Air Noise Environment
Environmental Monitoring and Assessment

Air Quality and Noise Assessment - Proposed Liquid Treatment Facility, Wetherill Park

Halgan Pty Ltd

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Where site inspections, testing or fieldwork have taken place, the report is based on the information made available by the client or their nominees during the visit, visual observations and any subsequent discussions with regulatory authorities. It is further assumed that normal activities were being undertaken at the site on the day of the site visit(s).

The validity and comprehensiveness of supplied information has not been independently verified and, for the purposes of this report, it is assumed that the information provided to Air Noise Environment Pty Ltd for the purposes of this project is both complete and accurate.

Executive Summary

Halgan Pty Ltd propose to incorporate a liquid waste treatment facility at their 10 Davis Road, Wetherill Park premise. The proposal is to construct the liquid waste treatment area in the south-western portion of the existing building. The facility will process up to 50 kilotonnes (kT) per annum of grease trap waste.

As a result of the proposed development, there is a potential for air and noise impacts on the nearest industrial premises. It is noted that the nearest residential receptors are 1.4 km away and potential impacts are expected to be minimal at this distance.

To address these potential impacts, Air Noise Environment has been commissioned to undertake an air and noise assessment of the proposed facility. The assessment has been completed using computational modelling in accordance with New South Wales Environmental Protection Authority requirements. This report presents the methodology, results and conclusions of the assessment.

Potential air quality impacts are associated with odour emissions from the new liquid waste tanks. Emissions are related to tank breathing, particularly during filling of the tanks when odour in the tank head space is forced out. All emissions from tanks will pass through an Odour Control Unit (OCU) system prior to being released via the rooftop of the existing building.

To assess air quality impacts from these sources, air dispersion modelling was undertaken using CALPUFF. A TAPM prognostic meteorological dataset developed was utilised in CALMET for predicting local meteorological conditions at the subject site. Emission rates for odour were based on previous sampling undertaken by ANE at a similar facility (treating grease trap) in Sydney. The derived CALMET meteorology and emission rates were then used as an input for CALPUFF to predict ground level concentrations of pollutants in the surrounding area. The results of the air modelling demonstrates compliance with the NSW EPA air quality criteria for all modelled pollutants by a significant margin and shows that the operation of the liquid waste facility is expected to have minimal contribution to the current air quality environment in the surrounding industrial area. Details of recommended odour mitigation and management procedures are presented in Section 5.7 of the report, which are important to achieving the air quality outcomes of the Protection of the Environment Operations Act (1997) and the POEO (Clean Air) Regulation (2010).

Potential noise sources at the site include truck movements and fixed plant (e.g. pump, exhaust fan). Overall, the potential operational noise impacts are considered to be minor given the nature of the sources (e.g. small fixed plant and infrequent vehicle movements). Nonetheless, noise modelling was completed using the CadnaA environmental noise model to confirm potential noise impacts. The results of the noise modelling showed compliance with the NSW Noise Policy for Industry criteria at the nearest industrial premises and distant residential receptors.

With regards to construction air and noise impacts, these are expected to be minimal given the nature of construction works proposed (internal refurbishment of an existing building and standard construction methods). With regards to potential vibration impacts, these are are expected to be negligible, based on the types of expected equipment operating on site (e.g. fixed plant, typical truck movement).

Overall, the outcomes of the assessment demonstrate that the proposed operation is expected to comply with the relevant NSW legislation and that the site represents a suitable location for the proposed liquid waste facility from air and noise perspective.

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1 Introduction

1.1 Scope of Study

Halgan Pty Ltd commissioned Air Noise Environment Pty Ltd to undertake an air and noise assessment for a proposed liquid waste treatment facility at 10 Davis Road, Wetherill Park.

The study has been undertaken to assess the potential impacts of the proposed facility on nearby sensitive receptors in accordance with the requirements of the New South Wales Environmental Protection Authority and the Secretary's Environmental Assessment Requirements (SEAR) Application Number SSD 10402. Specifically, the following documents have been referenced:

- SEAR (Application Number SSD 10402);
- NSW EPA Notice No. 152611;
- NSW Noise Policy for Industry (2017);
- NSW Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (2017); and
- Assessment and Management of Odour from Stationary Sources in NSW (November 2006).

Computational modelling has been undertaken for assessing potential air and noise impacts.

1.2 NSW EPA Information Request

The NSW EPA issued an information request on 16 September 2020. Table 1.1 presents details of the information request and a brief response with reference to relevant report sections.

Table 1.1: NSW EPA Information Request

Item	Response and Report Section
1. Odour criterion is incorrectly stated as 7 OU. Table 7.5 of the Approved Methods states that the odour criterion is 2 OU in an urban environment.	The 7 OU limit was stated for the reasons provided in Section 4.1 (i.e. relating to the onerous nature of applying a 2 OU criterion at potentially odorous nearby industry, when the criterion is also used at sensitive receptors (such as houses)). It is further noted the NSW odour assessment guideline derives a 2 OU goal for urban areas, taking into factors such as population density and sensitivity. 2 OU essentially accounts for the fact there could be sensitive populations associated with schools and residences. As the nearest receptors are industrial premises (also potential odour-emitting) with workers, the sensitivity of the population may be considered much less than a residential area. Therefore, it is appropriate and reasonable to adopt an odour limit higher than 2 OU for an industrial premise. In any case, it is noted that the odour results presented in Section 5.6 are predicted to be compliant with the 2 OU criterion.
2. The assessment does not discuss or outline what peak to mean ratios have been adopted (if any) or how they have been adopted to predict ground level odour concentrations for comparison against the impact assessment criterion.	The peak-to-mean ratio was included in the modelling (though not stated in the report). A 2.3 peak to mean ratio for downwash sources has was included (as per the NSW Approved Modelling Methods guideline recommendation for ground level or downwashed sources).
3. The meteorological year is not demonstrated to be representative. Section 4.1 of the Approved Methods requires that Level 2 Assessments correlate against at least five years of meteorological data to determine whether the data year is representative.	See Section 5.1.1.1 for further review of meteorology.
4. Calmet data has not been validated. Calmet data should be quantifiably validated against a meteorological station not used in the modelling.	The CALMET was validated against the Prospect AQ station. The Prospect AQ station was not included in the modelling as an observational station, as suggested by the NSW EPA response. Only TAPM prognostic data has been used in the CALMET as an input. It should further be noted that, while some differences in the CALMET predictions exist compared to the measured data, the CALPUFF modelling is highly conservative by assuming continuous odour emissions associated with unloading of a vehicle (24/7) and an odour emission rate three times higher than what was previously measured (see Section 5.3.3). Furthermore, with these conservative inputs, the peak odour results at neighbouring properties are more than a factor of 2.6 times lower than the 2 OU goal adopted for residential areas.
5. It is noted in the EIS that the entire treatment area is proposed to be enclosed and subject to odour management (5.3.1), however the location of the odour control system has not been detailed within the plans. Further information should be provided to show	Figure 2.2 presents updated site plans including the control system and position of the roof vent. All tanks including the DAF will be hard plumbed to the odour control unit.

Item	Response and Report Section
all sources of potentially contaminated air, especially the emissions from the Diffused Air Flotation (DAF), is to be captured in the treatment area.	The DAF unit will have a gas tight fitted capping installed with emissions directed to the odour control unit.
6. Details of the proposed location of the granular activated carbons filters and stack should be provided.	Figure 2.2 presents details of the proposed location and stack.
7. Details or consideration of the appropriateness of the proposed odour control system should be presented in terms of best practice for the operation of a grease trap treatment plant in comparison to enclosing the DAF in a negative pressure control room capturing all emissions with the odour control system.	The DAF unit will have a gas tight fitted capping installed with emissions directed to the odour control unit. This approach effectively achieves the same outcome of a negative pressure room, as a gas tight fitting will be adopted allow all emissions to be captured. On this basis, the proposed control system is considered best practice. It is noted that the recently established (approved in 2017) liquid waste facility in Glendenning operated by JJ Richards and Sons utilises a similar odour control approach (e.g. an activated carbon filter system fitted to all emissions including a DAF unit).

1.3 EIS Adequacy Review

An original report was issued on 31 March 2020, which was subsequently reviewed by the NSW Department of Planning, Industry and Environment[1]. The following table identifies items raised and where in the report they are addressed.

Table 1.2: NSW DPI Adequacy Review – Air Quality Items

Item	Response and Report Section
The EIS and supporting Air Quality and Noise Assessment report (prepared by Air Noise Environment) should provide detail and/or further clarification on the following:	
A greenhouse gas emission assessment should be provided (a justification is provided in the Air Quality and Noise Assessment report, but no detail is provided in the EIS).	See Appendix C.
A clear identification of sensitive receivers and a link of modelling results to those receivers.	See discussion in Section 5.5.
Further commentary on potential for fugitive emissions which is likely to be greatest risk should be provided as per Agency Requirements. Some of the key commentary in the Air Quality and Noise Assessment report on aspects such as key emission sources etc is not covered in the EIS chapter (Section 6.4), including commitment to appropriate mitigation.	As per Section 2.3, the potential impact from fugitive air emission sources are expected to be minimal, provided that the relevant air quality mitigation and management measures are in place. These measures can be ultimately detailed in a site AQMP (which could be a conditioned required as part of a subsequent approval).
Detail on potential air quality and odour impacts, including health related impacts for on-site employees.	The proposed operations are essentially a sealed process, with all waste handled in closed tanks. On this basis, the potential for air quality impacts on to

1 NSW DPI, Halgan Liquid Waste Management Facility (SSD 10402), EIS Adequacy Review, May 2020.

Item	Response and Report Section
	employees are expected to be low. The relevant occupational health and safety legislation and procedures will be adhered to by the proponent.
Figures showing the outcomes of modelling for all potential pollutants.	Concentration plots for all pollutants are shown in Section 5.6.
Mitigation should include the development of an air quality management plan, particularly for mitigation of potential impacts from fugitive emissions.	A comprehensive AQMP is outside the scope of this modelling assessment. Section 5.7 provides initial management measures that can be included and developed in an AQMP (which could be a conditioned requirement of any subsequent approval).
The Air Quality and Noise Assessment report should be updated to reflect the receipt of 50,000 tpa of grease trap waste in accordance with the Proposal description.	Relevant text has been updated.
The applicant should also review the EPA's requirements (Appendix A3 of the SEARs) to ensure they have been addressed.	As per Table 1.5, NSW EPA requirements have been addressed.

Table 1.3: NSW DPI Adequacy Review – Noise Items

Item	Response and Report Section
The EIS should provide detail and/or further clarification on the following:	
The number of heavy vehicles accessing the site.	A maximum of 18 vehicles have been considered as per the original assessment (15 in and 3 out).
A detailed justification for how the 'worst case' scenario was identified.	As discussed in Section 6.5, it is considered a worst-case as all potential noise sources are operating simultaneously. In reality, some noise sources (e.g. unloading pump) would operate intermittently or on an as required basis. It is noted that the proposed operation is not a noise intensive operations.
Clear identification of sensitive receiver locations. Linkage between the modelling and identified sensitive receivers.	Figure 6.1 presents further detail on the nearest industrial receptors, as reflected in the noise results table (Table 6.8).
The Air Quality and Noise Assessment report provided at Appendix G (prepared by Air Noise Environment) should be updated to reflect the receipt of 50,000 tpa of grease trap waste in accordance with the Proposal description.	Relevant text has been updated.
Include assessment of traffic noise impacts or justification for why it is not required.	The proposal is expected to result in up to 18 truck (15 in and 3 out) movements per day (or 1-2 per hour). This potential increase in truck movements is minimal compared to the expected number of vehicles movements in the surrounding industrial area. NSW Road Noise Policy specifies a 2 dB allowance to increase in $L_{Aeq,15\text{-}hour\ (7am\text{-}10pm)}$ noise levels as a result of new development. For such a threshold to be exceeded, the proposed development would need to increase current traffic levels by almost double. It is expected that 18 trucks per day would represent a

Item	Response and Report Section
	small proportion of the existing movements in the area (and certainly not two times the existing movements).

1.4 Original Information Requests

A list of the SEAR and NSW EPA requirements for the assessment are provided in Tables 1.4 to 5.5. Column 2 of the tables identify the report section where the requirement is dealt with.

Table 1.4: SEAR Number 10402 – Air and Noise Requirements

SEAR Requirements	Report Section
Air Quality and Odour	
A quantitative assessment of the potential air quality and odour impacts of the development in accordance with relevant NSW Environment Protection Authority (EPA) guidelines	Section 5
The details of buildings and air handling systems and strong justification for any material handling, processing or stockpiling external to a building	No external material handling will occur. All waste unloading will occur inside the building with roller doors closed.
A greenhouse gas emission assessment.	Greenhouse gas emissions associated with the operations are expected to be minor. Emissions will be associated with operation of fixed electrical equipment such as pumps, roller door motors, lighting and a scrubber exhaust fan. Operation of this basic industrial equipment is not expected to trigger any greenhouse gas reporting requirements. Appendix C provides further information on greenhouse gas emissions.
Details of proposed mitigation, management and monitoring measures.	Section 5.7
Noise and Vibration	
A quantitative assessment of potential construction, operational and traffic noise and vibration impacts, including cumulative impacts, in accordance with relevant NSW Environment Protection Authority guidelines and	See Section 6 for noise modelling. See Section 2.5 for discussion on construction air and noise impacts.
Details and justification of the proposed noise mitigation, management and monitoring measures.	Except for trucks arriving on site, all noisy activity and equipment will be located internal to the building. The results of the modelling show that noise impacts from the proposed operations will have a minimal impact on the neighbouring industrial premises. The nearest residential receivers are more than 1.4 km away and shielded from the site by existing industrial buildings. Noise impacts at these residential receptors are expected to be negligible.

