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SMEC INTERNAL REF. 30049148

Contact Water Management Plan

Bairnsdale Composting Facility

Prepared for: East Gippsland Shire Council
10 October 2025

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1. Introduction

SMEC Australia Pty Ltd (SMEC) was engaged by East Gippsland Shire Council (Council) to prepare a Contact Water Management Plan (CWMP) (technically known as a Leachate Management Plan (LMP)) for the proposed Bairnsdale Composting Facility (the site), currently being designed. This site is to be located at 200 Johnstons Road, Forge Creek VIC 3875, as shown in Figure 1, Appendix A.

The site is owned and managed by Council. The site is located adjacent to the Bairnsdale Landfill which holds an EPA permission to operate under EPA licence OL000072826 as a landfill (A05a) to receive putrescible waste, solid inert waste, as well as reportable priority wastes (A01) i.e. asbestos.

SMEC understands this CWMP will support the Development Licence Application (DLA) for the site and inform potential controls and management actions for the site consistent with EPA Publication 1588.1 '*Designing, Construction and Operating Composting Facilities*' and EPA Publication 788.3 '*Siting, design, operation and rehabilitation of landfills*'.

1.1 Objectives

The key objectives of this CWMP are to:

- Demonstrate that the site can be suitably managed in accordance with EPA Victoria Guideline '*Design, construction and operating compositing facilities'* (Publication 1588.1, 2017) and '*Siting, design, operation and rehabilitation of landfill*' (Publication 788.3, 2015);
- Identify, assess and address likely risks to human health and the environment arising from site operations, in accordance with EPA Victoria Guideline *'Assessing and controlling risk: A guide for business'* (Publication 1695.1, 2019);
- Provide a framework to guide the long-term performance of the site to operate within the conditions set out in future A07a permissions; and
- Demonstrate compliance with the Environmental Protection Act 2017 *Environmental Reference Standard*.

The key elements of the CWMP are presented in the body of the report, with supporting information and data provided in the attached Appendices.

1.2 Scope

The scope of works to prepare this CWMP included:

- Undertake a review of the site and existing activities.
- Prepare a summary of site conditions at the site, including key information from the hydrogeological assessment at the neighbouring landfill. Site conditions to include aquifers, groundwater uses, environmental values, depth to groundwater and surface water.
- Review the Conceptual Site Model to assess potential source, pathway and receptors of potential risks to human health and the environment relating to contact water generation at the site.
- Prepare management controls to reduce or eliminate the risk of contact water contamination onsite and offsite.

1.3 Regulatory Framework

The legislation, regulations and guidelines relevant to the site that have been considered in preparation of this CWMP are presented in Table 1–1.

Table 1–1: Legislation, regulations and guidelines

Legislation	
Federal	*Environmental Protection and Biodiversity Conservation Act 1999* *Work Health and Safety Act 2011* *AS/NZS31000:2009: Risk Management – Principles and guidelines.*
State	*Catchment and Land Protection Act 1994* *Climate Change Act 2010* *Environment Effects Act 1978* *Environment Protection Act 2017* *Environment Protection (Industrial Waste) Act 1985* *Flora and Fauna Guarantee Act 1988* *Heritage Act 1995* *Land Act 1985* *Land Regulations 2006* *Planning and Environment Act 1987* *Pollution of Waters by Oil and Noxious Substances Act 1986* *Water Act 1989* *Water (Subdivisional Easements and Reserves) Regulations 2011*
Regulations and guidelines	
Waste management	*Industrial Waste Management Policy (Protection of the Ozone Layer) No. S193* *Environment Reference Standard (ERS), EPA, May 2021* *EPA Publication 788.3: Siting, design, operation and rehabilitation of landfills, August 2015*
Water	*Australian Water Quality Guidelines for Fresh and Marine Water Quality, ANZG, 2018* *Water (Trade Waste) Regulations 2014* *Water (Resource Management) Regulations 2007* *Environment Reference Standard (ERS), EPA, May 2021* *EPA Publication 2033: Background levels methodology guidance (September 2022).* *EPA Publication 668.1: Hydrogeological assessment (groundwater quality) guidelines (October 2022).* *EPA Publication 669.1: Groundwater sampling guidelines (February 2022).*
Compost Facility	*Designing, constructing, and operating composting facilities, EPA Pub. 1588.1, June 2017* *AS 4454-2012 – Composts, Soil Conditioners and Mulches*
Licensing and Risk	*Assessing and controlling risk: A guide for business, EPA Pub. 1695.1, March 2019* *Licence assessment guidelines, EPA Pub. 1321.2, June 2011*

2. Site Activity and Background

2.1 Site Details

The site is Council owned and occupies approximately 3.3 hectares (8.2 acres).

