



AIR QUALITY MANAGEMENT PLAN

Wollongong Waste and
Resource Recovery Park

August 2021

Wollongong City Council
Waste Services

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1 Introduction

1.1 Overview

Wollongong City Council was granted project approval from the Department of Planning on 3 April 2013 (application number 11-0094) for Stage 1 Landfill Cell at Wollongong Waste and Resource Recovery Park (WWARRP) at Whytes Gully. Construction approval was subsequently provided by the EPA on the 23rd August 2013 under the existing EPL 5682.

This Air Quality Management Plan (AQMP) addresses condition 29 of schedule 4 which requires the proponent to prepare and implement an Air Quality Management Plan for landfilling.

1.2 Background

The Whytes Gully landfill site comprises two natural gullies known as the 'Western Gully' and the 'Eastern Gully' located at the base of the Illawarra Escarpment. Both gullies have been constructed as a series of stacked cells, progressively terraced in an upslope direction. The outer faces (sloping) of each cell combine to form an 'intermediate cover' for the entire emplacement on completion. The material used for the outer face is locally sourced VENM, with high clay content.

The uppermost horizontal face of each cell is buried beneath the next cell and comprises of coal wash (Western Gully) or slag (Eastern Gully). This material is referred to as 'intermediate cover'. Each cell is approximately 3 metres in total thickness and is made up of a series of 'lifts', each of which are also covered by a thin layer of daily cover to form a trafficable surface.

Currently, approximately 80 000 tonne of waste per year is landfilled at the site, which accepts all waste types with the exception of builders' waste. Recyclables, green waste, tyres, metal, mattresses, are stored on the site for a short period of time and then removed for recycling and/or processing. The remainder is landfilled.

The working tip face is covered daily, when operations cease, with a combination of 150mm soil and tip covers. The soil and tip covers are removed every morning prior to the site accepting customers.

1.3 Scope and Objective

The scope of the Air Quality Management Plan is in accordance with Condition 29 of Schedule 4 of Development Consent 11_0094 provided in Table 1 below.

Table 1: Conditions Table

Sch 4	Condition
29	The proponent shall prepare and implement an Air Quality Management Plan for landfilling operations in consultation with the EPA. The plan must: - be prepared and implemented by a suitably qualified and experienced expert - be approved by the Secretary prior to commencement of the operation - describe the measures that will be implemented to ensure: - best management practice employed - the air quality impacts (including odour) from landfilling are minimised during adverse meteorological conditions and extraordinary events - compliance with the relevant conditions of this approval. - describes the air quality management system; and - includes an air quality monitoring program that: - is capable of evaluating the performance of the landfill; - includes a protocol for determining any exceedances of the relevant conditions of approval and responding to complaints; - adequately supports the air quality management system; and - evaluates and reports on the effectiveness of the air quality management system. This plan must be documented in the LEMP (see Condition 3 in Schedule 5).

2 Statutory Requirements

2.1 Development Consent

Relevant Development Consent conditions are outlined in Table 2.

Table 2: Development Consent Conditions

Sch 3	Condition																									
2	The Proponent shall carry out the project generally in accordance with the: (a) Environmental Assessment (EA); (b) Project Preferred Report (PPR); (c) Statement of Commitments (see Appendix 1); (d) site layout plans and drawings in the EA (see Appendix 2); and (e) conditions of this approval.																									
Sch 4	Condition																									
23	The Proponent shall ensure the project does not cause or permit the emission of any offensive odour (as defined by the POEO Act).																									
24	The Proponent shall ensure that dust generated by the project does not exceed the criteria listed in Tables 2 to 4 at any private residential receiver, or on more than 25 percent of any privately owned land surrounding the site Table 2 Long term criteria for particulate matter <table><tr><th>Pollutant</th><th>Averaging period</th><th>Criterion</th></tr><tr><td>TSP matter</td><td>Annual</td><td>90 µg/m³</td></tr><tr><td>PM₁₀</td><td>Annual</td><td>30 µg/m³</td></tr></table> Table 3 Short term criteria for particulate matter <table><tr><th>Pollutant</th><th>Averaging period</th><th>Criterion</th></tr><tr><td>PM₁₀</td><td>24 hour</td><td>50 µg/m³</td></tr></table> Table 4 Long term criteria for deposited dust <table><tr><th>Pollutant</th><th>Averaging period</th><th>Maximum increase in deposited dust level</th><th>Maximum total deposited dust level</th></tr><tr><td>Deposited dust</td><td>Annual</td><td>2/g/m²/month</td><td>4 g/m²/month</td></tr></table>	Pollutant	Averaging period	Criterion	TSP matter	Annual	90 µg/m³	PM ₁₀	Annual	30 µg/m³	Pollutant	Averaging period	Criterion	PM ₁₀	24 hour	50 µg/m³	Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level	Deposited dust	Annual	2/g/m²/month	4 g/m²/month		
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Deposited dust	Annual	2/g/m²/month	4 g/m²/month																							
25	During construction, the Proponent shall ensure that: a) all vehicles on site do not exceed a speed limit of 25 kilometres per hour; b) all loaded vehicles entering or leaving the site have their loads covered; and c) all loaded vehicles leaving the site are cleaned of dirt, sand and other materials before they leave the site, to avoid tracking these materials on public roads.																									
26	The Proponent shall: a) implement best management practice, including all reasonable and feasible dust and odour mitigation measures to prevent and minimise dust and odour emissions from operation; b) prevent and minimise the air quality impacts of the project during adverse meteorological conditions and extraordinary events; c) regularly assess air quality monitoring data and relocate, modify, and/or stop operation to ensure compliance with the relevant conditions of this consent; and d) minimise surface disturbance of the site, other than as permitted under this consent.																									
27	For each stage of the project identified in Table 5, the Proponent shall comply with the maximum area specified for active tipping face, waste relocation, daily cover and 90 day cover in the corresponding row and columns (from left to right), unless otherwise approved by the Secretary in consultation with the EPA. Table 5: Active tipping face area, waste relocation area, daily cover and 90 day cover <table><tr><th>Stage</th><th>Active tipping face area (m²)</th><th>Waste relocation area (m²)</th><th>Daily cover area (m²)</th><th>90 day cover area (m²)</th></tr><tr><td>Stage 1</td><td>1,100</td><td>1,800</td><td>19,800</td><td>14,000</td></tr><tr><td>Stage 2</td><td>1,000</td><td>0</td><td>1,300</td><td>7,500</td></tr><tr><td>Stage 3</td><td>1,000</td><td>0</td><td>1,300</td><td>7,500</td></tr><tr><td>Stage 4</td><td>1,000</td><td>0</td><td>1,300</td><td>7,500</td></tr></table> Note: This condition has been included in the approval to help control/minimise odour and dust emissions	Stage	Active tipping face area (m²)	Waste relocation area (m²)	Daily cover area (m²)	90 day cover area (m²)	Stage 1	1,100	1,800	19,800	14,000	Stage 2	1,000	0	1,300	7,500	Stage 3	1,000	0	1,300	7,500	Stage 4	1,000	0	1,300	7,500
Stage	Active tipping face area (m²)	Waste relocation area (m²)	Daily cover area (m²)	90 day cover area (m²)																						
Stage 1	1,100	1,800	19,800	14,000																						
Stage 2	1,000	0	1,300	7,500																						
Stage 3	1,000	0	1,300	7,500																						
Stage 4	1,000	0	1,300	7,500																						
28	The proponent shall install and operate a meteorological weather monitoring station on the site for the life of the project that complies with the requirements in the latest version of the EPA's Approved Methods of																									