Table 1.5: NSW EPA – Air and Noise Requirements

NSW EPA Requirements	Report Section
Air	

NSW EPA Requirements	Report Section
Identify all potential discharges of fugitive and point source emissions of pollutants and odour for all stages of the proposal. All processes that could result in air emissions must be identified and described in detail.	Section 2.3
Describe the receiving environment in detail. The proposal must be contextualised within the receiving environment (local, regional and inter-regional as appropriate). The description must include but need not be limited to: • meteorology and climate; • topography; • surrounding land-use • identified sensitive receptors; and • ambient air quality.	Section 3
Identify comparable facilities within the airshed and consider the cumulative impact of air emissions from these facilities.	Section 3.3
Assess all risks to the environment, human health and amenity associated with emissions of air pollutants, including odour, from all stages of the proposal.	Section 2.3 and 4.1
Justify the level of assessment undertaken on the basis of risk factors, including but not limited to: • proposed location; • characteristics of the receiving environment; and • type and quantity of pollutants emitted.	A quantitative Level 2 air quality modelling assessment has been undertaken. This is the highest level of assessment allowed for in the NSW Approved Modelling Methods guideline.
Include a consideration of 'worst case' emission scenarios and impacts at proposed emission limits including consideration of what emissions may be released during plant start up, shut down, non-standard operations, and emergency shut down.	See Section 2.3 for discussion on activities with air emissions, and Section 5.3 for modelled air emissions data.
Account for cumulative impacts associated with existing emission sources as well as any currently approved developments linked to the receiving environment.	See Section 3.3 discussion in air modelling results Section 5.6.
Include air dispersion modelling conducted in accordance with the Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales 2016.	Section 5
Demonstrate the proposal's ability to comply with the relevant regulatory framework, specifically the Protection of the Environment Operations (POEO) Act (1997) and the POEO (Clean Air) Regulation (2010).	Section 5.7
Detail emission control techniques/ practices, including emission sampling and monitoring, that will be employed by the proposal, and benchmark these techniques/practices against best practice emission control and management.	Section 5.7
Include a consideration of contingency options to be employed for odour mitigation where additional control is required.	Section 5.7
Noise and Vibration	
Identify any noise sensitive locations likely to be affected by activities at the site, such as residential properties, schools, churches, and hospitals. Typically the location of any noise sensitive locations in relation to the site should be included on a map of the locality.	Section 2.1
Construction noise associated with the proposed development should be assessed using the Interim Construction Noise Guideline (DECC, 2009).	Section 2.5
Operational noise from all industrial activities to be undertaken on the premises should be assessed using the guidelines contained in the Noise Policy for Industry (EPA, 2017). This assessment should be undertaken for all proposed operational times (i.e. day, evening and night). The assessment must include detail of all noise management, mitigation and monitoring measures.	Section 6
Noise on public roads from increased road traffic generated by land use developments should be assessed using the guidelines contained in the NSW Road Noise Policy (DECCW, 2011). http://www.epa.nsw.gov.au/resources/noise/2011236nswroadnoisepolicy.pdf	The proposed use will result in 15 additional trucks per day (or 1-2 trucks per hour). This minor increase in movements is expected to have negligible impact on road noise levels.

NSW EPA Requirements	Report Section
Vibration from all activities (including construction and operation) to be undertaken on the premises should be assessed using the guidelines contained in the Assessing Vibration: a technical guideline (DEC, 2006).	Potential vibration impacts from the proposed activity are expected to be negligible, based on the expected sources (e.g. fixed plant, typical truck movement).

1.5 This Report

This report summarises the methodology, results and conclusions of the air quality and noise assessments. Glossaries of terms are presented in Appendix A and B to assist the reader.

2 Proposed Development

2.1 Site Location

The development site is located at 10 Davis Road, Wetherill Park, which is zoned as General Industrial (IN1) under the Fairfield Local Environmental Plan 2013. This zone extends 300 m to the north (before turning to parkland) and greater than 1 km to the east, south, and west. The nearest sensitive receptors (residential houses) are located 1.4 km to the south, along Horsley Drive. A map indicating the zoning surrounding the site is provided in Figure 2.1.

Figure 2.1 - Development Site Location and Council Zoning

2.2 Proposed Operations

The liquid waste treatment facility will operate in the existing building at 10 Davis Road. The proposal is to refurbish the south-west portion of the building to incorporate a fully enclosed partition for use as a liquid waste treatment facility.

The facility will process up to 50 kilotonnes (kT) per annum of grease trap waste. Liquid waste tankers will enter the premise, via a roller door entry near the north-east corner of the building, and into a bunded unloading area. Prior to unloading of any liquid, the roller doors to the liquid facility will be closed. Treated grease trap material and associated sludge material will be transported off-site for beneficial reuse.

All treatment tanks and processes will be connected to a specially designed Odour Control Unit (OCU) system, venting via the rooftop of the building.

The operations are proposed to occurs 12 hours a day (core hours 4 am to 4 pm), Monday to Friday. No works would be carried out on Saturdays and Sundays unless deemed an emergency.

A maximum of 18 trucks movements are expected per day (15 in and 3 out) (or 1-2 per hour based on the proposed operating hours of 4 am to 4 pm). Outgoing trucks include sludge and treated grease trap trucks. All trucks will enter the site via Davis Road and exit via Elizabeth Street.

Should Halgan seek planning consent for the manufacturing of plastic tanks using roto-moulding equipment at the subject site, there is a potential for cumulative impacts. This component of the operations may be progressed, subject to the planning approval of the liquid waste treatment facility. For the purpose of the assessment, plastic tank manufacturing has been considered to considered to assess cumulative air and noise impacts associated with the ultimate operations.

Figure 2.2 presents the proposed site layout.

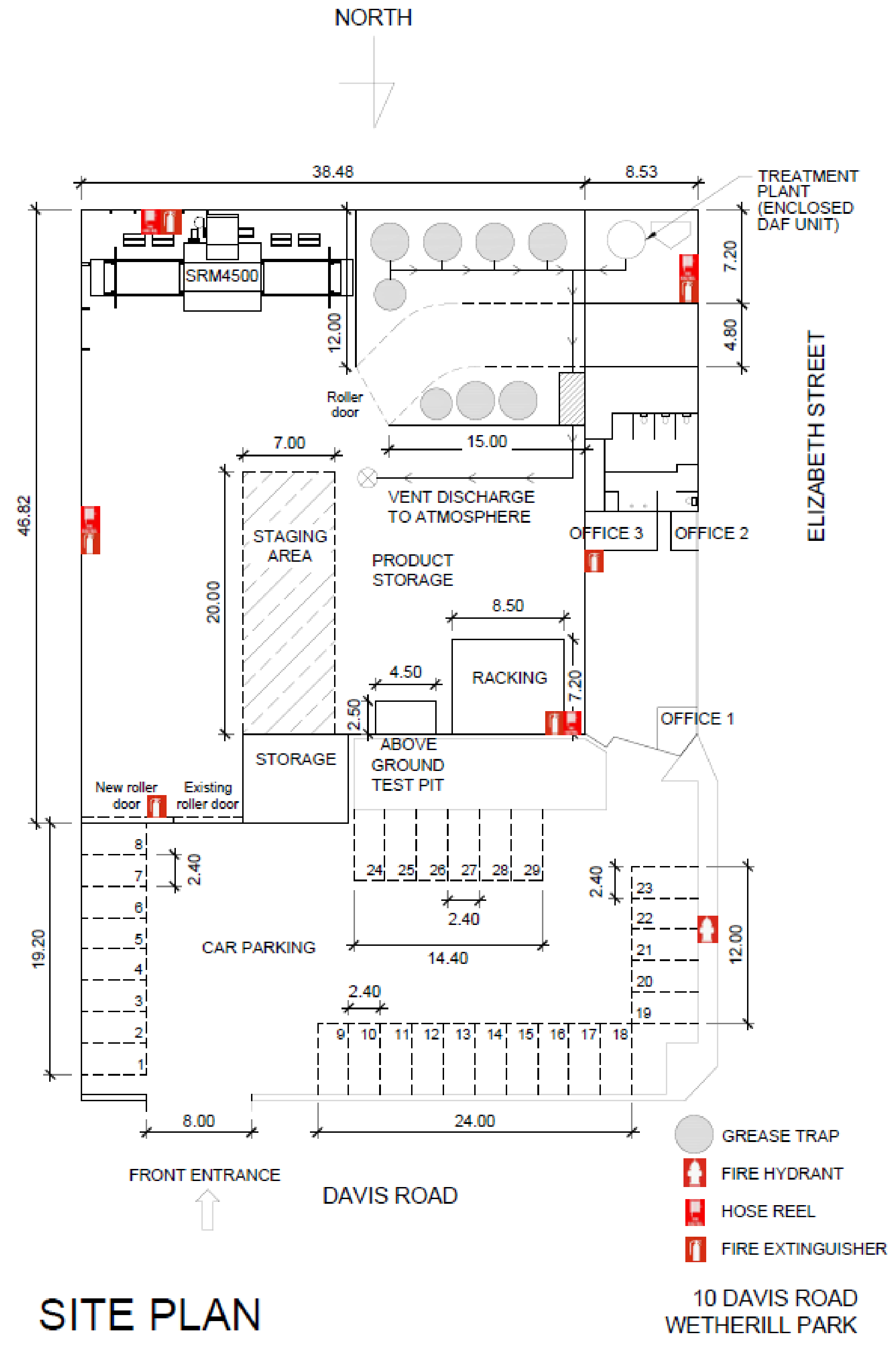


Figure 2.2 - Proposed Site Layout

2.3 Potential Air Emissions

Odour from liquid waste is considered to be the main indicator for assessing potential air quality impacts for the site. The main source of odour is associated with the venting of emissions from tanks via an OCU system. All tanks and treatment processes will be hard plumbed to the OCU system, and emissions will be vented via a rooftop exhaust.

Odour emissions are also expected to occur during the loading of trucks with treated material or sludge for transportation off site. This will occur only approximately 3 times a day (or 1.5 hours a day, assuming half an hour for loading each truck). While odour emissions during this activity will not be connected to the OCU system, the potential for odour impacts from this activity are expected to be minor due to the infrequent nature of the activity (1.5 hours per day) and low flow rate associated with emissions (< 0.02 m^3/s flow rate, based on 30 m^3 of waste and half an hour of loading).

Other potential sources of odour include spills and waste residue on vehicles and equipment. These are considered fugitive emissions, and can be minimised through appropriate odour management measures and good housekeeping.

With regards to plastic tank manufacturing activities, site visits to one of Halgan's current operations indicate that odour emissions from the use of a roto-moulding machine are negligible. Furthermore, review of the plastic bead Safety Data Sheet that would likely be used on site to produce plastic tanks (Microlene M11 UV R02) also shows no hazardous compounds are present. Therefore, should Halgan seek planning approval for plastic tank manufacturing, it is expected that activities will have minimal contribution to cumulative (liquid waste plus plastic tank manufacturing) air quality impacts from the site.

2.4 Potential Noise Emissions

The following key noise sources have been identified for the site:

- waste tanker movements;
- unloading pump; and
- OCU system exhaust fan.

The OCU exhaust fan will operate continuously, while the unloading pump will be required only during unloading/loading of trucks. A maximum of 18 waste tanker movements (15 trucks unloading and 3 trucks for outloading) are expected. This equates to 1-2 per hour for 12 hours of operations per day.

Overall, the potential operational noise impacts are considered to be minor given the nature of the sources (e.g. small fixed plant and vehicle movements). Furthermore, the nearest residential receptors are at least 1.4 km away from the site and shielded from the site by industrial buildings.

2.5 Construction Air and Noise Impacts

Potential impacts associated with construction of the proposed facility are expected to be minimal, given the large separation distance to the nearest sensitive receptors and the standard construction methods to be adopted. Construction will involve refurbishment of an existing building mainly revolving around the construction of new dividing walls and installation of treatment tanks.

On this basis, there will be minimal air emissions associated with construction. Potential noise impacts will primarily be associated with operation of hand tools. Construction activities will also occur inside the existing on-site building.

Overall, these activities have a minimal sphere of influence in terms of air and noise impacts, and are expected to have a minor impact on neighbouring industrial premises and negligible impact on the nearest residential receivers at least 1.4 km away.

3 Existing Environment

3.1 Topography

The proposed site is located in Wetherill Park, approximately 35 km west of Sydney. Figure 3.1 shows the variation in topography of the local area. Terrain heights in the 10 km area surrounding the site range between 0-140 m above sea level. Prospect Reservoir is one of the dominant features of the topography, and is marked as the flat grey area immediately north of the site (red circle). Prospect Reservoir is approximately 5.2 km^2. The ring-shaped area to the east is Prospect Hill, which was the site of historical quarry activities, indicated by the area of lower topography in the middle of the hill. Prospect Reservoir is bounded to the west by Western Sydney Parklands, which extends to the south-west to include the ridge in the lower corner of the area shown in the figure.