2.1.1 Description of Proposed Site Activities

The new proposed site activity would involve the processing of Food Organics and Garden Organics (FOGO) material (W_4) onsite for use within the purpose-built composting facility. The facility is proposed to conduct aerobic composting. The process will involve pasteurisation within a covered, forced aeration pad followed by windrow maturation. The site will require EPA permissions to undertake the activity as it will be classed as A07a *Organics Waste Processing-large*. The site would be processing feedstocks ranked as medium to high risk, as per EPA Publication 1558.1.

As per the Environmental Management Plan (EMP) (SMEC, 2024), the site will be designed with a proposed feedstock throughput of 25,000 tonnes of municipal FOGO each year; it is projected that the site would generate approximately 40,000 m^3 of compost product per year. A summary of the processes is provided below:

- Kerbside municipal FOGO is unloaded within the incoming shed.
- Manual contamination (i.e. general waste and plastics) removal by site staff.
  - This waste will then be taken to the landfill site to the east for lawful disposal.
- Cleaned feedstock is loaded into forced aeration bays and covered for the pasteurisation phase of the compost process.
  - Moisture, temperature and oxygen are monitored while the compost is pasteurising.
  - As required by EPA Publication 1558.1, the material will be held at over 55°C for a minimum of three days.
- Following the pasteurisation, compost will be loaded into windrows and periodically turned until mature; the site will be designed on a 16-week maturation phase.
- Following maturation, the compost will be passed through a trommel to appropriately size the material ready for use as a mature compost product.

In conjunction with this composting, the proposed design for the site will have a contact water dam, contact water tank and contact water management system. The proposed contact water dam and proposed contact water tank will be the main collection points for any contact water generation on site, predominately from the windrows of composting product, the compost maturation pad, access roads, drop off station, storage area and Convaero system.

2.1.2 Site History

There is limited historical data available for this site. However, based on information presented in the most recent 53v Landfill Aftercare Audit for the adjacent landfill site (Nolan Consulting, 2021), it is inferred that historically the area was used for agricultural purposes.

2.1.3 Surrounding Land Uses

The site is currently zoned within the Farming Zone (FR1) – Schedule 1 and is bounded by agricultural land to the south and west, with Johnstons Road to the north (SMEC, 2024). To the east, there is the active Bairnsdale Landfill. Further information is included in Table 2–1. See Figure 2, Appendix A. for map of sensitive receptors and their proximity to the site.

Table 2–1: Surrounding Land Uses

Direction	Description
North	Johnstons Road bounding the site. Agricultural land and a quarry further north-east. Hollis Creek is to the north of the site.

Direction	Description
East	Bairnsdale Landfill immediately east. Further east is McDonalds Road, a wildlife reserve (Macleod Morass) and Jones Bay. Skeene Creek enters the site from the east along McDonalds Road. The creek extends through the southern portion of the parcel south of the active landfill and proposed compost site boundary.
West	Agricultural land and a residential property approximately 530 m from the site boundary. Further west is Forge Creek Road.
South	Agricultural land and residential property approximately 1 km from the site boundary. Further south is Forge Creek Road.

2.1.4 Underground Services

A Before You Dig Australia (BYDA) search was undertaken at the site, and no existing services were identified within the site extents (SMEC, 2024).

2.2 Climate

As per the EMP (SMEC, 2024), the site is located within a mild temperate climate region.

A review of the most recent climate data from the closest Bureau of Meteorology (BoM) weather station (ID: 085279) (BoM 2024a) indicates the following wind, rainfall and temperature data for the site, as summarised in Table 2–2 and Table 2–3:

- Annually based on data between 1943 and 2024, the area experiences mean temperatures of 4.0°C (min) to 25.9°C (max).
- Annually based on data between 1942 and 2024, the area experiences a mean rainfall of 645.8 mm, with a mean number of 47 days yearly with rain ≥1 mm.
- Annually based on data between 1942 and 2010, the mean 9am and 3pm wind speeds are 10.1 km/hr and 18.2 km/hr, respectively.