Sampling Air Pollutants in New South Wales Guideline. The meteorological station must be maintained to be capable of continuously monitoring the following parameters:	
• Air temperature • Wind direction • Wind speed • Relative humidity	
Sch 5	
Condition	
5	Annual Review One year after the commencement of operation, and annually thereafter, the Proponent shall review the environmental performance of the Project to the satisfaction of the Director-General. This review must: (a) describe the operations that were carried out in the past calendar year; (b) analyse the monitoring results and complaints records of the project over the past year, which includes a comparison of these results against the • relevant statutory requirements, limits or performance measures/criteria; • monitoring results of previous years; and • relevant predictions in the EA; (c) identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance; (d) identify any trends in the monitoring data over the life of the Project; (e) describe what actions will be implemented over the next year to improve the environmental performance of the project (including a timeline for the completion of each action); and (f) be placed on Council's website within 2 weeks of its completion.
9	INDEPENDENT ENVIRONMENTAL AUDIT Within a year of the commencement of operation of the project, and every 5 years thereafter, unless the Director-General directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the Project. This audit must: (a) be conducted by suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Director-General; (b) include consultation with the relevant agencies; (c) assess the environmental performance of the project and assess whether it is complying with the relevant requirements in this approval and any relevant EPL (including any plan or program required under these approvals); (d) review the adequacy of any plans or programs required under these approvals; and (e) recommend measures or actions to improve the environmental performance of the Project, and/or any plan or program required under these approvals; and (f) be placed on Council's website within 2 weeks of its completion. Note: This audit team must be led by a suitably qualified auditor and include experts in any fields specified by the Director General.
10	Within 6 weeks of the completing of this audit, or as otherwise agreed by the Director-General, the Proponent shall submit a copy of the audit report to the Director-General, together with its response to any recommendations contained in the audit report.

2.2 Environmental Protection Licence 5862

The operation of the WPRRF is also subject to conditions of Environment Protection Licence 5862 ('EPL') as shown below in Table 3. These conditions cover the monitoring, testing and reporting of surface and subsurface gas and accumulated gas, actions required to minimise air pollution and notification of environmental harm.

Table 3: EPL Conditions

Discharges to Air and Water and Applications to Land			
P1	Location of monitoring/discharge points and areas		
P1.1	The following points referred to in the table below are identified in this licence for the purposes of monitoring and/or the setting of limits for the emission of pollutants to the air from the point.		
EPA identification no.	Type of Monitoring Point	Type of Discharge Point	Location Description
3	Surface gas monitoring		Areas where intermediate or final cover has been placed.
4	Gas accumulation monitoring		Inside all buildings within 250 metres of deposited waste.
21	Subsurface gas monitoring		Monitoring point labelled LFG MW1 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298084 N6184278
22	Subsurface gas monitoring		Monitoring point labelled LFG MW2 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298202 N6184228
23	Subsurface gas monitoring		Monitoring point labelled LFG MW3 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298297 N6184244
24	Subsurface gas monitoring		Monitoring point labelled LFG MW4 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298376 N6184303
25	Subsurface gas monitoring		Monitoring point labelled LFG MW5 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298438 N6184381
26	Subsurface gas monitoring		Monitoring point labelled LFG MW6 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298376 N6184303
27	Subsurface gas monitoring		Monitoring point labelled LFG MW7 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298470 N6184553
28	Subsurface gas monitoring		Monitoring point labelled LFG MW8 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298376 N6184303
29	Subsurface gas monitoring		Monitoring point labelled LFG MW9 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298465 N6184645
30	Subsurface gas monitoring		Monitoring point labelled LFG MW10 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298448 N6184684
31	Subsurface gas monitoring		Monitoring point labelled LFG MW11 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298400 N6184695
32	Subsurface gas monitoring		Monitoring point labelled LFG MW12 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298351 N6184701

Limit Conditions	
L4	Potentially offensive odour
L4.1	The licensee must not cause or permit the emission of offensive odour beyond the boundary of the premises.