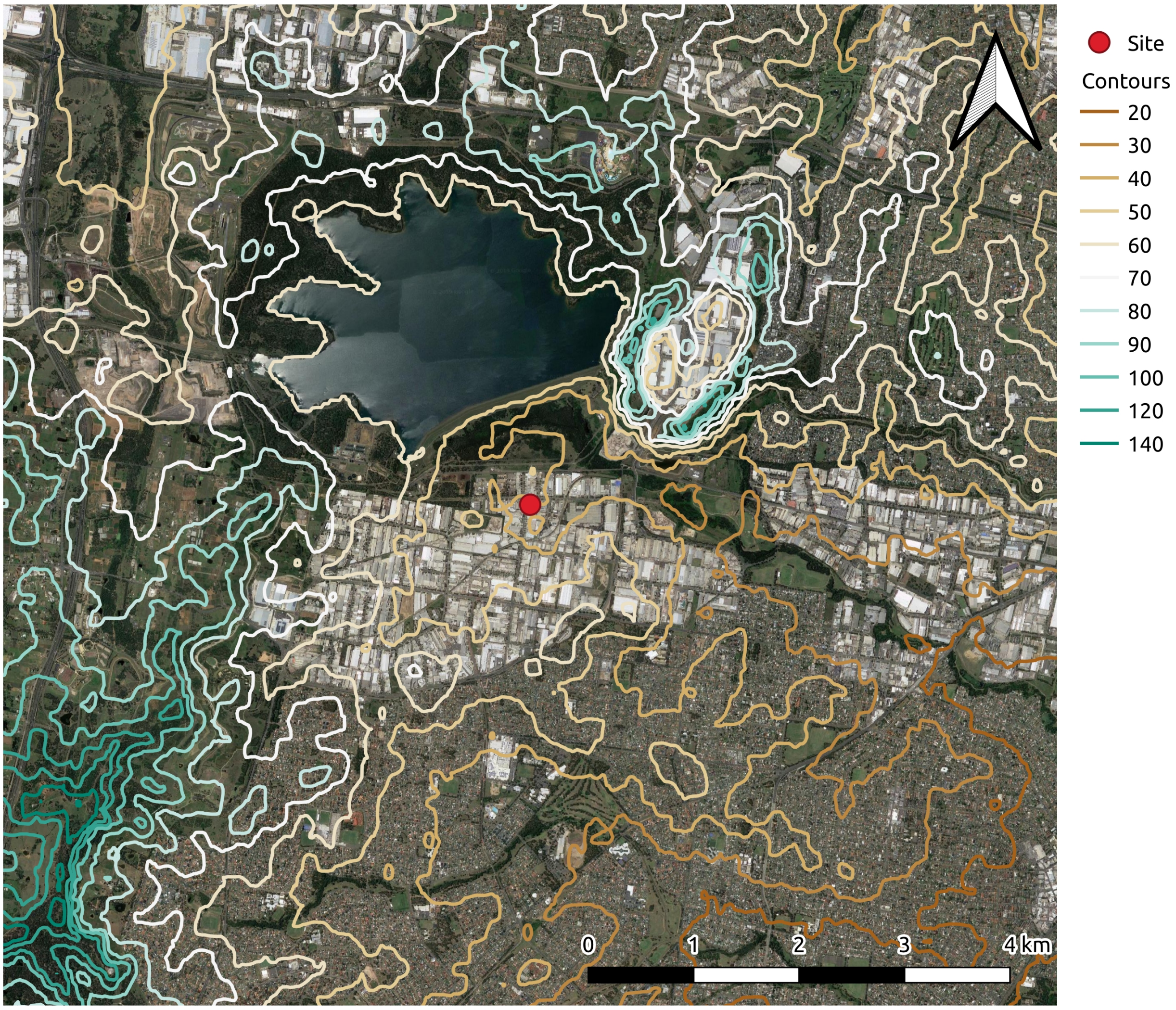
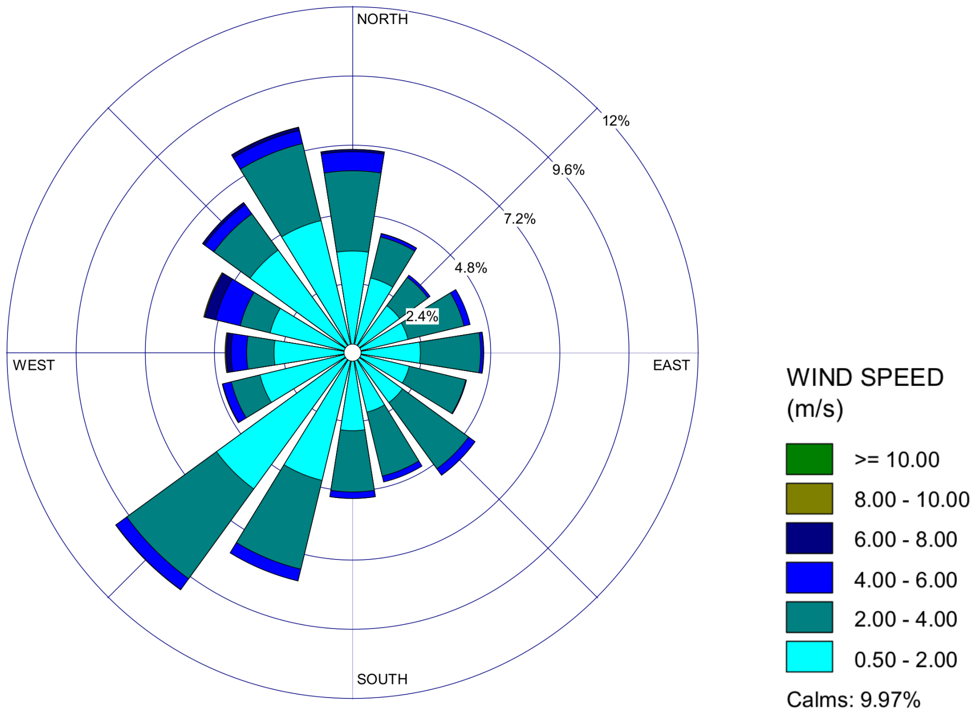


Figure 3.1 - Terrain of Proposed Site and Surrounding Area

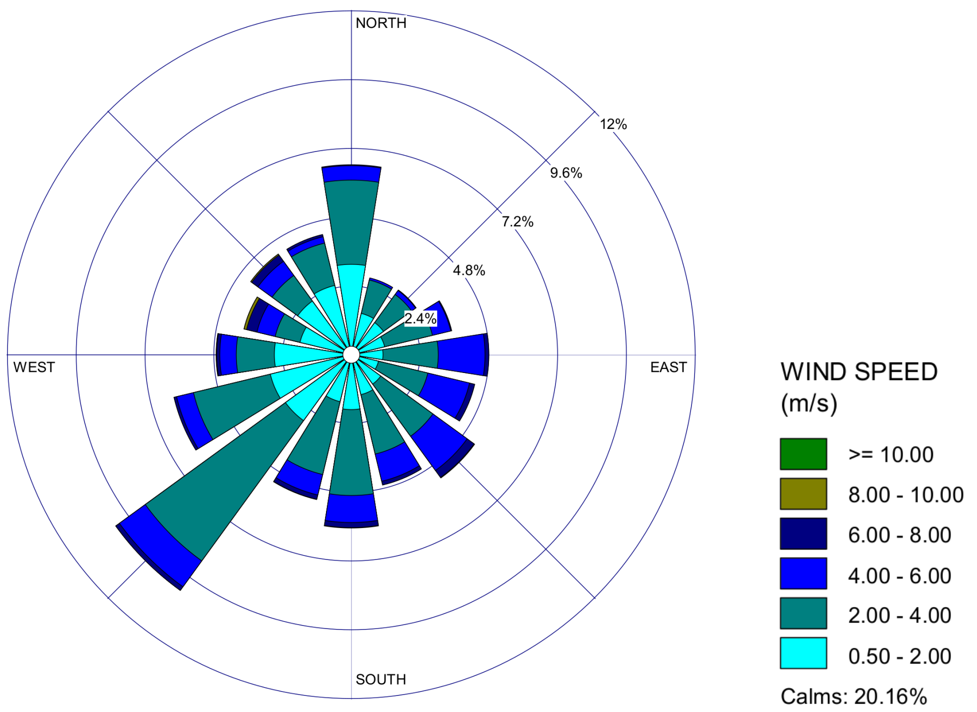
3.2 Meteorology

Sydney and the surrounding suburbs are classified as a humid subtropical climate on the Köppen-Geiger system. This climate zone is characterised by warm temperatures and precipitation throughout the year. The proposed site is equidistant from two monitoring stations: the Horsley Park Bureau of Meteorology station (ID: 067119), located 5 km to the south-west, and the NSW EPA Prospect air quality monitoring station, located 5 km to the north-north-east.

Wind roses showing 5 years of observations are presented in Figure 3.2. In terms of wind direction, the two stations are comparable, with prevailing winds from the south-west and north or north-north-west. From a wind speed perspective, Horsley Park reports a higher percentage of calm wind speeds (20.1%) than the Prospect monitoring station site (9.9%), though the percentage of low wind speeds (< 2.0 m/s) is higher at the Prospect site. Low wind speeds make up 50.7% of the observations at the Horsley Park site and 62.6% of the observations at the Prospect monitoring site.



Prospect NSW EPA Station



Horsley Park BOM station

Figure 3.2 - 2014-2018 Measured Winds

3.3 Existing Air Emission Sources

Where existing industrial uses are present, there is a potential for cumulative air quality impacts. The key air quality indicator associated with the proposed operations is odour. Based on a site visit and review of aerial photography, industrial uses in the area also expected to emit odour are summarised in Table 3.1.

Table 3.1: Nearby Air Emission Sources

Business Name	Address	Air Emission Source	Air Quality Indicators	Separation Distance
SUEZ Wetherill Park Resource Recovery Centre	20 Davis Road	General waste	Odour	450 m west of site
Cleanaway Waste Oil Recycling	6 Davis Road	Waste oil handling (e.g. unloading, storage tanks).	Odour, VOCs	160 m east of site
MD Polishing	9 Davis Road	Spraybooths for coating of furniture	Odour, VOCs	Adjacent, east of site
El Toro Smash Repair Centre	1/11 Davis Road	Two vehicle spray booths	Odour, VOCs	50 m west of site
Status Paint and Panel	26B Davis Road	Two vehicle spray booths	Odour, VOCs	50 m north of site
Xclusive Collision Repair Centre	5/12 Arnott Place	Vehicle spray booths (number unknown)	Odour, VOCs	130 m north of site

The SUEZ Wetherill Park Resource Recovery Centre and Cleanaway Waste Oil Recycling represent the nearest major industrial premises with odour emissions. Both these sites operate under Environment Protection Licences. Other industrial premises in the area associated with cumulative air quality impacts include various spray booth operations.

The potential for the addition of the proposed liquid treatment facility to increase existing odour impacts will be dependent on the extent of emissions released during operations. The proposed facility will utilise an OCU system so that all treatment and storage tank odour emissions are minimised prior to release to atmosphere. The modelling presented in Section 5 demonstrates that air pollutant concentrations from the proposed operations are expected to have minimal contribution to the existing air emission sources in the area.

4 Assessment Criteria

4.1 Air Quality Criteria

The odour assessment has been completed in accordance with the odour criteria presented in the document “Assessment and management of odour from stationary sources in NSW”, published by the NSW Office of Environment and Heritage (OEH) in November 2006.

The document comprises two parts - a technical framework (which defines the criteria) and technical notes (that discuss assessment methodologies). In the policy document, the OEH note that odour assessment criteria need to be designed to take into account the range of sensitivities to odours within the community, and to provide additional protection for individuals with a heightened response to odours. Therefore, the odour assessment criteria allows for population size, cumulative impacts, anticipated odour levels during adverse meteorological conditions and community expectations of amenity. Table 4.1 presents odour criteria for various population sizes, as specified by the OEH.

Table 4.1: NSW EPA Odour Criteria

Population of Affected Community	Odour Assessment Criteria (OU)
Rural single residence (≤)	7.0
~ 10	6.0
~ 30	5.0
~ 125	4.0
~ 500	3.0
Urban area (≥ 2000) and/or schools and hospitals	2.0

Alternatively, the NSW EPA identifies that the following equation may be applied:

$$\text{Odour assessment criterion (OU)} = (\log_{10}(\text{population}) - 4.5)/-0.6$$

The above odour criteria is applicable at sensitive receptors. The NSW EPA air modelling and odour guidelines define a sensitive receptor as:

> *“...a location where people are likely to work or reside; this may include a residential dwelling, school, hospital, office or public recreational area.”*

While the definition includes ‘where people are likely to work’, industry (or industrial premises) however are generally not considered to be sensitive receptors. The activities undertaken in industrial areas are often inherently odorous. For example, the use of paints and other coatings in panel repair facilities often results in odours being emitted beyond the boundary of the facility of the site. Despite this, these odours would not usually be considered as offensive by the neighbouring industrial uses. It is also noted that industrial uses are not mentioned in the glossary of terms for a Sensitive Receptor under the Approved Methods guideline.

For the subject site, potential odour impacts onto neighbouring industrial uses is considered to be the main focus of the air quality assessment, given that the nearest residential areas are more than 1 km away. In the absence of specific criteria for industrial areas, for the purpose of the assessment, a 7 OU peak criterion has been adopted to assess the potential for odour impacts on industrial uses. 7 OU is the highest possible criterion adopted in NSW for residential uses.

For comparison to the assessment criteria, impacts in odour units are reported as peak concentrations (i.e. approximately one second average) and as the 99th percentile of predicted concentrations based on a Level 3 odour assessment methodology.

4.2 Noise Criteria

4.2.1 Overview

The acoustic assessment has been completed in accordance with the procedure identified in the *NSW Noise Policy for Industry (2017) (NPI),* published by the NSW Environment Protection Authority. The policy sets two separate noise criteria to meet environmental noise objectives: one to account for intrusive noise and the other to protect the amenity of particular land uses. The derivation of the two sets of criteria in accordance with the NSW NPI are presented below.

4.2.2 Comment on Background Noise Monitoring

It is noted that, given the low risk of noise impacts to sensitive receptors due to a large separation distance (1.4 km), continuous baseline noise monitoring was not undertaken. The monitoring is usually undertaken for the determination of a Rating Background Level[2] (RBL) upon which intrusiveness noise criteria is derived. However, the NSW NPI also defines minimum RBL values that are to be adopted if no monitoring is completed or if measured levels are lower than the defined minimum values. For the purpose of the assessment, the minimum RBL values have been adopted as a conservative approach.

Based on the NSW NPI methodology, noise criteria for industrial premises is not dependent on baseline noise monitoring data being available. Therefore, no monitoring was considered necessary around the boundary of the site.

4.2.3 Intrusiveness Noise Level

According to the NPI, intrusive noise refers to noise that exceeds background noise levels (as defined by the Rating Background Level or RBL) by more than 5 dB. The project intrusiveness noise level seeks to protect an area against significant change in noise levels. The intrusiveness criteria for the assessment has been summarised in Table 4.2 and applies only to sensitive receptors, such as residential dwellings.

Table 4.2: Derived Intrusive $L_{Aeq,15\text{-}minute}$ Noise Criteria

2 The RBL is the overall, single-figure background level representing each assessment period (day/evening/night). The RBL is defined by the lowest 10th percentile $L_{A90,15\text{-}minute}$ typically measured over a 1 week period.

Period	Rating Background Level dB(A)	Intrusiveness Noise Criteria $L_{Aeq,15\text{-}minute}$
Day	35	40
Evening	30	35
Night	30	35
a RBL values are based on the minimum levels defined in the NSW NPI.		

It is noted that the nearest residential dwellings are 1.4 km away and shielded from the site by existing industrial buildings. Therefore, the potential impacts from the site operations are expected to be negligible.

4.2.4 Amenity Noise Level

The project amenity noise levels aims to protect an area against cumulative noise impacts from industry and to maintain the acoustic amenity for specific land uses. Unlike the intrusiveness noise level which focuses on residential uses, the amenity noise level applies to all types of land uses (e.g. commercial, industrial and residential).

The project amenity noise level is defined as follows:

> Project amenity noise levels = recommended amenity noise level for land use of interest minus 5 dB(A)

The recommended amenity noise level for a particular land use is presented in Table 2.2 of NPI and copied below for ease of reference.