Additionally, historical climate data from the Bairnsdale Airport (weather station ID: 085279) was obtained from SILO (SILO, 2024) to assess the daily rainfall and evaporation levels from 1975 to 2024.

Table 2–2: Climate Data for BoM Station 085279 for 1943–2024 (BoM, 2024a)

Statistic	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Mean daily evaporation (mm)*	6.5	5.8	4.4	2.8	1.7	1.4	1.5	2.2	3.1	4.0	5.1	6.0	3.7
Mean Relative Humidity (%) at 9am**	68	76	77	78	83	83	82	77	72	68	70	69	75
Mean minimum temperature (°C)	13.2	12.9	11.4	8.8	6.7	4.7	4.0	4.5	5.8	7.6	9.7	11.4	8.4
Mean maximum temperature (°C)	25.9	25.5	24.0	20.8	17.6	15.0	14.7	15.7	17.9	19.9	21.8	23.8	20.2
Notes: *Data from BoM Station 085072 for 1971–2015 as no data available for BoM Station 085279 **Data range 1943–2010													

Table 2–3: Rainfall Data BoM Station 085279 for 1942–2024 (BoM, 2024a and BoM, 2024b)

Statistic	January	February	March	April	May	June	July	August	September	October	November	December	Annually	24 hours
Mean monthly rainfall (mm)	50.7	44.4	47.6	56.5	44.3	62.7	45.9	37.3	50.2	62.6	80.2	62.5	645.8	-
Highest rainfall (mm)	127.6	206.8	144.0	181.0	225.4	322.6	182.0	70.8	172.7	128.2	275.6	153.0	934.2	-

Statistic	January	February	March	April	May	June	July	August	September	October	November	December	Annually	24 hours
Highest Daily rainfall (mm)	75.2	80.4	74.4	103.2	119.9	109.4	80.2	29.8	58.2	54.0	105.2	52.6	119.9	-
90th Percentile rainfall (mm)	102.9	90.8	83.1	113.8	74.3	109.6	93.5	59.4	88.9	103.7	136.9	99.2	821.3	-
1-in-20 year (mm)*	-	-	-	-	-	-	-	-	-	-	-	-	-	133

Notes:

*Assuming latitude and longitude of -37.88, 147.57

2.3 Geology

A review of Visualising Victoria's Groundwater (VVG) (VVG, 2024) indicates the regional geological units present in the study area are Quaternary Sediments with potential Haunted Hills Formation along the northern boundary.

Geology at the neighbouring landfill is Quaternary from 0.7 m below ground level (BGL) to 5.6 mBGL, underlain by sands and gravels (inferred Haunted Hills Formation) to 39.5 mBGL and deeper underlain by Boisdale Formation, underlain again by Gippsland Limestone (Golder, 2018).

2.4 Hydrogeology

A review of the VVG database indicates that regional groundwater beneath the site occurs at depths ranging between 20 to 50 metres below ground level (m BGL), dependent on localised topography (VVG, 2024).

Site observations from the neighbouring landfill frequently note that groundwater is observed to be 30 mBGL and lower than the base of surface water bodies (Golder, 2018 & Nolan Consulting, 2021).

The hydrogeological assessment conducted at the neighbouring landfill site (Golder, 2018) estimated south-easterly groundwater flow direction at the site, changing to a north-easterly flow direction across the landfill extent.

2.4.1 Aquifers

Based on the geology present at the site and regionally (VVG, 2024), there are various aquifers present at the site: the Quaternary Aquifer and the Haunted Hills Formation as an upper tertiary/quaternary aquifer, the Gippsland Limestone/Lakes Entrance formation as an upper mid-tertiary aquitard, as well as the Cretaceous and Palaeozoic Bedrock basement.

2.4.2 Existing Groundwater Uses

There are no bores located on the site, however, several groundwater bores are located at the neighbouring Bairnsdale Landfill.

A search of the VVG database shows eight registered groundwater bores within 1 km of the centre of the site. Four of the bores are observational bores related to the landfill itself, one is domestic, one is domestic and stock and two are unknown uses. The bores are presented in Table 2–4.

Table 2–4: Existing, registered groundwater bores within 1 km of the Site according to VVG (2024).