Operating Conditions	
O3	Dust
O3.1	The premises must be maintained in a condition which minimises or prevents the emission of dust from the premises.
O3.2	All operations and activities occurring at the premises must be carried out in a manner that will minimise the emission of dust from the premises.
O6	Waste Management
O6.5	The licensee must apply cover material to landfilled waste in accordance with this condition. This cover material must be either Virgin Excavated Natural Material (VENM), Excavated Natural Material (ENM - as defined and characterised by the Excavated Natural Material Order, as in force from time to time), Road Asphalt Profilings (RAP), Steel Furnace Slag (SFS), Steel Framed Fabric or Metal Covered Landfill Lids or an alternative cover approved in writing by the EPA. a) Daily cover must be applied to a minimum depth of 150mm over all exposed landfilled waste prior to ceasing operations at the end of each day. b) Intermediate cover must be applied to a depth of 300mm over surfaces of the landfilled waste at the premises which are to be exposed for more than 90 days. c) Cover material stockpile: at least two weeks cover material must be available at the premises under all weather conditions. This material may be won on site, or alternatively a cover stockpile may be maintained adjacent to the tip face. d) Excavated Natural Material used as cover material must be managed in accordance with the practices detailed in the licensee's letter dated 21 March 2017 (Z17/70390).
O6.6	The licensee must ensure that landfill cells are capped progressively during operations and specifically at times when the level of waste reaches final heights.
O6.7	Vehicles leaving the premises must not track materials to external surfaces.
O6.8	The licensee must not exhume any landfilled waste unless approved in writing by the EPA

Monitoring and Recording Conditions

M2Requirement to monitor concentration of pollutants discharged

M2.1For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns:

M2.2Air Monitoring Requirements

POINT 3

Pollutant	Units of measure	Frequency	Sampling Method
Methane	percent by volume	Special Frequency 2	Special Method 1

POINT 4

Pollutant	Units of measure	Frequency	Sampling Method
Methane	percent by volume	Special Frequency 2	Special Method 2

POINT 21,22,23,24,25,26,27,28,29,30,31,32

Pollutant	Units of measure	Frequency	Sampling Method
Methane	percent by volume	Special Frequency 2	Special Method 3

Note: Special frequency 1 means annually and whenever overflows occur.

Note: Special frequency 2 means monthly if an initial survey indicates significant gas.

Note: Special method 1 means in accordance with surface gas emission monitoring procedures described in Section 5.2 Landfill Gas Surface Emission Monitoring of the Environmental Guidelines: Solid Waste Landfills (2016).

Note: Special method 2 means in accordance with gas accumulation monitoring procedures described in Section 5.4 Gas Accumulation Monitoring in Enclosed Structures of the Environmental Guidelines: Solid Waste Landfills (2016)

Note: Special method 3 means in accordance with subsurface gas monitoring procedures described in Section 5.3 Landfill Gas Sub-Surface Monitoring of the Environmental Guidelines: Solid Waste Landfills (2016).

Reporting Conditions	
R1	Annual Return Documents
R1.1	The licensee must complete and supply to the EPA an Annual Return in the approved form comprising: 1. a Statement of Compliance, 2. a Monitoring and Complaints Summary, 3. a Statement of Compliance - Licence Conditions, 4. a Statement of Compliance - Load based Fee, 5. a Statement of Compliance - Requirement to Prepare Pollution Incident Response Management Plan, 6. a Statement of Compliance - Requirement to Publish Pollution Monitoring Data; and 7. a Statement of Compliance - Environmental Management Systems and Practices. At the end of each reporting period, the EPA will provide to the licensee notification that the Annual Return is due.
R1.2	An Annual Return must be prepared in respect of each reporting period, except as provided below.
R1.5	The Annual Return for the reporting period must be supplied to the EPA via eConnect EPA or by registered post not later than 60 days after the end of each reporting period or in the case of a transferring licence not later than 60 days after the date the transfer was granted (the 'due date').
R1.6	The licensee must retain a copy of the Annual Return supplied to the EPA for a period of at least 4 years after the Annual Return was due to be supplied to the EPA.
R1.7	Within the Annual Return, the Statements of Compliance must be certified and the Monitoring and Complaints Summary must be signed by: a) the licence holder; or b) by a person approved in writing by the EPA to sign on behalf of the licence holder.
R1.8	The Annual Return must be accompanied by/or include an Annual Report which must contain an assessment of environmental performance relevant to licence conditions including: a) tabulated results of all monitoring data required to be collected by this licence; b) a graphical presentation of data from at least the last three years (if available) in order to show variability and/or trends. Any statistically significant variations or anomalies should be highlighted and explained; c) an analysis and interpretation of all monitoring data; d) an analysis of and response to any complaints received; e) identification of any deficiencies in environmental performance identified by the monitoring data, trends or incidents and of remedial action taken or proposed to be taken to address these deficiencies; and f) recommendations on improving the environmental performance of the facility.
R2	Notification of environmental harm
R2.3	The licensee must notify the EPA within 24 hours by telephoning Environment Line on 131 555 if surface gas monitoring required by the licence detects methane of 500 ppm (volume/volume) or greater.
R2.4	The licensee must notify the EPA within 24 hours by telephoning Environment Line on 131 55 if subsurface gas monitoring required by the licence detects methane of 1% (volume/volume) or greater.

2.3 Definitions

The Protection of the Environment Operations (POEO) Act 1997 provides the following definitions:

offensive odour:

An odour:

- (a) That, by reason of strength, nature, duration, character or quality, or the time at which it is emitted, or
 - I. Is harmful to (or likely to be harmful to) a person who is outside the premises from which it is emitted; or
 - II. Interferes unreasonably with (or is likely to interfere unreasonably with) the comfort or repose of a person who is outside the premises from which it is emitted, or
- (b) That is of a strength, nature, duration, character or quality prescribed by the regulations or that is emitted at a time, or in other circumstances, prescribed by the regulations.

3 Dust Management

3.1 Potential Sources

Emissions causing reduction in air quality can originate from landfill and waste transfer operations, including cell construction, liner preparation, dumping and compaction, capping vehicle traffic and machinery used in landfilling.

Dust emissions are more likely to occur on warmer and windy days, and during prolonged dry weather. The magnitude of the impact will depend upon the type and size of the operational site, prevailing wind speed and direction, adjacent land use and the occurrence of natural and/or constructed wind breaks, wind abatement measures or buffers.

3.2 Dust Mitigation and Minimisation Controls

The objective of dust controls is to minimise pollutants leaving the site as airborne dust, reduce stormwater sediment load and protect local amenity.

Potential dust sources and their controls are listed in Table 4.