Table 4.2: Recommended Amenity Noise Levels

Receiver	Noise Amenity Area	Time of Day	Recommended Amenity Noise Level $L_{Aeq,period}$ dB(A)
Residential	Rural	Day	50
		Evening	45
		Night	40
	Suburban	Day	55
		Evening	45
		Night	40
	Urban	Day	60
		Evening	50
		Night	45
Hotels, motels, caretakers' quarters, holiday accommodation, permanent resident caravan parks	See column 4	See column 4	5 dB(A) above the recommended amenity noise level for a residence for the relevant noise amenity area and time of day
School classroom - internal	All	Noisiest 1-hour period when in use	35

Receiver	Noise Amenity Area	Time of Day	Recommended Amenity Noise Level $L_{Aeq,period}$ dB(A)
Hospital ward Internal External	 All All	 Noisiest 1-hour Noisiest 1-hour	 35 50
Place of worship - internal	All	When in use	40
Area specifically reserved for passive recreation (e.g. national park)	All	When in Use	50
Active recreation area (e.g. school playground, golf course)	All	When in Use	55
Commercial premises	All	When in Use	65
Industrial premises	All	When in Use	70
Industrial interface (applicable only to residential noise amenity areas)	All	All	Add 5 dB(A) to recommended noise amenity area

The receivers relevant to this noise assessment include residential dwellings in an Urban noise amenity area. Based on this, the recommended amenity noise levels are 60 dB(A), 50 dB(A) and 45 dB(A) for the day, evening and night, respectively.

Using these recommended levels and a minus 5 dB(A) adjustment as required by the NSW NPI, Table 4.3 presents the project amenity noise levels.

Table 4.3: Project Amenity Noise Levels

Period	Recommended Amenity Noise Level dB(A)	Adjustment dB(A)	Project Amenity Noise Level dB(A)	
			$L_{Aeq,period}$	$L_{Aeq,15\text{-}minute}$
Residential				
Day	60	-5	55	58
Evening	50	-5	45	48
Night	45	-5	40	43
Industrial				
Industrial Premises	70	-5	65	68

[a] As per the NPI requirements, the $L_{Aeq,period}$ amenity noise level can be converted an an $L_{Aeq,15\text{-}minute}$ noise level using a plus 3 dB(A) correction. An alternative correction may be considered with robust evidence.

4.2.5 Project Noise Trigger Level

As required by the NSW NPI, the lower of the intrusive and amenity noise levels is to be adopted for an assessment. The final levels are referred to as the project noise trigger levels, which are summarised in Table 4.4.

Table 4.4: Assessment Noise Criteria

Period	Project Noise Trigger Level	
	Residential	Industrial
Day	40 $L_{Aeq,15\text{-}minute}$	68 $L_{Aeq,15\text{-}minute}$
Evening	35 $L_{Aeq,15\text{-}minute}$	68 $L_{Aeq,15\text{-}minute}$
Night	35 $L_{Aeq,15\text{-}minute}$	68 $L_{Aeq,15\text{-}minute}$

The noise criteria applies at the most-affected point (i.e. highest noise level) on or within the residential property boundary. If the actual property boundary is more than 30 metres from the house, then the criteria applies at the most-affected point within 30 m of the house.

5 Air Dispersion Modelling

5.1 Modelling Methodology

Atmospheric dispersion modelling involves the mathematical simulation of the dispersion of air contaminants in the environment. The modelling utilises a range of information to estimate the dispersion of pollutants released from a source, including:

- meteorological data for surface and upper air winds, temperature and pressure profiles as well as humidity, rainfall, cloud cover, and ceiling height information;
- emissions parameters including source location and height, source dimensions and physical parameters (e.g. exit velocity and temperature) along with pollutant mass emission rates;
- terrain elevations and land use both at the source and throughout the surrounding region;
- the location, height, and width of any obstructions (such as buildings or other structures) that could significantly impact on the dispersion of the plume; and
- sensitive receptor locations and heights.

For the purpose of the assessment, meteorological modelling has been undertaken using The Air Pollution Model (TAPM) and CALMET to predict localised meteorological conditions. The meteorological data derived from these models has been used as an input for the CALPUFF dispersion modelling.

5.1.1 TAPM

A site-specific meteorological data set has been determined using the prognostic model TAPM. Prognostic models permit the development of localised meteorological data sets based on synoptic weather conditions. The model predicts the regional flows important to dispersion, such as sea breezes and terrain-induced flows, against a background of larger-scale meteorology provided by synoptic analyses. The output of this model provides a meteorological data set suitable for introduction into a diagnostic meteorological model, such as CALMET. Where good quality prognostic data is available for a site, this methodology is the recommended approach for the modelling of contaminant concentrations using CALMET[3].

5.1.1.1 Choice Of Model Year

The year 2018 was chosen for this assessment as it experienced typical wind conditions for the area. Table 5.1 shows the wind conditions for five recent observational years; wind roses for the same period are shown in Figure 5.1. As shown in the table, the year 2018 experienced typical wind speed and direction conditions. Importantly, the 2018 observations of calm and low wind speeds (< 1.5 m/s) are within 1% of average conditions over the five years surveyed. These conditions are critical

3 TRC Environmental Corporation (March 2011) ‘Generic Guidance and Optimum Model Settings for the CALPUFF Modelling System for Inclusion into the ‘Approved Methods for the Modelling and Assessment of Air Pollutants in NSW, Australia’, prepared on behalf of the NSW Office of Environment and Heritage.

for this assessment as the sources are near ground level and a high proportion of calm and near-calm conditions contribute to poor dispersion of emissions.

Table 5.1: Percentage of Wind Conditions in Each Wind Speed Category

Year	Calm (0-0.5 m/s, %)	0.5-1.5 m/s (%)	>1.5 m/s (%)
2014	9.5	35.4	53.6
2015	10.3	38.1	51.1
2016	10.2	35.7	53.6
2017	10.1	35.1	54.2
2018	9.7	35.0	54.8
Average	**9.9**	**35.8**	**53.4**

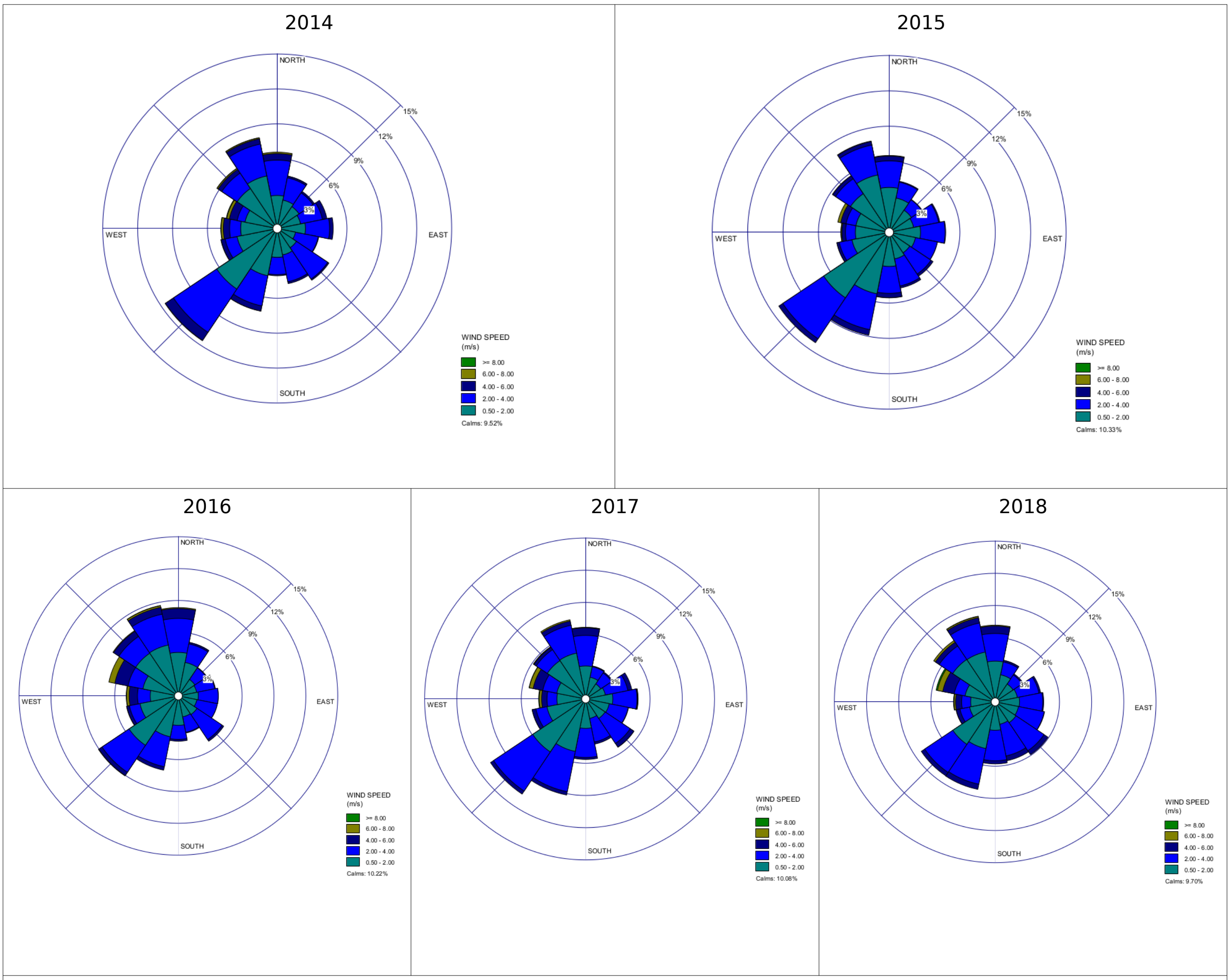


Figure 5.1 - Prospect AQ Station Wind Roses, 2014 - 2018

5.1.1.2 TAPM Settings

The 3D prognostic data was derived using TAPM (Version 4.05). The model was configured with a series of nested grids chosen to provide an appropriate communication and transfer of information from the broad synoptic to the local scale. The model was configured to use a domain consisting of 25 x 25 x 25 grid points with nesting spacings of 30 km, 10 km, 3 km, and 1 km. Table 5.2 presents a summary of the TAPM settings.

Table 5.2: TAPM Settings

Setting/Input	Value
Latitude, Longitude	33° 50’ S, 150° 54 E
Easting X, Northing Y (m)	305675, 6254340
Date (year)	2018
Grid Points	25 x 25
Outer Grid Spacing	30 km x 30 km
Vertical Grid Levels	25 grid levels 10, 25, 100, 150, 200, 250, 300, 400, 500, 600, 750, 1000, 1250, 1500, 1750, 2000, 2500, 3000, 3500, 4000, 5000, 6000, 7000, 8000
Number of Grid Domains	4 (30 km, 10 km, 3 km, 1 km)

5.1.2 CALMET

As discussed in the previous section, a three-dimensional prognostic data set derived from the TAPM model was input to CALMET to predict meteorological conditions at the development and surrounding area. The following sections provide an overview of the data utilised in the CALMET modelling, along with details of some of the key parameters selected to establish calculation limits within CALMET.

5.1.2.1 Vertical Stations

CALMET was initialised with a total of 10 vertical layers with boundaries at 20 m, 40 m, 80 m, 160 m, 320 m, 640 m, 1,200 m, 3,000 m, and 4,000 m respectively. The vertical levels used in the modelling were selected to provide the model with the ability to predict atmospheric conditions at a range of heights. A greater resolution of vertical heights has been adopted nearer to the ground, given the ground level sources considered in the assessment.

5.1.2.2 Terrain And Land Use Data

Terrain data for the area surrounding the development was obtained from the Digital Elevation Model (DEM) 1 second grid of Australia generated from the Shuttle Radar Topography Mission (STRM) that flew in 2000. Data for a 10 km x 10 km area has been extracted for use in the modelling.

The TERRAD value in CALMET is used to determine the radius of influence for terrain features within the model domain. The TERRAD value has been calculated based on the rule ‘ridge-to-ridge divided by 2, rounded up', recommended by the NSW Office of Environment and Heritage[4]. A TERRAD value of 2 km has been adopted based on the surrounding topography and ridges.

Land use data was also created based on NSW Land Use data and incorporated into the CALMET model. Where land use categories do not directly correspond with the CALMET land use input file categories, satellite imagery has been reviewed to determine the most appropriate land use category. Figures 5.2and 5.3 present the modelled terrain and land use in CALMET.

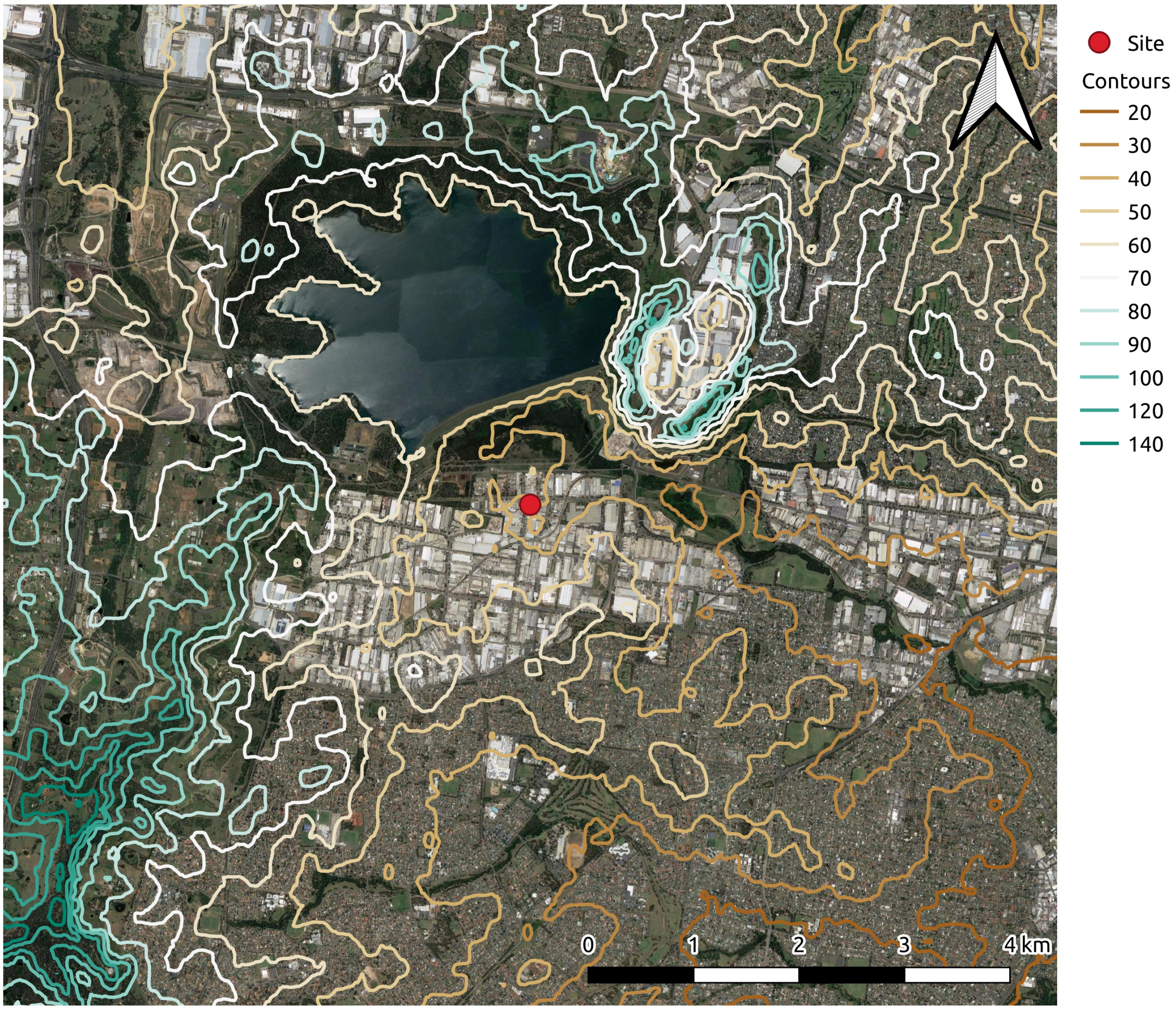


Figure 5.2 - Modelled Terrain

4 TRC Environmental Corporation (March 2011) 'Generic Guidance and Optimum Model Settings for the CALPUFF Modelling System for Inclusion into the 'Approved Methods for the Modelling and Assessments of Air Pollutants in NSW, Australia' prepared on behalf of the NSW Office of Environment and Heritage.