Bore ID	Direction from Site	Distance from Site (m)	Total Depth (m)	Screened Depth (m)	Screened Lithology
119506	North-west	325	22	19–22	Sandstones
119507	South-east	719	31	21–30	Sand, gravelly clay
119508	South-east	458	35	26–35	Gravel, sand and clay
120349	West	829	124	84–124	Shelly marl and limestone

Bore ID	Direction from Site	Distance from Site (m)	Total Depth (m)	Screened Depth (m)	Screened Lithology
141403	South-east	486	39.1	35.3–38.2	Sands and interbedded layers
46982	West	953	118.8	Unknown	Unknown
46989	South	872	131	Unknown	Unknown
WRK964349	South	865	46.1	35.5–43	Sand

2.5 Topography and Drainage

As per the EMP (SMEC, 2024), the site is located within the Gippsland Basin's northern edge, on a plateau. Further east and north of the site, the plateau slopes down towards the water bodies of Skeene Creek and the Macleod Morass. The neighbouring landfill has a topography that slopes approximately from the south-west to the north-east (Golder, 2018).

Several surface water bodies are nearby the site, the closest are:

- Farm dams on neighbouring properties (approximately 850 m south).
- Skeene Creek (approximately 900 m south-east).
- Hollis Creek (approximately 850 m north-west).
- Macleod Morass (approximately 2,600 m east).
- Mitchell River (approximately 2,200 m north-east).
- Jones Bay (approximately 4,700 m north-east).

2.6 Environmental Values

The *Environment Protection Act 2017* (the Act) is the overarching legislation governing the management of environmental resources in Victoria. The Act creates the framework whereby various aspects of the environment are managed. The Victoria Government Gazette Environment Reference Standard (ERS) (Victorian Government, 2021) is a subordinate legislation and outlines the environmental values of waters and other environmental aspects.

Under the Act, Council is obliged to adhere to the general environmental duty (GED). As such, Council must reduce the risk of harm from its activities to human health and the environment and from pollution or waste.

The ERS provides an approach for identifying the environmental values of the resource and identifies the guidelines against which the environmental values are to be assessed. The relevant environmental values are outlined below.

2.6.1 Groundwater

Groundwater quality segments are defined in terms of the concentration of Total Dissolved Solids (TDS) with the environmental values determined by the groundwater segment.

According to VVG (2024), groundwater salinity in the area is between 1,000 to 3,500 mg/L, which corresponds to groundwater Segment A2 of the ERS. However, a review of the hydrogeological assessment prepared for the adjacent landfill (Golder, 2018) considers the groundwater adjacent to the site to be in Segment A1. Based on this information, the most conservative segment has been selected for the site. The environmental values to be protected under Segment A1 are shown in Table 2–5. Groundwater quality objectives are provided in Table 2–6.

Table 2–5: Environmental values that apply to the groundwater segments

Environmental Value	Segments (mg/L TDS)						
	A1	A2	B	C	D	E	F
	(0 – 600)	(601 – 1,200)	(1,201 – 3,100)	(3,101 – 5,401)	(5,401 – 7,100)	(7,101 – 10,000)	(>10,001)
Water dependent ecosystems and species	✓	✓	✓	✓	✓	✓	✓
Potable water supply (desirable)	✓						
Potable water supply (acceptable)		✓					
Potable mineral water supply	✓	✓	✓	✓			
Agriculture and irrigation (irrigation)	✓	✓	✓				
Agriculture and irrigation (stock watering)	✓	✓	✓	✓	✓	✓	
Industrial and commercial use	✓	✓	✓	✓	✓		
Water-based recreation (primary contact recreation)	✓	✓	✓	✓	✓	✓	✓
Traditional Owner cultural values	✓	✓	✓	✓	✓	✓	✓
Buildings and structures	✓	✓	✓	✓	✓	✓	✓
Geothermal properties	✓	✓	✓	✓	✓	✓	✓

2.6.2 Surface water

Within the larger precinct exists Skeene Creek, south of the site which extends from east to west. The ERS (2021) categorises the site to be within the “Central Foothills and Coastal Plains” surface water segment. The environmental values for this segment, as per Table 5.5 of the ERS (2021), are as follows:

- Water dependent ecosystems and species that are slightly to moderately modified.
- Human consumption after appropriate treatment.
- Agriculture and irrigation.
- Human consumption of aquatic foods.
- Aquaculture.
- Industrial and commercial.
- Water-based recreation (primary, secondary contact and aesthetic enjoyment).
- Traditional Owners cultural values.