Table 4: Potential Dust Sources and Controls

Aspect	Control	Relevant statutory requirement
Trafficked areas	• Internal roads are sealed to within approximately 100 m of the tip face. • The access road to the tip face is covered with breckets (a gravelly slag product) or aggregate type material. • Unsealed trafficable areas are watered on a regular basis. • Plant operating at the tip face is not entering other areas of the site to prevent access roads from becoming impacted any dirt. • Site roads are frequently cleaned with a water cart if found to be impacted by dirt. • Vehicular speeds on site must not exceed 25km/hr. • All loaded vehicles entering the site to have their loads covered. • Vehicles must be washed down and clean before leaving the site.	Consent Sch 3 Cond 2 Sch 4 Cond 25 Sch 4 Cond 26 Appendix 1 EPL O3.1 O3.2 O6.7
Operational areas	• Mechanical Plant and equipment are properly serviced and maintained in an efficient operation condition. • Temporarily suspending operations under extreme wind speed conditions. • Revegetating capped areas as soon as possible after forming. • Restricting the size of disturbed areas as much as possible.	Consent Sch 2 Cond 2 Sch 4 Cond 26 Appendix 1 EPL O3.1 O3.2
Stockpiles	• Revegetating stockpiles that will not be used for some time.	Consent Sch 4 Cond 26

Aspect	Control	Relevant statutory requirement
		EPL O3.1 O3.2

3.3 Monitoring

Air quality monitoring is required to ensure that the project does not exceed the criteria listed in the tables in Schedule 4 condition 24 of the consent.

Particulate matter and deposited dust are monitored in accordance with this section to monitor compliance with this requirement. Details are provided in Table 5.

Table 5: Dust monitoring

Action	Frequency	Timing	Parameter	Description of location
Visual dust inspection	Daily	Continuous	Visible dust	All of site
Particulate matter	Monthly	End of month	Total suspended particulate (TSP) matter (μm^3)	Glengarry Cottage carpark Whytes Gully Eastern Gully As shown in Appendix 1.
Particulate matter (PM_{10})	Monthly	End of month	Total suspended particulate (TSP) matter less than 10 micron (μm^3)	Glengarry Cottage carpark Whytes Gully Eastern Gully As shown in Appendix 1
Deposited dust monitoring	Monthly	End of month	Deposited dust $\text{g}/\text{m}^2/\text{month}$	Locations 1 to 5 as shown in Appendix 1

The siting of monitoring equipment, collection, and analysis methodology for the monitoring of particulate matter and deposited dust must be in accordance with Australian Standard AS 3580.1.1:2007 Methods for Sampling and Analysis of Ambient Air – Guide to siting air monitoring equipment (Standards Australia, 2007a) subject to site constraints.

3.4 Response to Incidents / Regulatory Breach

Table 6 details actions to be undertaken in the event of excessive dust emission from the site.

Table 6: Response to Dust Incidents / Regulatory Breach

Situation	Response	Reporting
Excessive dust from trafficked area, operational area or stockpile that has gone off site.	Immediate - Wash/dampen road/stockpile/operating area with water cart. - Clean road with road sweeper - Cover stockpile with tarp if possible.	If incident is causing or threatening material harm to the environment. Contact NSW EPA within 24 hours on 131 555. Within 7 days of this notification, a plan for further investigation and/or

Situation	Response	Reporting
	- Suspend operations (Permission to be sought from Divisional Manager via Coordinator and Manager) Later - Undertake remediation actions including reducing uncovered area and providing wind breaks by increasing vegetation, including hydro-mulching)	remediation of the elevated gas levels to be submitted to the EPA.
Breach of criteria listed in the tables in Schedule 4 condition 24 of the consent.	- Check that controls listed in Section 4.2 are in place. - Check that staff are conducting ongoing daily monitoring. If breach is ongoing: Undertake remediation actions including reducing uncovered area and providing wind breaks by increasing vegetation, including hydro-mulching)	If incident is causing or threatening material harm to the environment. Contact NSW EPA within 24 hours on 131 555. Within 7 days of this notification, a plan for further investigation and/or remediation of the elevated gas levels to be submitted to the EPA.

3.5 Contingency Plan

In the event of a predicted event that has the potential to cause dust emissions, the contingency plan, provided in Table 7 should be implemented.

Table 7: Dust Emissions Contingency Planning

Description	Operational Control(s)
BOM alert for high winds in region	Review the site to ensure it is prepared for the event by: - Ensure all roads are clean. - Ensure water cart is operational and filled. Engage a water cart if needed. - Ensure all unsealed areas are dampened prior to event. - Ensure water cart is resourced to enable additional road washing and dampening of unsealed areas. - Order additional road sweeping throughout event. - Cover stockpiles if necessary
High temperatures predicated by BOM	Review the site to ensure it is prepared for the event by: - Ensure all roads are clean. - Ensure water cart is operational and filled. Engage a water cart if needed. - Ensure all unsealed areas are dampened prior to event. - Ensure water cart is resourced to enable additional road washing and dampening of unsealed areas. - Order additional road sweeping throughout event.

4 Landfill Gas Management

4.1 Potential Sources of Landfill Gas

Landfill gas is contained within the landfill by a combination of the leachate barrier system, site capping and revegetation and covering of waste. Landfill gas controls are installed progressively during the life of the landfill and post closure period.

A landfill gas extraction system has also been installed and will continue to be extended during the life of the landfill. The extraction system consists of sacrificial horizontal gas wells followed by vertical gas wells. Extracted gas is flared to atmosphere. Planning is underway into the development of a gas to energy facility.

Infrastructure for the monitoring of sub-surface landfill gas will continue to be extended in line with the landfill in accordance with the LEMP.

4.2 Gas Mitigation and Minimisation Controls

The objective of the landfill gas containment system is to minimise emissions of landfill gas through the surface of the landfill to minimise greenhouse gas emissions, odours and emissions of airborne impurities, pathogens and toxins that may pose a health risk to the community.

Potential Landfill gas sources and their controls are listed in Table 8.