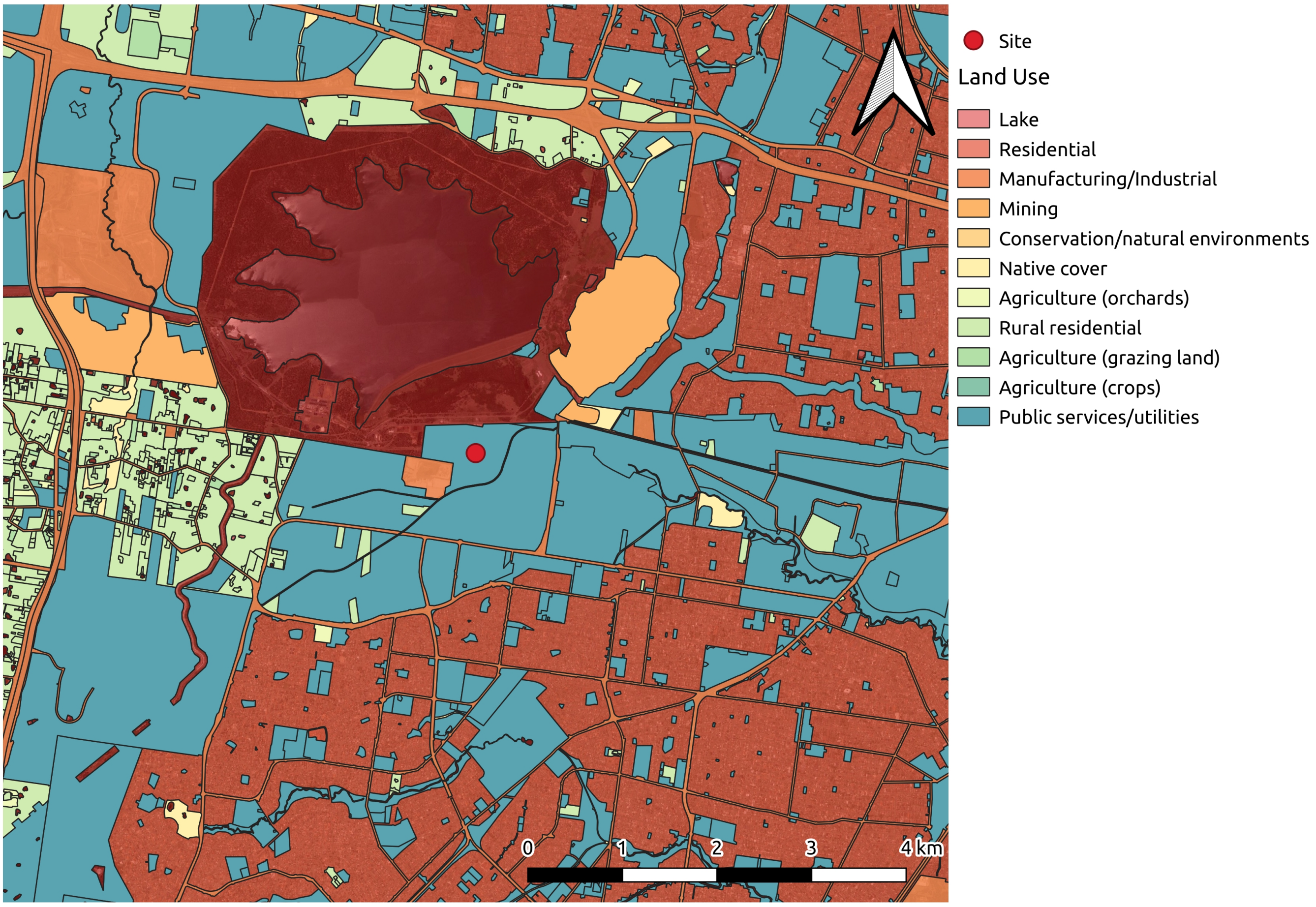


Figure 5.3 - Modelled Land Use

5.1.3 CALPUFF Dispersion Modelling

The CALPUFF modelling system treats emissions as a series of puffs. These puffs are then dispersed throughout the modelling area and allowed to grow and bend with spatial variations in meteorology. In doing so, the model is able to retain a memory of the plume's movement throughout a single hour and from one hour to the next while continuing to better approximate the effects of complex air flows.

CALPUFF utilises the meteorological processing and prediction model CALMET to provide three dimensional wind field predictions for the area of interest. The final wind field developed by the model (for consideration by CALPUFF) includes an approximation of the effects of local topography, the effects of varying surface temperatures (as is observed in land and sea bodies) and surface roughness (resulting from varied land uses and vegetation cover in an area). The CALPUFF model is able to resolve complex terrain influences on local wind fields including consideration of katabatic flows and terrain blocking.

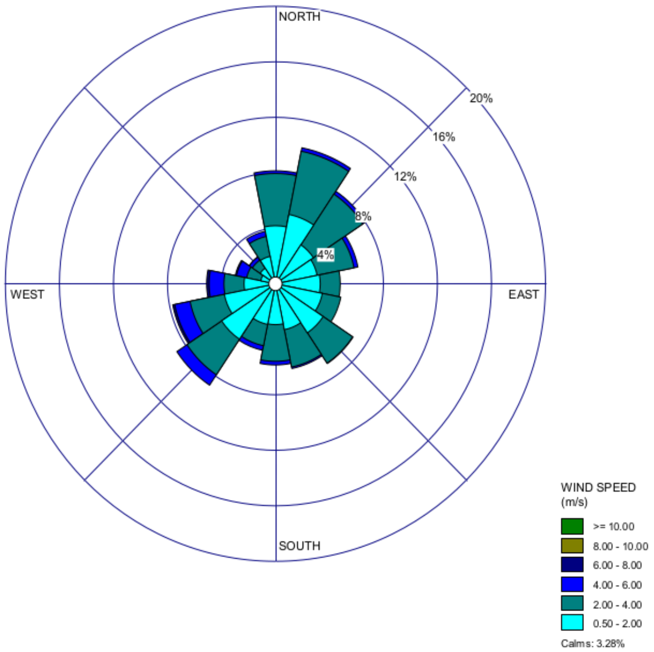
5.1.4 CALPOST

Post processing of modelled emissions is undertaken using the CALPOST package. This allows the rigorous analysis of pollutant predictions generated by the CALPUFF system. In particular, CALPOST is able to provide an analysis of predicted pollutant concentrations for a range of averaging periods from 1 hour to 1 year.

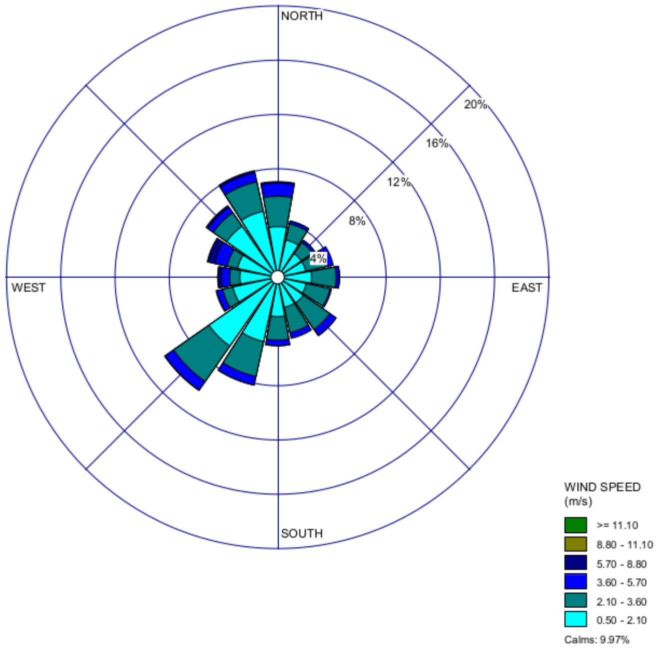
5.2 Meteorological Predictions

5.2.1 Wind Predictions

Predicted 2018 wind conditions have been compared to measured wind data (2014-2018) at the Prospect NSW EPA air quality station (5 km north-north-east of the development site). Figure 5.4 shows wind roses for the measured and predicted data.



2018 CALMET Prediction (Prospect AQ site)



2014-2018 Measured (Prospect AQ site)

Figure 5.4 - CALMET Predicted Wind Rose (2018) vs Measured Wind Rose (2014-2018)

Predicted and measured wind roses are noted to be comparable at the Prospect NSW EPA monitoring station. The wind roses show a dominant south-westerly component. The largest discrepancy between the predicted and measured wind field is in winds from the north-north-west and north-north-east, with 8% measured to the north-north-west and 1% predicted to the north-north-east. Projected and measured winds in other directions show similar distributions.

With regard to wind speed, the measured and observed low wind speeds (0.5-2.0 m/s) in all directions are nearly identical (51% vs 52%). Calms winds, which are associated with poorer dispersion outcomes, are not a major feature of the site. They account for 9% of the observed winds in the five years of measurements, and 3% of the modelled conditions.

Overall, the predicted meteorological data is considered an accurate reflection of site conditions and is appropriate for the assessment of potential air quality impacts from the proposed site.

5.2.2 Atmospheric Stability Class

The amount of turbulence in the ambient air has a major effect upon the rise and dispersion of emissions. The amount of turbulence in the atmosphere is often described using a series of six Pasquill stability classes: A, B, C, D, E, and F. Of these, Class A denotes the most unstable or most turbulent conditions and Class F denotes the most stable or least turbulent conditions. Figure 5.5 provides a summary of the predicted atmospheric stability conditions for the site. The colours indicate the number of times a particular stability class was predicted in the model year.

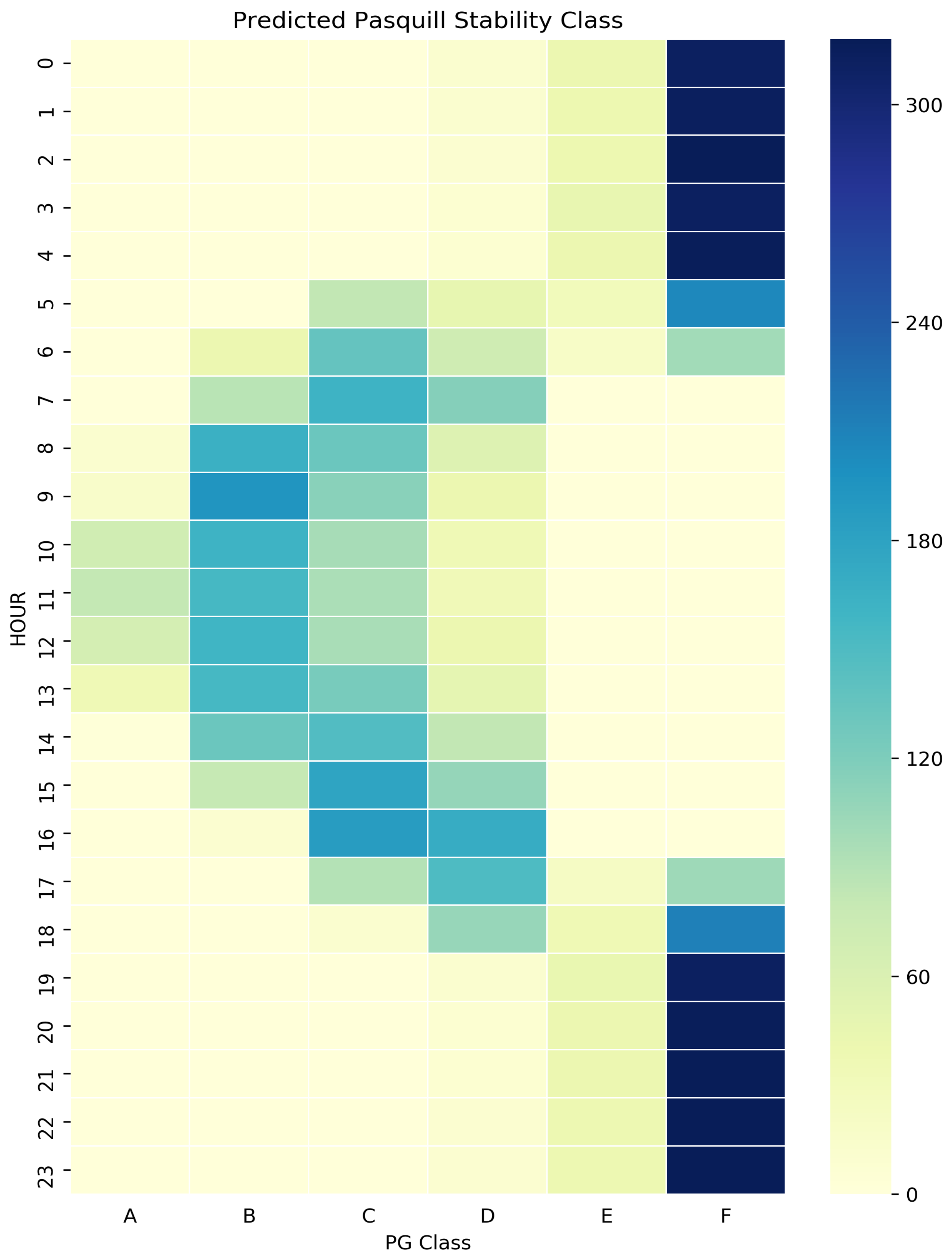


Figure 5.5 - Pasquill Stability Classe

5.2.3 Mixing Heights

Figure 5.6 presents a plot showing predicted mixing heights for each hour of the day. Areas in grey and white represent overnight and daytime hours, respectively. The range and pattern of predicted mixing heights is considered typical for the location. Higher mixing heights occur during the daytime, while lower mixing heights occur during the night when stable conditions are dominant and temperature inversions occur.