The relevant quality objectives for the surface water onsite are set out below in Table 2–6.

Table 2–6: Groundwater and Surface water quality objectives

Analyte	Water dependent ecosystems[1]	Potable Water Supply[2]	Agriculture and Irrigation (Stock Watering)[3]	Agriculture and Irrigation (Irrigation)[4]	Water based Recreation (Primary)[5]	Buildings and Structures[6]
Ammonia as N (mg/L)	0.9	0.41[7,8]	-	-	0.41[7,8]	-
Nitrate as N (mg/L)	1.1 | 2.6 | 29 *	11.3[7]	90.3	-	113[7]	-
Nitrite as N (mg/L)	-	0.91[7]	-	-	9.1[7]	-
Nitrogen (Total) mg/L	1.1[13]	-	-	5	-	-
Total Phosphorous (mg/L)	0.055[13]	-	-	-	-	-
Total Dissolved Solids (mg/L)	-	600[8]	3,000	-	600[8]	-
Turbidity (NTU)	25[11]	5	-	-	-	-
Aluminium (mg/L)	-	-	-	5.0	-	-
Calcium (mg/L)	-	-	1,000	-	-	-
Chloride (mg/L)	-	250[8]	-	175	250[8]	6,000
Magnesium (mg/L)	-	-	2,000	-	-	-
Sodium (mg/L)	-	180[8]	-	115	180	-
Sulphate as S (mg/L)	-	83[7,8]	-	333[7]	83[7,8]	330
Arsenic (mg/L)	-	0.01	0.5	0.1	0.1	-
Cadmium (mg/L)	0.0002	0.0002	0.01	0.01	0.02	-
Chromium (mg/L)	-	-	1.0	0.1	-	-
Copper (mg/L)	0.0014	1.0[8]	0.4	0.2	1.0[8]	-
Iron (mg/L)	-	0.3[8]	-	0.2	0.3[8]	-
Lead (mg/L)	0.0034	0.01	0.1	2.0	0.1	-
Manganese (mg/L)	1.9	0.1[8]	-	0.2	0.1=[8]	-
Mercury (mg/L)		0.001	0.002	0.002	0.001	-
Nickel (mg/L)	0.011	0.02	1.0	0.2	0.2	-
Zinc (mg/L)	0.008	3.0[8]	20	2	3.0[8]	-
Formaldehyde (mg/L)	-	0.5	5	-	0.5	-
pH	6.8 – 7.7[13]	6.5 – 8.5[8]	6.0 – 8.5	-	6.5 – 8.5[8]	<5.5

Analyte	Water dependent ecosystems[1]	Potable Water Supply[2]	Agriculture and Irrigation (Stock Watering)[3]	Agriculture and Irrigation (Irrigation)[4]	Water based Recreation (Primary)[5]	Buildings and Structures[6]
PFOS (µg/L)	0.00023[9]	0.07[10]	0.07[10,12]	-	2[11]	-
PFOA (µg/L)	19[9]	0.56[10]	0.56[10,12]	-	10[11]	-
PFHxS (µg/L)	-	0.07[10]	0.07[10,12]	-	2[11]	-
Sum of PFOA and PFHxS (µg/L)	-	0.07[10]	0.07[10,12]	-	2[11]	-

Notes:

* 95% Freshwater Toxicant DGV's (Criteria for nitrate as N is adjusted based on water hardness (Alkalinity (Bicarbonate as CaCO3)). A value of 1.1 mg/L is adopted for soft water (<30 m/L CaCO3), 2.6 mg/L is adopted for moderately hard water (30 – 150 mg/L CaCO3) and 29 mg/L is adopted for hard water (>150 mg/L CaCO3)).

[1] ANZG Freshwater Toxicant DGVs LOSP 95% (Nov 2024)

[2] NHMRC, *National Water Quality Management Strategy, Australian Drinking Water Guidelines 6- Version 3.5*, 2011 (Updated August 2025) (ADWG 2025).

[3] ANZECC 2000 Livestock DW Low Risk Trigger Values

[4] ANZECC 2000 Irrigation Long Term Trigger Values

[5] Recreational guidance is based on ADWG 2025, multiplied by a factor of 10 for non-volatile contaminants to reflect the lower likelihood of water being ingested while partaking in recreational activities as per NHMRC, *Guidelines for Managing Risks in Recreational Water*, 2008.