Table 8 : Potential Landfill Gas Sources and Controls

Aspect	Control	Relevant statutory requirement
Operational (short term) landfill gas containment	- Leachate barrier system (as per section 7.2.1 of the LEMP) - Landfill face is covered with cover material – 150mm VENM and/or landfill covers at close of business daily. - Landfill surfaces which are to be exposed for >90 days to be covered with 300mm cover material. - More than two weeks of cover material available at the landfill face at any time.	Consent Sch 3 Cond 2 Sch 4 Cond 10 - 13 Sch 4 Cond 27 EPL O6.5
Long term landfill gas containment	- Site capping as per Site Rehabilitation Plan - Revegetation as per landscape Management Plan and Vegetation Management Plan, - Site Rehabilitation Plan developed and implemented	Consent Sch 3 Cond 2 Sch 4 Cond 51 Sch 4 Cond 27 EPL O6.6 O6.13
Gas Extraction	- Progressive installation of horizontal and vertical gas well as per Figure 14 In LEMP and updates. - Flaring of gas.	Consent Sch 3 Cond 2 Sch 3 Cond 2 Sch 4 26 EPL No specific

In accordance with the Environmental Guidelines: Solid Waste Landfills, flares for treating landfill gas must be enclosed and at ground level. They must meet the operating requirements in the Protection of the Environment Operations (Clean Air) Regulation 2010, namely gas residence time >0.6 seconds, combustion temperature >760°C, destruction efficiency >98%, and flame present always while air impurities are required to be treated. Regular monitoring is required of temperature (in °C) and volumetric flow rate (in cubic metres/second).

4.3 Monitoring

The objective of monitoring for landfill gas is as follows:

- Subsurface gas monitoring is to detect gas that may potentially migrate off-site.
- Surface gas monitoring is to demonstrate that the landfill cover material, capping and/or the gas extraction system are effective in controlling the emission of landfill gas. Monitoring the surface of the landfill should locate any point sources or fissures that may be emitting landfill gas.
- Building gas accumulation monitoring to monitor gas build up which may have the explosion. It is also intended to protect human health as methane is both an asphyxiant and explosive.

EPL Condition P1.1 prescribes monitoring locations and Condition M2.2 prescribes the methodology to be used and how often the monitoring is to be undertaken. Monitoring required is summarised in Table 9 below.

Table 9: Landfill gas monitoring

Action	Frequency	Timing	Parameter	Description of location	EPA ID
Subsurface gas monitoring	Quarterly	March, June, September, December	Methane % v/v	Subsurface gas monitoring wells. Refer to Error! Reference source not found..	21 - 32
Surface gas monitoring	Quarterly	March, June, September, December	Methane % v/v	Areas where intermediate cover has been placed. Refer to Appendix 2.	3
Building gas accumulation monitoring	Quarterly	March, June, September, December	Methane % v/v	Glengarry Cottage Operations Hub Weighbridge. Refer to Appendix 2.	4

4.4 Response to Incidents / Regulatory Breach

Table 10 details actions to be undertaken in the event of excessive dust emission from the site.

Table 10: Response to Incidents / Regulatory Breach

Monitoring Type	Situation	Response	Reporting
Subsurface Gas	Detection of methane of 1% v/v or greater.	Response may be one or several of the following: • An increase in monitoring frequency and/or the installation of additional monitoring wells • Volumetric/gas flow determinations to assess the significance of gas generation rates and the potential scale of off-site gas migration. • Gas accumulation monitoring in enclosed structures located nearby. • A revised landfill gas risk assessment, addressing the source, potential gas migration pathways and potential receptors. • Notifications to potentially affected persons. • Installation of landfill gas controls at the source and/or receptors. • Remediation actions in accordance with Section 8.4 of the LEMP.	In accordance with condition R2 of the EPL: Contact NSW EPA within 24 hours on 131 555. Within 7 days of this notification, a plan for further investigation and/or remediation of the elevated gas levels to be submitted to the EPA.
Surface gas	Detection of methane of 500ppm or greater.	Response may be one or several of the following: • Repairing or replacing cover material. • Flux (emissions) monitoring in quantify emission rates and help identify the extent of gas loss (surface scans give a concentration, not a flow rate). • Installation of sub-surface monitoring wells (if not already installed) to gauge the extent of any lateral migration of gas. • Adjustment or installation of gas controls to extract and treat gas. • Remediation actions in accordance with Section 8.4 of the LEMP.	In accordance with condition R2 of the EPL: Contact NSW EPA within 24 hours on 131 555. Within 7 days of this notification, a plan for further investigation and/or remediation of the elevated gas levels to be submitted to the EPA.
Building gas accumulation	Detection of methane of 1% v/v or greater.	Response may be one or several of the following: • Daily monitoring to be undertaken until ventilation or other measures control the methane build-up. • Ventilate affected area. • Installation of landfill gas controls at the source and/or receptors. • Further subsurface monitoring to delineate any potential landfill gas emissions. Remediation actions in accordance with Section 8.4 of the LEMP.	No specific reporting requirements.

5 Odour Management

Odour management will be undertaken to fulfil approval and EPL requirements.

In 2020, in response to odour concerns in the catchment, Council worked with EPA to assess the Site's odour management and address the Special Conditions included in the most recent Variation. The "Wollongong Waste and Resource Recovery Park (WWRP) – Odour Investigation Assessment" was undertaken by specialist consultants, The Odour Unit Pty Ltd (See Appendix 5). This assessment meets the requirements of EPA Licence No. 5862- Licence Variation No. 1604123 (Special Conditions E1.4 and E1.5) outlined in the table below.

<i>Special Condition E1.4</i>	<i>The licensee must engage a suitably qualified and experienced odour specialist to assess odour emissions from the premises and on the performance and effectiveness of the odour mitigation measures. Provide the EPA with a copy of this assessment by 30th April 2021.</i>
<i>Special Condition E1.5</i>	1) <i>Undertake a detailed risk assessment of the premises to identify all significant odour generating sources at the premises.</i> 2) <i>The risk assessment must be informed by site specific odour monitoring. All monitoring must be undertaken in accordance with the NSW EPA's Approved Methods for the Sampling and Analysis of Air Pollutants in NSW.</i> 3) <i>Where measured, site specific odour emission rates are significantly different to those previously adopted in the odour modelling report by Pae Holmes (June 2012), the modelling be revised to include site specific data.</i> 4) <i>Undertake a detailed feasibility study to consider and evaluate options to reduce odour emissions from the highest ranked odour generating sources.</i> 5) <i>The study should evaluate the expected change in offsite odour impact via a revised odour impact assessment.</i>

An Action Plan based on the recommendations is outlined in Section 5.6.

5.1 Potential Odour Sources

Following a detailed review of the WWRP site operations WCC has identified several potential odour sources including:

1. Commercial Tip Face
 - Landfilling of putrescible waste
 - Landfilling on non-putrescible waste
 - Includes commercial vehicle unloading
2. Small Vehicle Transfer Area (SVTA)
 - Tipping floor for transfer of putrescible waste from small vehicles
 - Tipping floor for transfer of putrescible waste from small vehicles
 - Storage of mattresses, tyres, e-waste, and other recyclables reclaimed from waste
3. Leachate Containment and Stormwater Pits
4. Gas Leakage
 - Gas leakage from historical landfilling
5. Vehicles Entering / Exiting the Site

5.2 Controls of Potential Odour Sources

The objective of odour control at the site is to prevent degradation of local amenity by odour. Potential sources of odours and their controls are listed in Table 11.

Table 11: Potential Odour Sources and Controls

Location	Control	Relevant statutory requirement
Commercial Tip Face	- Waste received must comply with allowed waste listed in Condition L2.1 of Environment Protection Licence 5862. - Waste type will be monitored by the weighbridge staff and site operators using the waste classification guidelines. - Waste delivery trucks entering the site are required to be fully enclosed or covered. - Waste delivery vehicles deposit waste at tip face. - Waste is immediately compacted into landfill. - Landfill face is covered with cover – 150mm VENM and/or landfill covers at close of business daily. - Equipment parked at the site is regularly cleaned.	Consent Sch 3 Cond 2 Sch 4 Cond 7 Appendix 1 EPL L2.1
Small vehicle Transfer Area	- Waste received must comply with allowed waste listed in Condition L2.1 of Environment Protection Licence 5862. - Waste type will be monitored by the weighbridge staff and site operators using the waste classification guidelines. - Waste type will be monitored by the weighbridge staff and site operators using the waste classification guidelines. - Only light vehicles, including small trucks, deposit waste into SVTS operational area. - Waste is immediately loaded into a truck and transported to the Commercial Tip Face. - Equipment parked at the site is regularly cleaned. - Litter inspections conducted daily and the site (and, if necessary, surrounding area) cleared of litter weekly. - Trailer mounted Deodoriser Suppression Systems are operational.	Sch 3 Cond 2 Sch 4 Cond 9 Appendix 1
Leachate Containment and Stormwater Pits	- All liquid that comes into contact with waste is considered leachate. - Routine site inspection will be conducted to observe wastewater treatment is operational, and promptly follow-up with any issues as per the Contingency Plan in Section 5. - Routine site walks will be conducted to ensure stormwater drains are free of debris and/or waste. - Debris/waste will be cleared from stormwater drains as soon as practicable. - Leachate Ponds are monitored and aerated. - Leachate will be treated in the wastewater treatment plant on site, in accordance with the Trade Waste Agreement.	Sch 3 Cond 2 Appendix 1

Location	Control	Relevant statutory requirement
	SUEZ arranges collection and analysis of water sampling as per Trade Waste Agreement.	
Gas leakage	As detailed in Table 8.	
Vehicles entering / exiting the site	- If odorous waste has been identified, it must be directed to the appropriate area, and buried and covered as soon as possible. - Traffic management procedures to co-ordinate the delivery schedule and avoid a queue of the incoming or outgoing trucks for extended periods of time. - Spill management procedures to include immediate cleaning up of any spill/leakage from incoming and outgoing trucks.	Sch 3 Cond 2 Appendix 1
Leachate leaks	- Leachate leaks are repaired immediately - Trailer mounted Deodoriser Suppression Systems are operational.	Sch 3 Cond 2 Appendix 1
Special wastes	- Directed to the appropriate area and buried and covered as soon as possible. - Trailer mounted Deodoriser Suppression Systems are operational.	
Exhumation of waste / material movement	- Approval gained from EPA and notification provided prior to commencement of work. - Uncovered waste covered immediately - Trailer mounted Deodoriser Suppression Systems are operational.	EPL O6.8
Septic Tanks (emptying)	- Scheduled when tanks are full - Tanks emptied as soon as possible without delay - Correct connectors used to provide a seal	
General	- Ensure all machinery and equipment is maintained in accordance with manufacturer's recommendations and keep maintenance records. - Operational practices and management plans will be reviewed regularly as outlined in Section 6 and - Provide relevant training to staff including: Site induction; Waste handling and transfer training; Machinery operation training; Spill response training; Deodoriser Dust Suppression System training; and Toolbox meetings to discuss safety and/or compliance, conducted at least once a month.	Sch 3 Cond 2 Appendix 1

5.3 Odour Monitoring Program

Monitoring of odour is undertaken to ensure that activities on the site are not causing offensive odour in the community. Monitoring to be undertaken is listed in

Table 12.

Table 12: Odour Monitoring

Action	Frequency	Timing	Parameter	Description of location
Odour detection (proactive)	Daily	Continuous	Odour	All of site
Odour detection (proactive)	Weekly	Worst case weather conditions e.g., morning in calm conditions, middle of day, when wind is blowing towards sensitive receptors (Environmental Guidelines: Solid Waste Landfills)	Odour	Refer Appendix 3.
Odour detection (proactive)	Daily	When undertaking potentially odorous activities	Odour	All of site
Odour detection (reactive)	Three days consecutive	Morning when odour complaint received	Odour	Refer Appendix 3.

Personnel conducting field odour surveys should be trained and calibrated for odour assessment in accordance with the requirements for olfactory testing in Australian Standard AS 4323.3:2001 Stationary Source Emissions – Determination of odour concentration by dynamic olfactometry (Standards Australia, 2001).