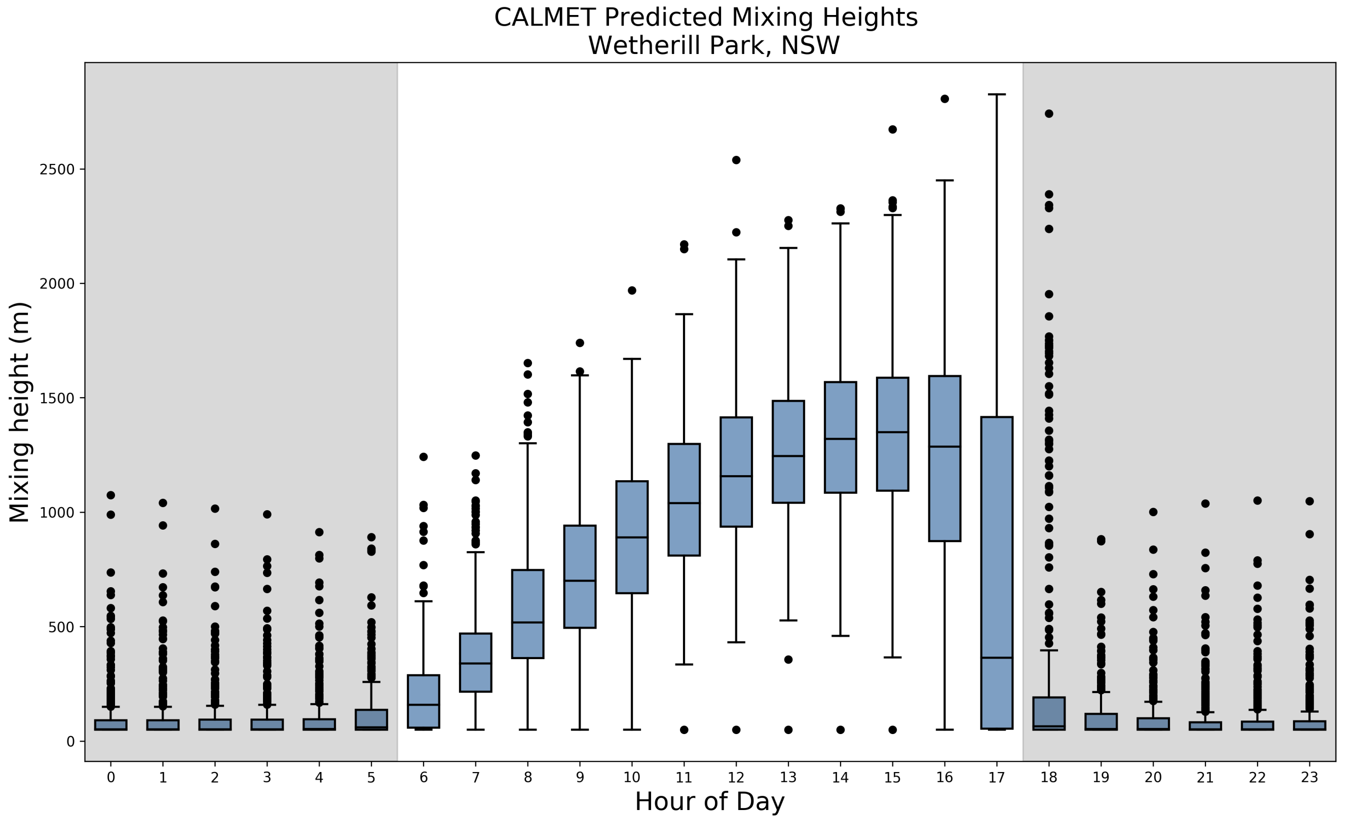


Figure 5.6 - Predicted Mixing Heights

5.2.4 Temperature

Figure 5.7 presents a plot showing predicted temperatures for each hour of the day. The range and pattern of predicted temperatures are considered typical for airsheds in the region. As expected, higher temperatures occur during the day time, while lower temperatures occur overnight when there is no incoming solar radiation. The average predicted temperature at the site is 18°C, which matches the measured average temperature for the same year at the Prospect monitoring station.

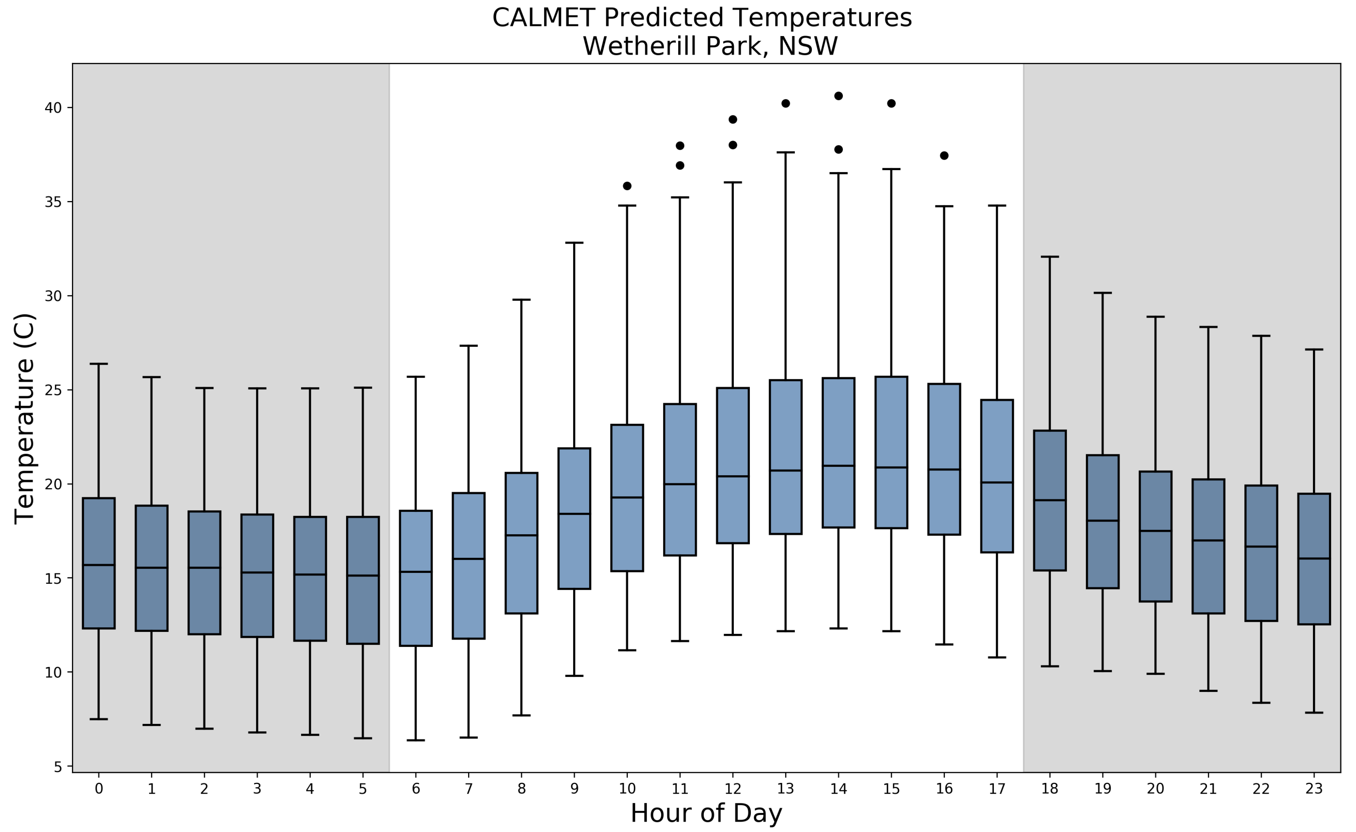


Figure 5.7 - Predicted Temperatures

5.2.5 Summary of Outcomes

A review of the predicted data sets for the year 2018 indicate that the outcomes from the CALMET model are suitable for predicting potential air quality impacts from the proposed development. Key meteorological parameters, including wind field, stability class and temperature, are considered to be representative of the subject site and surrounding area based on a comparison to measured data.

5.3 Air Emissions Data

5.3.1 Source of Data

Air emissions data has been sourced from previous sampling undertaken by Air Noise Environment for similar liquid waste facilities located in Wacol (Brisbane) and Glendenning, also involving the treatment of grease trap.

It is noted that this data has been previously used for State Significant Projects in NSW as follows:

- Application Number SSD-6767 – Glendenning Liquid Waste Facility; and
- Application Number SSD-6767-Mod1 – Modification 1 to increased throughput at Glendenning Liquid Waste Facility.

The above projects were subsequently approved. The Environment Protection Licence for the Glendenning site (EPL No. 21053) allows for the site to store and process the following liquid waste through non-thermal treatment processes:

- J100 – waste mineral oils unfit for their original intended use;
- J120 – waste oil/hydrocarbons mixtures/emulsions in water;
- K120 – liquid food waste;
- K110 – grease trap waste.

The proposed waste stream for the Halgan facility is K110 grease trap waste. The overall operations in relation to waste streams, storage and processing methods are comparable between the existing Glendenning and proposed Halgan facility. This includes receival of waste, storage, non-thermal separation and emissions via an odour control unit.

The following sections present a summary of the sampling details conducted at the Glendenning facility which is presented in full in the air quality report issued by Air Noise Environment in 8 April 2019[5] (and currently published online at the NSW Planning Portal website[6]).

5.3.2 Previous Sampling

Table 5.3 presents the sampling methods adopted. Tables 5.4 presents a summary of the odour and sampling results during unloading/loading of liquid waste. Emissions during unloading are expected to be higher compared to emissions from undisturbed storage tanks. The VOC sampling did not identify any VOCs in the organic waste (all results were below the detection limit).

Table 5.3: Summary Of Emission Monitoring Methods

Measurement Parameter	Location	Method Equivalency	NATA Accredited
Sampling Positions	Scrubber Inlet	**AS4323.1-1995** Method 1: selection of sampling positions	Yes
Velocity, Flowrate and Temperature	Scrubber Inlet	**AS 4323.2-1995** “Stationary Source Emissions Method 2: Determination of Total Particulate Matter - Isokinetic Manual Sampling - Gravimetric Method” **TM-2** USEPA (2000) Method 2	Yes
Moisture Content	Scrubber Inlet	**USEPA Method 4** Determination of Moisture Content in Stack Gases	Yes
Speciated Organic Compounds	Scrubber Inlet, Scrubber Outlet	**NIOSH Method 1500** Sampling onto carbon tubes with analysis by Gas Chromatograph	Yes
Odour	Scrubber Inlet, Scrubber Outlet	**AS/NZS 4323.3:2001** Stationary Source Emissions - Determination of Odour Concentration by Dynamic Olfactometry NSW (**OM-7**)	Yes

5 Air Noise Environment, Air and Noise Assessment – Increased Throughput, Liquid Waste Facility, Glendenning, 8 April 2019, Ref: 4022.4-Stage1-report02.pdf.

6 NSW Government, Glendenning Liquid Waste Facility, Modification 1 Amend Limits of Consent to Increased Used Oil/Industrial Oily Water Throughput, https://www.planningportal.nsw.gov.au/major-projects/project/13721, 2019.

Table 5.4: Odour Sampling Results (OCU Inlet and Outlet During Grease Trap Unloading)

Test	Sampling Location	Odour Concentration (OU)	Odour Emission Rate (OUV/s)
1	OCU Inlet	2670	1027.2
1	OCU Outlet	73	27.9

5.3.3 Adopted Emission Rates

Based on the emissions data above, Table 5.5 presents the modelled odour emissions data considered in the modelling.

It is noted that the odour emission rate at the OCU outlet was 27.9 OUV/s (which represented a 97% reduction from 1027.2 OUV/s at the inlet). To allow for some conservatism in the modelling, a total odour emission rate of 100 OUV/s has been adopted for the proposed rooftop OCU outlet.

Table 5.5: Modelled Rooftop Vent Emissions

Source	X (km)[a]	Y (km)[a]	Relative Height (m)[b]	Diameter (m)[c]	Exit Velocity (m/s)[d]	Temp (°C)[e]	Emission Rate (OUV/s)
OCU Rooftop Exhaust	305.896	6253.927	9.0 m (1.0 m above roof)	0.3	5.0	Ambient	100

a Centre of existing building

b Assumed height above roof

c Assumed exit diameter for a similar OCU and exhaust system

d Conservative velocity estimate for a mechanically vented OCU system

e Ambient emission temperature expected (no thermal treatment involved in proposed process)

5.4 Modelling Scenario

A highly conservative modelling scenario has been adopted whereby liquid waste loading is occurring continuously 24/7. In practice, loading will occur intermittently (1-2 trucks per hour) between the hours of 4 am and 4 pm on Monday to Friday.

5.5 Modelled Receptors

The air modelling has been undertaken to identify air quality impacts on neighbouring industrial premises. A detailed receptor grid (300 m x 300 m, 5 m spacing) plus boundary receptors has been adopted to ensure sufficient resolution for identifying the highest off-site concentration. Due to the effects of building downwash, the highest concentrations are expected to occur in close proximity to the development site.

Figure 5.8 presents the 5 m gridded receptor domain. Results for off-site concentrations (at and beyond boundary) have been extracted from an analysis of the 5 m gridded domain.

Figure 5.8 - Gridded Receptor Domain

5.6 Modelling Results

Table 5.6 below presents the predicted air modelling results for odour.

Table 5.6: Predicted Odour Results

Location	Highest Predicted Concentrations Off-Site (mg/m^3)	Averaging Time	Criteria
Highest Off-site	0.75	99^{th} Percentile, Peak	7 OU
Western Boundary	0.70		
Northern Boundary	0.52		
Eastern Boundary	0.53		
Southern Boundary	0.69		

The NSW EPA does not define odour criteria for nearby industrial premises. The 7 OU criterion has been adopted as the highest possible value with NSW applied to residential areas (i.e. single rural dwellings), as discussed in Section 4.1. The modelling shows compliance by a significant margin for odour assuming an appropriately designed OCU system is implemented on site. The predicted peak 99^{th} concentration is also below the limit of detection (1 OU), therefore, the contribution to odour in the area can be considered negligible.

Figure 5.9 presents a predicted ground level concentration plot for odour. It is noted that the highest off-site concentrations are predicted at a point immediately south of the development site. This point represents a 'hot spot' associated with the affect of building downwash, whereby pollutants are forced to the ground as a result of wind-induced turbulence in the wake of a building structure. A review of the concentration plots shows that predicted concentrations at other nearby industrial premises are more than two times lower than the highest prediction immediately to the south.

Finally, it is noted that the modelling is highly conservative by assuming the following:

- 24/7 waste loading activity;
- A relatively low exit velocity of 5 m/s (typical mechanically exhausted OCU vents are in the range of 10 m/s or more);
- A 90% odour reduction efficiency for the OCU – commissioning testing at an existing OCU indicates an odour reduction efficiency of up to 97%.

Given the above assumptions, it is expected that ground level concentrations would be lower in practice.

Figure 5.9 - Predicted Ground Level Odour Concentration Plot

Scenario: Continuous Emissions from Roof OCU Vent	**Averaging Time:** Peak, 99th Percentile
Location: Wetherill Park	**Units:** Odour Unit
Pollutant: Odour	**Criteria:** 7.0

5.7 Odour Mitigation and Management Measures

The air dispersion modelling assumes that an Odour Control Unit (OCU) is installed at the liquid waste treatment facility. All storage tanks are proposed to be hard plumbed to the OCU such that all odorous emissions during unloading will be vented through the OCU and out a rooftop exhaust. There are a range of OCU systems that can be utilised to assist in the reduction of odour emissions. These systems include activated carbon, biological treatment and wet scrubbers. Table 5.7 presents a brief summary of the OCU systems which can be used to effectively treat odour.

Table 5.7 - Comparison of Major Odour Control Technologies for the Waste Water Industry

Control Type	Advantages	Disadvantages
Activated Carbon	Removes a diverse mix of complex odours and VOC. Highest odour (ou) removal efficiencies compared to other technologies. Effective under variable odour loads. Minimal ancillary equipment and maintenance	Flammable material. Higher initial costs.
Biological treatment (trickling filters, scrubbers)	Removes a diverse mix of complex odours and compounds. Clean/sustainable process utilising micro-organisms.	Larger amounts of space required. Increased complexity in design and maintenance required in ensuring effectiveness of micro-organisms.
Wet Scrubbers	Low capital costs. Low space requirements.	Greater levels of maintenance required due to instrumentation and chemicals required.

Further design of the OCU is normally undertaken at the detailed design phase of a project. It is recommended that these details are determined through discussions with the OCU supplier. Activated carbon is recommended for the reasons stated in Table 5.7. With regards to maintenance, activated carbon is easily replaceable in the event that breakthrough occurs (point in time when the carbon filter reaches capacity). Furthermore, previous testing by ANE has shown high reduction efficiencies (see Section 5.3). Based on previous sampling at the grease trap liquid waste facility in Glendenning, the pre-treated odour emissions during grease trap loading is approximately 1000 OUV/s. The use of an activated carbon filtration system achieved a 97% reduction based on post-treatment sampling.

Biological treatment systems are effective systems however, one of the main drawbacks is that large space requirements are needed for the same amount of odour removal provided by other control technologies (which is a key issue for a small industrial lot). Wet scrubbers have low space requirements, however, there are greater levels of maintenance required including the use of chemicals and post-handling of contaminated water.

The proposed operations must comply with the relevant provisions of the Protection of the Environment Operations (POEO) Act (1997) and the POEO (Clean Air) Regulation (2010). Overall, these policies seek to protect and enhance the environment of NSW in areas such as air quality. The

POEO (Clean Air) Regulation also prescribes emissions standards for various industrial emission sources, though none of the categories directly related to the operation of the proposed liquid treatment facility. The proposed OCU is a key mitigation measure to assist in achieving appropriate air quality outcomes consistent with the aforementioned policies, as also demonstrated by the predicted modelling compliance. Even though an OCU is proposed to minimise process emissions from storage tanks, attention must also be given to general odour management techniques and measures to further control odour emissions from the site. These measures should be implemented on a day-to-day basis. A list of recommended management procedures are presented below:

- implementation of a waste acceptance evaluation procedure to ensure all waste received on site meets the relevant criteria;
- closure of rollers doors during all waste unloading activity to minimise the potential for fugitive odour emissions;
- cleaning of vehicles where necessary prior to departure from site;
- use of odour neutralisers;
- availability of spill kits to allow for prompt containment of spills which could be odorous;
- regular inspection and cleaning of any inground sumps;
- daily odour survey observations around the boundary of the site;
- work procedures in the event of any particularly odorous loads (e.g. use of odour neutraliser, identifying waste source and investigating possibility of treating off-site or diverting to another waste facility);
- additional OCU medium on-site at all times (e.g. additional activated carbon to be stored on site and used once the OCU has reached capacity).

It is recommended that an Odour Management Plan be developed as part of the proposed operations to ensure that on-site activities are undertaken in a such away as to minimise odour impacts onto neighbouring industrial premises.

6 Noise Assessment

6.1 Modelling Methodology

For the purposes of predicting impacts associated with noise emissions from the proposed development on nearby sensitive receptors, noise modelling of the sources was completed using the proprietary software CadnaA (Computer Aided Noise Abatement Model) developed by DataKustik. CadnaA incorporates the influence of meteorology, terrain, ground type and air absorption in addition to source characteristics to predict noise impacts at receptor locations. The prediction method incorporated into CadnaA is in accordance with *ISO Standard 9613-2 (1996) Acoustics - Attenuation of sound during propagation outdoors*.

The model is utilised to assess the potential noise emissions from the site under a range of operating scenarios and meteorological conditions. The noise modelling also allows investigation of possible noise management solutions, in the event that non-compliance with the assessment criterion is predicted. The following sections discuss the inputs, assumptions and results of the noise modelling.

6.2 Meteorology

All predictions have been undertaken in accordance with *ISO Standard 9613-2 (1996) Acoustics - Attenuation of sound during propagation outdoors*. ISO 9613-2 predictions are relevant for light to moderate downwind conditions (1 to 5 m/s) or a well-developed moderate ground-based temperature inversion (e.g. clear, calm night).

6.3 Topography

Terrain data for the area surrounding the development was obtained from the Digital Elevation Model (DEM) 5 Metre Grid of Australia derived from LiDAR model, which represents a National 5 metre (bare earth) DEM that has been derived from some 236 individual LiDAR surveys between 2001 and 2015.

6.4 Modelled Sensitive Receptors

A total of 12 discrete receptors have been modelled at 1.5 m above ground to represent the nearest industrial uses. 2 additional receptors have been included to represent the nearest residential areas to the far east and south. Figure 6.1 presents the modelled discrete receptors.

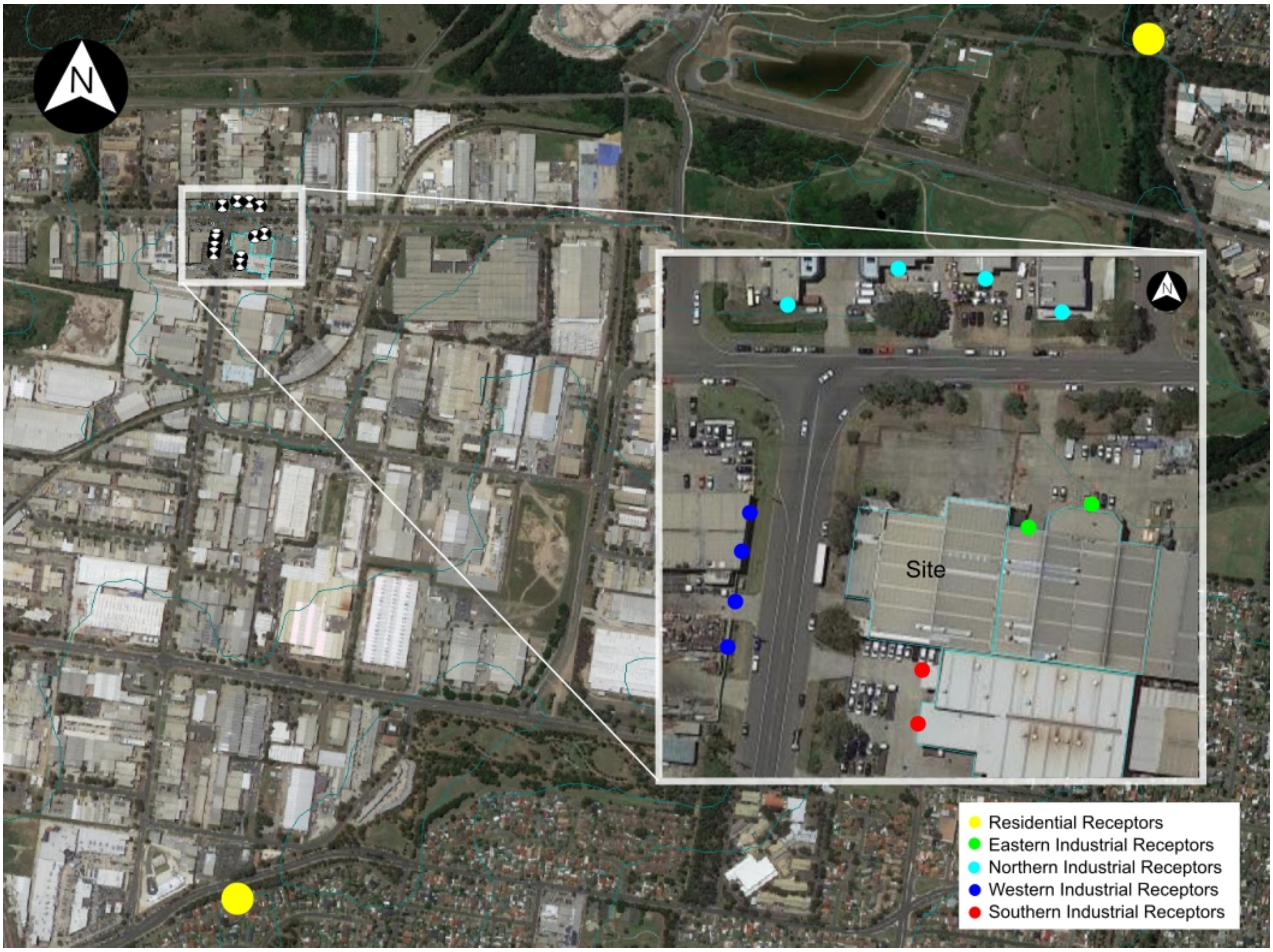


Figure 6.1 - Modelled Noise Receptors

6.5 Noise Modelling Scenario

The noise modelling has considered a worst-case scenario with all key noise sources operating simultaneously:

- unloading pump;
- mechanical rooftop vents;
- odour control unit fan;
- truck movements; and
- plastic moulding machine (subject to future planning approval).

The above scenario is considered worst-case as it assumes that all sources are operating simultaneously. In reality, the unloading pump would be operating intermittently (i.e. when trucks unload, 1-2 per hour). The plastic moulding machine would also operate intermittently.

As noted above, the noise modelling has considered the operation of existing plastic roto-moulding equipment to allow for the assessment of cumulative noise impacts.

6.6 Noise Source Data

Table 6.1 presents the modelled noise source data for the on-site noise sources and activity. Noise source data is based on ANE’s in-house noise source data, which includes noise measurements of similar activity and equipment.

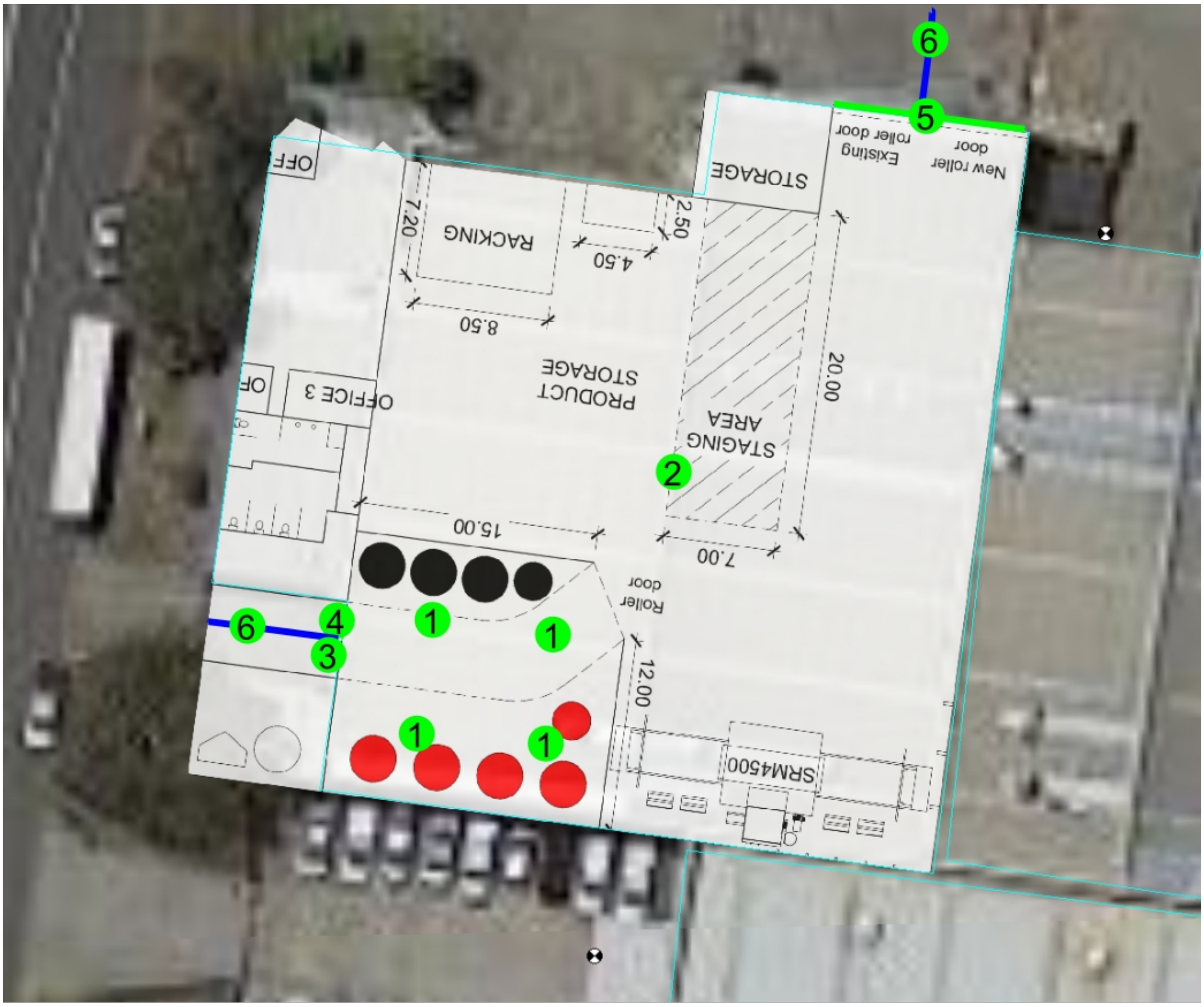
The data presented in Table 6.1 represent L_{Aeq} noise levels (unless otherwise stated).