[6] AS 2159-2009 Piling – Design and Installation

[7] Calculated using stoichiometry for conversion from total species concentration.

[8] Aesthetic value used for conservatism.

[9] PFAS NEMP (HEPA, 2025) 99% species protection, freshwater

[10] PFAS NEMP (HEPA, 2025) Health-based guidance value – Drinking water (NHMRC 2011)

[11] PFAS NEMP (HEPA, 2025) Health-based guidance value – Recreational water (NHMRC 2019)

[12] PFAS NEMP (HEPA, 2025) Health-based guidance value – Drinking water (NHMRC 2011) has been applied as a conservative measure, in the absence of criterion for agriculture and irrigation PFAS values.

[13] ERS criteria – Table 5.8: Rivers and streams indicators and objectives for Central Foothills and Coastal Plains, *Lowlands of Yarra, South Gippsland, Bunyip, Latrobe, Thomson, Mitchell, Tambo and Snowy basins*

It is noted that the ERS default level of species protection % should be included for any future contaminants that may be encountered but not listed.

2.6.3 Land

In accordance with Table 4.2 of the ERS (2021), the land use category for the site is Industrial/commercial. The environmental values for this segment are as follows:

- Land dependent ecosystems and species that are highly modified.
- Human health.
- Buildings and structures.

2.6.4 Odour and Wind

In accordance with the ERS (2021), Council is legally obligated to manage the ambient air environment around the site and ensure there are no adverse impacts resulting from odour and wind at the site.

There are no specific criteria related to assessment of these amenity impacts. However, as indicated in Table 2.1 in the ERS, there are several environmental impacts that are to be minimised within ambient air quality:

- Life, health and well-being of humans.
- Life, health and well-being of other forms of life, including protection of ecosystems and biodiversity.
- Local amenity and aesthetic enjoyment.
- Visibility.

- The useful life and aesthetic appearance of buildings, structures, property and materials.
- Climate systems that are consistent with human development, the life, health and well-beings of humans and the protection of ecosystems and biodiversity.

According to wind rose based on five years of weather data collected by the Bairnsdale Airport Weather Station, there is a prevailing wind blowing to the site's south/south-east (Figure 2–1). The nearest sensitive receptor (dwelling) to the south/south-east is located 1,125 m from the proposed operational area.

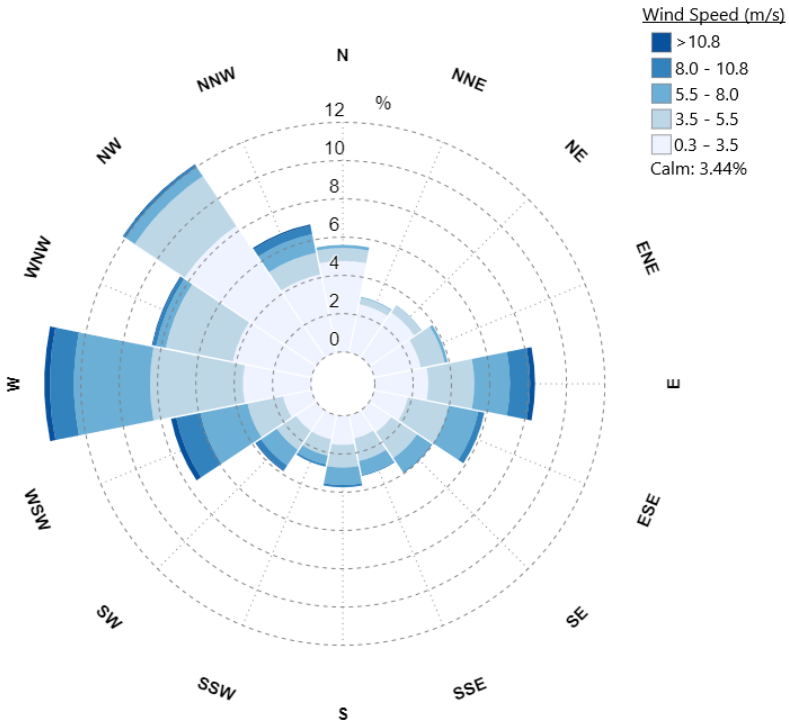

Figure 2–1: Wind Rose for Forge Creek for the Bairnsdale Airport weather station sourced from *Bureau of Meteorology* .

2.7 Pathogens

Council has a duty to ensure that human health, the environment and amenity are protected throughout the composting process. