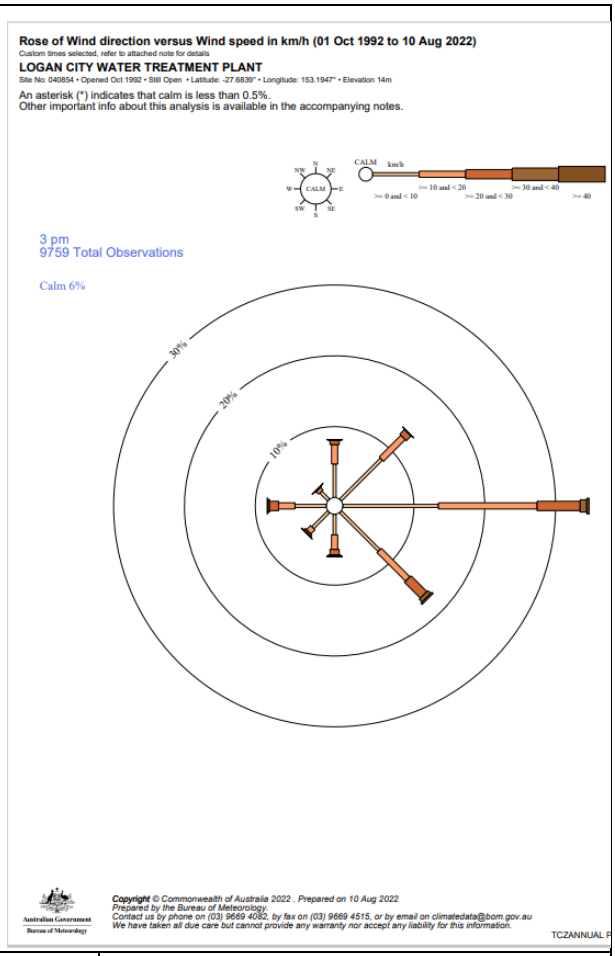
The mean temperature range is between 9.0°C and 29.9°C with the coldest month being July and the hottest, January. The rainfall in the region is variable, with most rainfall in the warmer months. On average, most of the annual rainfall is received between December and March. Rainfall is lowest between July and September. The mean annual rainfall is approximately 1092.4 mm.

The long-term wind roses recorded daily at the Logan City Water Treatment Plant station at 9am and 3pm are provided in Figure 4-1. Winds are shown to be primarily from the west at 9am and from the east at 3pm. The morning westerly winds have the potential to carry pollutants from the site to the closest sensitive receptors (see Figure 2-2) and are generally light (>10km/hr or >2.8m/s). Stronger winds (>40km/hr or >11.1m/s), which have the potential to disturb dust and carry pollutants longer distances, occur infrequently.

Table 4-1: Mean Long-term Weather Data for Logan City Water Treatment Plant

Month	Mean Temperature		Rainfall (mm)	9 am Conditions			3 pm Conditions		
	Max (°C)	Min (°C)		Temp (°C)	RH (%)	Wind Speed (km/h)	Temp (°C)	Mean RH (%)	Wind Speed (km/h)
Jan	29.9	20.7	125.8	26	72	7.4	28.1	64	14.3
Feb	29.4	20.6	171.7	25.4	75	6.7	27.7	65	13.3
Mar	28.5	19.3	143.1	23.9	76	6.7	26.7	63	13.8
Apr	26.5	16.1	78.2	20.8	78	5.3	24.8	61	12.3
May	24	12.8	103.9	16.8	81	5.5	22.6	59	9.7
Jun	21.6	10.2	70.6	13.8	82	4.9	20.5	57	8.7
Jul	21.5	9	37.4	12.9	80	5.3	20.3	53	9.3
Aug	22.8	9.5	41.3	14.5	76	5.4	21.3	52	10.9
Sep	25.2	12.6	40.5	18.8	70	5.6	23.4	52	12.6
Oct	26.6	15.1	74.3	21.8	67	6.9	24.6	57	13.3
Nov	28	17.5	100.7	23.7	67	7	25.8	61	13.4
Dec	29.1	19.3	123.5	25.2	69	7	27.4	61	13.2
Annual	**26.1**	**15.2**	**1092.4**	**20.3**	**75**	**6.1**	**24.4**	**59**	**12.1**





Location: Logan City Water Treatment Plant	**Data Period:** 1992 to 2022	**Data Type:** Measured Data

Figure 4-1: Long Term Wind Rose for Logan City Water Treatment Plant (1992 to 2022)

5 Assessment of Potential Impacts

The proposed warehouse development is designed to suit the operational requirements of the proposed warehouse (distribution centre). The tenancy occupying the subject site is confirmed to be used for warehouse industry activities which are appropriate within the Greater Flagstone PDA.

Table SC1.1 of the Logan Planning Scheme 2015 defines warehouses as *the use of premises for – a. storing or distributing goods, whether or not carried out in a building; or b. the wholesale of goods, if the use is ancillary to the use in paragraph a.* Typical warehouse activities do not include industrial activity such as processing or manufacturing and is therefore not expected to generate emissions to air. Furthermore, the majority of these activities are proposed within the building which further minimises any emissions to air.