5.4 Response to Incidents / Regulatory Breach

Table 13 details actions to be undertaken in the event of excessive dust emission from the site.

Table 13: Response to Incidents / Regulatory Breach

Monitoring Type	Situation	Response	Reporting
Odour	Offensive odour detected – onsite or offsite	- Conduct site walkover to determine source of the odour. - Ensure odour controls are in place in accordance with Table 11.	In accordance with condition R2 of the EPL: Contact NSW EPA within 24 hours on 131 555. Within 7 days of this notification, a plan for further investigation and/or remediation of the elevated gas levels to be submitted to the EPA.

Monitoring Type	Situation	Response	Reporting
Odour	Community Complaint received	- Correlate the complaint with weather conditions and activities on site at the time. - Conduct site walkover to determine source of the odour. - Ensure odour controls are in place in accordance with Table 11. - Instigate odour detection monitoring in the community.	

5.5 Contingency Plan

In the event of a predicted event that has the potential to cause odour impacts beyond the boundaries of the site, the contingency plan, provided in Table 14 should be implemented.

Table 14 : Odour Emissions Contingency Plan

Description	Operational Control(s)
Significant rain event	Review the site to ensure it is prepared for the rain event including: - Ensure leachate tank has capacity. - Ensure wastewater treatment plant is operational. - Ensure stormwater tank has capacity, and keystone valve is operational. - Ensure stormwater drains are free of debris.
Rain event followed by warm weather	Ensure all controls listed in Table 11 are in position and operational. Implement additional odour monitoring.

5.6 Odour Emissions Improvement Action Plan

An investigation of odour emissions from the site undertaken by The Odour Unit in May 2021 (refer Appendix 4 for full report). Based on the Assessment findings and in the context of industry best practice, the following recommendations were provided and are considered to reflect proactive mitigation measures to manage the risk of adverse conditions that could lead to a higher than desirable degree of odour emissions from the activities at the Whytes Gully WRRC.

The adoption of these recommendations in the context of the odour generating sources, in order of highest to lowest, is provided in

Table 15.

Table 15: Prioritisation of odour generating sources and recommendations*

Odour Source Rank	Odour Source Description		Applicable Recommendation
1	Intermediate Cover	Lined	- Recommendation 1 - Recommendation 3 - Recommendation 4
		Unlined	- Recommendation 5 - Recommendation 6
2	Active tipping face		- Recommendation 5 - Recommendation 6
3	Leachate Management System	Leachate pond P-1	Recommendation 2
		Leachate pond S-1	Recommendation 5
		Leachate pond B-1	Recommendation 6
4	Stormwater Pond Management System		- Recommendation 5 - Recommendation 6

* Taken from 'Whytes Gully Waste and Resource Recovery Centre – Odour Investigation Assessment – Kembla Grange – Final Report – June 2021.

Full details of the recommendations are provided in Section 5 of the full report (refer Appendix 4).

Based on the independent recommendations Council will actions the following projects to improve air quality odour performance as funded within the 2021-25 Wollongong Council Infrastructure Delivery Program. Council has committed to the following budget as provided in Table 16: Financial commitment to odour action recommendations

Table 16: Financial commitment to odour action recommendations

Action	Financial Commitment
Leachate treatment system upgrades	\$350,000
Leachate Pond upgrades	\$400,000
Stormwater pond upgrades	\$100,000
Landfill cover system upgrades	\$50,000

6 Community Engagement

6.1 Complaints Management

The purpose of maintaining a complaints register is to record and monitor the number of complaints received to gain an understanding of possible offsite impacts from operations so that actions can be taken to mitigate and/or prevent these recurring in future.

Council is also legally obliged to record, monitor and report complaints in accordance with the EPL.

The EPL contains the following requirements for management of complaints.

- M4.1 The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.
- M4.2 The record must include details of the following:
- a) the date and time of the complaint.
 - b) the method by which the complaint was made.
 - c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect.
 - d) the nature of the complaint.
 - e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and
 - f) if no action was taken by the licensee, the reasons why no action was taken.
- M4.3 The record of a complaint must be kept for at least 4 years after the complaint was made.
- M4.4 The record must be produced to any authorised officer of the EPA who asks to see them.
- M5.1 The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.
- M5.2 The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.

6.1.1 Complaints Register

A complaints register will be maintained in an excel spreadsheet to log public complaints regarding air quality and odour. The register will record:

- Date
- Time
- Nature of complaint, and
- The subsequent actions taken to help minimise or eliminate the concerns.

Complaints that cannot be attributed to the WWARRP will also be logged in the register along with investigation details and outcomes.

All staff will be trained in the requirement to notify and record any public complaints.

The Complaints Line Telephone Number, the same as Council's Customer Service line, is 02 4227 7111. This number is a public listing and is clearly displayed as the Complaints Line Telephone Number displayed at the front gate to the WWARRP and on Council's website and webpages for the WWARRP.

6.1.2 Whyte Gully Community Reference Group

Council has committed in Appendix 1 of the consent to holding a meeting twice a year to provide a forum by which the residents located closest to the landfill can opportunity to speak directly to staff at the WWARRP.

This meeting, known as the Whytes Gully Community Reference Group is organised by the Waste and Resource Recovery Manager. Meeting invitations are distributed along with an agenda and minutes of the previous meeting.

Representatives from our major waste contractors are also invited to attend the meeting.

6.1.3 Meteorological Equipment

To assist with the management of air quality and odour complaints and to obtain data for modelling, the landfill must have an operational meteorological weather monitoring station on the site for the life of the project that complies with the requirements of Australian Standard AS 3580.14-2011 Methods for Sampling and Analysis of Ambient Air – Part 14: Meteorological monitoring for ambient air quality monitoring applications (Standards Australia, 2011).

The meteorological station must be maintained to be capable of continuously monitoring the following parameters:

- Air temperature
- Wind direction
- Wind speed
- Relative humidity

7 Air Quality Reporting

There are several reporting avenues that are detailed in the EPL (5862). The reporting provided below are those that are applicable to air quality.