Table 6.1: Modelled Noise Source Data – Sound Power Level

Noise Source	Frequency Spectra									Total	
	31.5	63	125	250	500	1k	2k	4k	8k	A	Lin
Liquid Waste Component											
Mechanical Rooftop Vent[a]	71	76	83	74	70	68	70	66	60	82	88
Unloading Pump[a]	69	68	76	77	83	74	66	82	62	89	92
Odour Control Unit Fan[a]	71	74	78	68	63	65	69	69	65	80	85
Truck Movement (L_{Amax} Passby, 2 per hour)	63	78	82	91	86	90	97	99	97	103	109
Other Activity											
Roto-moulding Machine	74	67	68	70	67	65	60	54	45	69	77
[a] As a conservative approach, a 5 dB correction for tonality has been assumed for the fixed plant											

6.7 Noise Source Locations

Figure 6.2 shows location of the modelled noise source data for the expected noise sources.



Source ID
1. Mechanical Rooftop Vent
2. OCU Rooftop Exhaust (fan noise breakout)
3. Unloading Pump (modelled at roller door with 5 dB reduction for attenuation through door)
4. OCU Fan (modelled at roller door with 5 dB reduction for attenuation through door)
5. Noise breakout from future roto-moulding machine
6. Truck Movement (2 trucks per hour)

Figure 6.2 - Modelled Noise Source Location

6.8 Predicted Noise Results

Table 6.2 and Figure 6.3 presents predicted noise levels.

Table 6.2 - Predicted Noise Levels

Receptors	Predicted $L_{Aeq,15\text{-}minute}$ Noise Level dB(A	Project Noise Trigger Level
Industrial – South	47	68
Industrial – East	43	68
Industrial – West	49	68
Industrial – North	43	68
Nearest Residential	< 10	35

The results of the modelling indicate compliance with the NSW NPI noise criteria at both industrial and residential receptors by a significant margin. The large margin of compliance is reflective of the minimal noisy activity associated with proposed site operations, which is limited to the operation of fixed plant and truck movements.

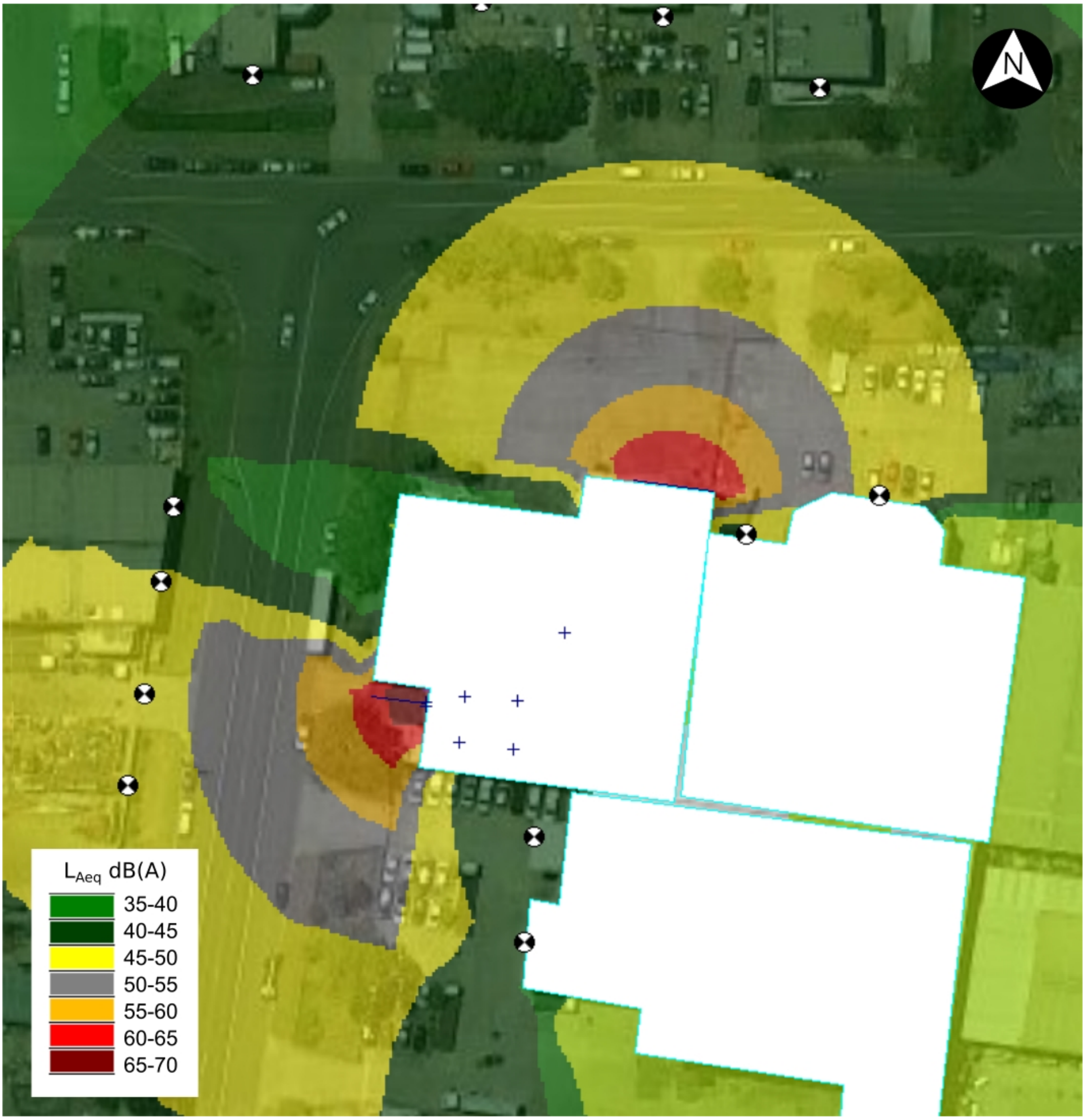


Figure 6.3 - Predicted L_{Aeq} Noise Contour Plot

7 Conclusion

An air and noise assessment has been undertaken for the proposed liquid waste treatment facility at 10 Davis Road, Wetherill Park. The results and findings of the assessment are summarised as follows:

- the nearest receptors are industrial premises surrounding the development site. The nearest residential uses are 1.4 km from the site;
- noise modelling demonstrates compliance with the noise criteria (defined by the NSW Noise Policy for Industry 2017) at the nearest residential and industrial receptors using a highly conservative approach (all potential sources operating simultaneously and under worst-case meteorology);
- air quality modelling of odour demonstrates compliance with the ambient air quality criteria at and beyond the boundary of the site (as defined in the NSW Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales 2017). The results show that the operation of the liquid waste facility is expected to have minimal contribution to the current air quality environment in the surrounding industrial area;
- the recommended odour mitigation and management measures provided in Section 5.7 should be implemented on-site, including the use of an Odour Control Unit. These measures will enable the proposed facility to operate in a manner that is conducive to achieving the outcomes of Protection of the Environment Operations Act (1997) and the POEO (Clean Air) Regulation (2010) with respect to air emissions;
- the potential for construction air and noise impacts are considered to be minimal given that activities will be limited to refurbishment of an existing building and only standard construction methods would be adopted;
- potential vibration impacts from the proposed activity are expected to be negligible, based on the types of expected equipment operating on site (e.g. fixed plant, typical truck movement).

Overall, based on the results of the air and noise modelling, the proposed operation is expected to comply with the relevant NSW legislation and the site represents a suitable location for the proposed liquid waste facility from an air and noise perspective.

Appendix A - Acoustic Glossary

APPENDIX A: GLOSSARY OF ACOUSTIC TERMINOLOGY	
A-Weighting	A response provided by an electronic circuit which modifies sound in such a way that the resulting level is similar to that perceived by the human ear.
dB (decibel)	This is the scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and the reference pressure ($0.00002 N/m^2$).
dB(A)	This is a measure of the overall noise level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
Facade Noise Level	Refers to a sound pressure level determined at a point close to an acoustically reflective surface (in addition to the ground). Typically a distance of 1 metre is used.
Free Field	Refers to a sound pressure level determined at a point away from reflective surfaces other than the ground with no significant contribution due to sound from other reflective surfaces; generally as measured outside and away from buildings.
Hertz (Hz)	A measure of the frequency of sound. It measures the number of pressure peaks per second passing a point when a pure tone is present.
L_{Aeq} Equivalent Continuous Sound Level	This is the equivalent steady sound level in dB(A) containing the same acoustic energy as the actual fluctuating sound level over the given period. For a steady sound with small fluctuations, its value is close to the average sound pressure level.
$L_{A90,T}$	This is the dB(A) level exceeded 90% of the time, T.
$L_{A10,T}$	This is the dB(A) level exceeded 10% of the time, T.
$L_{A50,T}$	This is the dB(A) level exceeded 50% of the time, T.
L_{WA}	The A-weighted sound power level in dB.

Appendix B - Air Quality Glossary

APPENDIX B: GLOSSARY OF AIR QUALITY TERMINOLOGY	
Conversion of ppm to mg/m^3	Where R is the ideal gas constant; T, the temperature in kelvin (273.16 + T°C); and P, the pressure in mm Hg, the conversion is as follows: mg/m^{-3} = (P/RT) x Molecular weight x (concentration in ppm) $= \frac{P \times \text{Molecular weight} \times (\text{concentration in ppm})}{62.4 \times (273.2 + T°C)}$
g/s	Grams per second
mg/m^3	Milligrams (10^{-3}) per cubic metre.
$\mu g/m^3$	Micrograms (10^{-6}) per cubic metre.
ppb	Parts per billion.
ppm	Parts per million.
PM_{10}, $PM_{2.5}$, PM_1	Fine particulate matter with an equivalent aerodynamic diameter of less than 10, 2.5 or 1 micrometres respectively. Fine particulates are predominantly sourced from combustion processes. Vehicle emissions are a key source in urban environments.
50th percentile	The value exceeded for 50 % of the time.
NO_x	Oxides of nitrogen – a suite of gaseous contaminants that are emitted from road vehicles and other sources. Some of the compounds can react in the atmosphere and, in the presence of other contaminants, convert to different compounds (eg, NO to NO_2).
VOC/s	Volatile Organic Compound/s. These compounds can be both toxic and odorous.

Appendix C – Greenhouse Gas Emissions

Appendix C – Greenhouse Gas Emissions

Under the National Greenhouse and Energy Reporting Act 2007, there are requirements for controlling corporations to register and report if they emit greenhouse gases, produce energy, or consume energy at or above specified quantities in a given financial year. The reporting thresholds have been phased in as follows:

- From 1st July 2008 corporations were required to register and report if:
    - they control facilities that emit 25 kilotonnes or more of greenhouse gas (CO_2 equivalent), or produces/consumes 100 terajoules or more of energy.
    - their corporate group emits 125 kilotonnes or more of greenhouse gas (CO_2 equivalent), or produces/consumes 500 terajoules or more of energy.
- For the reporting year 2009 – 2010 corporations are required to register and report if:
    - they control facilities that emit 25 kilotonnes or more of greenhouse gas (CO_2 equivalent), or produces/consumes 100 terajoules or more of energy.
    - their corporate group emits 87.5 kilotonnes or more of greenhouse gas (CO_2 equivalent), or produces/consumes 350 terajoules or more of energy.
- For the reporting years after 2009 – 2010 corporations are required to register and report if:
    - they control facilities that emit 25 kilotonnes or more of greenhouse gas (CO_2 equivalent), or produces/consumes 100 terajoules or more of energy.
    - their corporate group emits 50 kilotonnes or more of greenhouse gas (CO_2 equivalent), or produces/consumes 200 terajoules or more of energy.

Greenhouse gas emissions associated with the proposed liquid waste operations are expected to be minor. Emissions will be associated with operation of fixed electrical equipment such as pumps, roller door motors, lighting and a scrubber exhaust fan.

Emission factors used to calculate GHG emissions (as CO_2-e) from electricity consumption are provided the Department of Climate Change and Energy Efficiency National Greenhouse Accounts Factors – August 2019. The relevant emission factors for the project are associated with fuel-related emissions (Scope 1). For New South Wales, the relevant GHG emission factor for electricity consumption is 0.81 kg CO_2-e per kWh.

Table C1 presents indicative GHG emissions associated with electricity consumption (assuming indicative equipment sites and numbers, which indicates the low emissions associated operation of basic electrical equipment.

Table C1 - GHG Emissions

Equipment	kW	No.	Total kW	kWhr
Unloading Pump	1	1	1	3600
Industrial Lights	0.25	10	2.5	9000
Exhaust Fan	2.2	1	2.2	7920

Equipment	kW	No.	Total kW	kWhr
Roller Door Motor	1	2	2	7200
Pump Motors	1	10	10	36000
Total (kWh)				63720
Emission Factor (CO_2-e per kWh)				0.81
GHG Emissions (tonnes per year)				52