The proposed development is anticipated to generate vehicle movements and operations, including:

- 104 staff vehicles per day,
- 5 visitor vehicles per day,
- 60 heavy vehicles per week, and
- 20 B-doubles per week.

A screening level assessment of vehicle emissions has been carried out as follows:

- A conservative air emissions inventory for the proposed facility was compiled using USEPA emission factors for idling vehicles; and
- Ground-level pollutant concentrations were estimated based on the emissions scenario and compared against the Logan City Council air quality planning criteria to assess potential impacts.

5.1 Emissions Estimation

The USEPA has developed a series of computer models that estimate the emissions for different types of vehicles (USEPA Ref# EPA420-F-08-025). Idle emission rates based on national data representing the in-use fleet of July 2008 are presented in Table 5-1. It is noted that vehicle emission technologies have improved significantly since 2008 such that these emission rates represent a considerable over estimation of those for current Australian fleet conditions.

Table 5-1: Average Idle Emission Rates by Pollutant and Vehicle Type

Pollutant	Vehicle Emission Rate (g/hour)		Total Combined Emission Rate (g/s)
	LDGV	HDDV	
CO	71.225	25.628	1.59
NOx	3.515	33.763	0.09
Particles (as PM_{10})	NA	1.196	0.00033
Particles (as $PM_{2.5}$)	NA	1.100	0.0003

NA not applicable. The USEPA states there is not enough information for these emission rates to be developed. The USEPA further states that the PM contribution to ambient air quality from gasoline vehicles and light-duty diesel cars and trucks is normally negligible.

The vehicle classes are defined as follows:

- LDGV: Light duty gasoline fuelled vehicles up to 6,000 lb GVW
- HDDV: Heavy duty diesel vehicles over 8,500 lb GVW

As a conservative emissions estimation scenario, it is assumed that a peak hourly rate of 80 LDGV and one (1) HDDV idling at the facility, simultaneously. The maximum vehicle emission rate specified for each pollutant type in Table 5-1 from the light-duty vehicle and heavy duty diesel vehicle classes are used to derive a combined total emission rate for all vehicle classes (i.e. LDGV and HDDV) for the estimation.

A worst-case screening level pollutant concentration (P_C) from a ground level source at the closest receptor may therefore be estimated by the following gaussian plume equation:

$$P_C = 10^6 \times ER / (U \times W_{WC} \times W_{WC})$$

Where:

P_C – pollutant concentration ($\mu g/m^3$)

ER – combined emission rate (g/s)

U = worst-case windspeed (typically assumed to be 1m/s)

Wwc = worst case cloud width [m] (typically assumed W = 0.1x, where x is distance from the source)

Hwc = worst case cloud depth (typically assumed H = 50 m in worst case)

While the calculated Pc represents an estimation of the maximum potential concentration, it is important to note that this is a conservative approximation.

It is also noted that the conservative 100% conversion rate of NOx to NO_2 has been adopted for comparison against Logan City Council Acceptable Ground Level Concentrations for this pollutant.

5.2 Assessment

Table 5-2 summarises the estimated pollutant concentrations at the closest receptor which is at a 220m distance from the proposed development and compares them with the ground level pollutant concentration criteria.

Table 5-2: Summary of Estimated Pollutant Concentrations

Pollutant	Estimated Pollutant Concentration mg/m³	Averaging Time	Criteria mg/m³
Nitrogen Dioxide	0.080	1 hour	0.19
Carbon Monoxide	1.445	1 hour	29
Particles (as PM_{10})	0.0003	1 hour	0.08
Particles (as $PM_{2.5}$)	0.0003	1 hour	0.05

As shown in Table 5-2, the maximum estimated pollutant concentrations (including NO_2, PM, and CO) at the closest sensitive receptor are well below the acceptable ground level concentration criteria set by the Logan City Council. These results, based on conservative assumptions such as a 100% conversion rate of NOx to NO_2, indicate that the proposed development is anticipated to have a negligible impact on air quality at sensitive receptors in the surrounding environment.

6 Conclusion

This Air Quality Assessment has been prepared on behalf of CH Hydrangea Pty Ltd (Applicant) in support of a development application over land at 4499 – 4651 Mount Lindesay Highway, North Maclean QLD 4280 and described as Lot 39 on SP258739 (site). This PDA Development Application seeks approval from the Minister of Economic Development Queensland for the following aspects of development:

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This Air Quality Assessment has also been prepared on behalf of the Applicant to support a development application over part of the site (Proposed Lot 101).

The proposed warehouse development is designed to suit the operational requirements of the proposed warehouse (distribution centre) and is proposed to operate 24 hours, 7 days a week. The warehouse is deemed to be an appropriate use within the Greater Flagstone PDA, and negligible air emissions generating activities are expected to occur on site and primarily within the warehouse building.

Due to the nature of the activities being undertaken on site, it is anticipated that there will be negligible emissions to air and impacts to air are not be expected to have any unreasonable impact at the closest rural residential receptors which are >200m from the subject site nor cause any unreasonable levels of air pollutants or odour.

Overall, Vipac therefore considers that potential air quality impacts should not be a constraint to the proposed development.