7.1 Incident Reporting

The relevant conditions in EPL 5862 are provided in Section 0.

7.1.1 Telephone Reporting

Initial contact can be made via the EPA's 24-hour pollution line when an incident is identified. The pollution line can be reached on 131 555, or 02 9995 5555 if calling from outside NSW.

7.1.2 Written Reporting

A written notice of any incidents should be made to the NSW EPA within 7 days of the incident occurring.

7.2 Annual Return (EPA)

The relevant conditions in EPL 5862 are provided in Section 0.

The Annual Return comprises an electronic form accessed via the eConnect portal at [Link to eConnect](#). The Waste and Resource Recovery Manager and Senior Environment Officer have access to this link.

The form must be completed annually within 60 days of the EPL anniversary date.

7.3 Annual Report

The relevant conditions in EPL 5862 are provided in Section 0.

The Annual Return contains all the monitoring data required to be undertaken by EPL 5863, both in tabular and graphical format. The report also contains an analysis and interpretation of the results plus identification of any deficiencies, trends or incidents and the remedial action taken.

The Annual Report must be submitted with the Annual Return.

7.4 Annual Review

Schedule 5 Condition 5 of the Project Approval requires an Annual Review to be submitted to the EPA (refer Section 2.1).

This report is essentially the same as the Annual Report however covers a different period as the day of consent and EPL Anniversary are not the same. Council has made representation to the EPA to have the anniversary date altered to enable one report to be prepared.

7.5 Independent Environmental Audit

Schedule 5 Condition 9 and 10 of the Project Approval requires an Independent Environmental Audit to be undertaken and submitted to the EPA (refer Section 2.1).

The audit must be conducted by a suitable qualified, experienced, and independent audit, at Councils cost, to assess the performance of the site and whether it is complying with the relevant requirements in the approval and EPL, including Management Plans.

The audit report must be submitted to DPIE within six weeks of completing the audit.

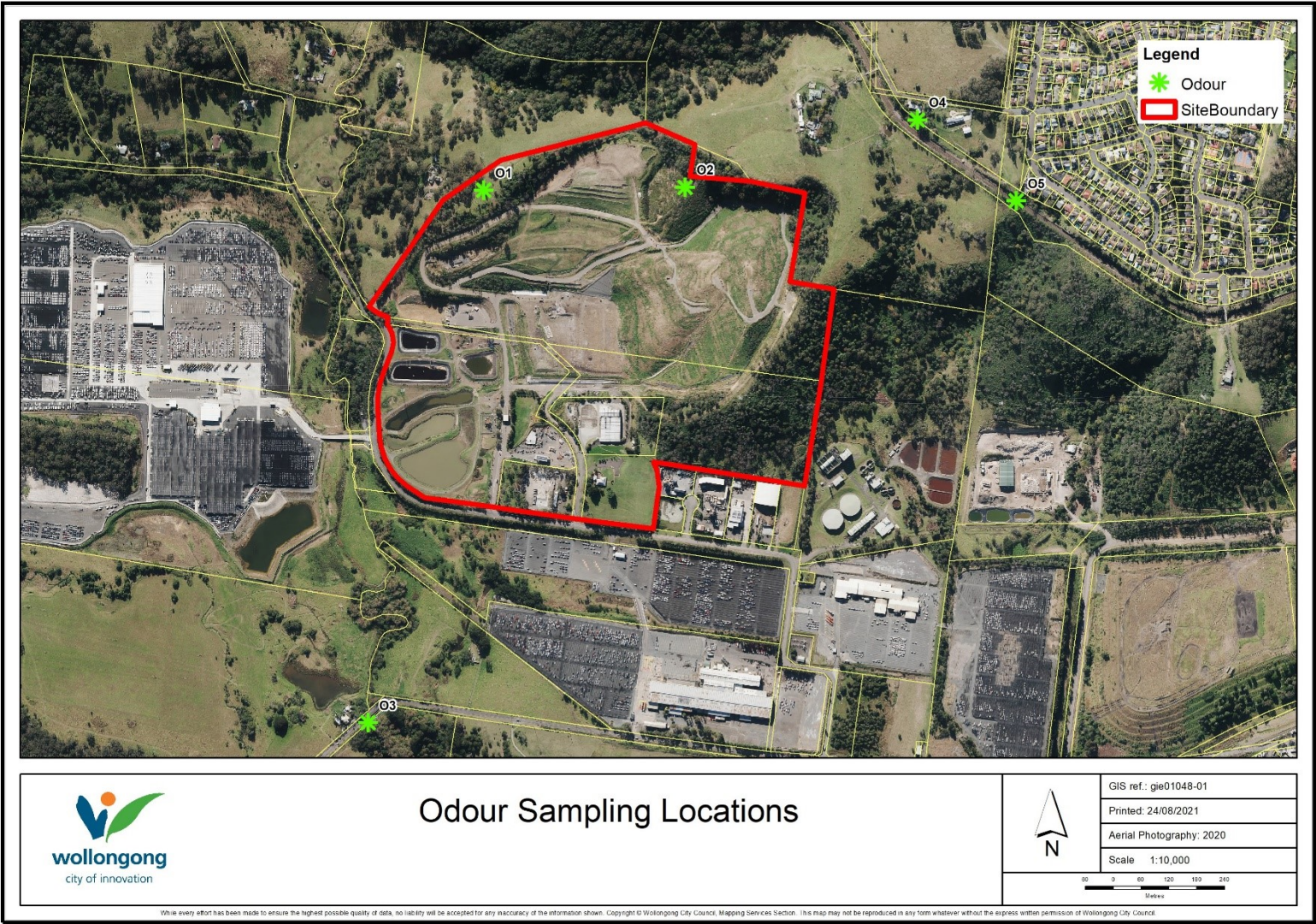
Appendix 1: Dust Monitoring Locations



Appendix 2: Gas Monitoring Locations



Appendix 3: Odour Monitoring Locations



Appendix 4: Odour Investigation Assessment Kembla Grange Report - June 2021 – The Odour Unit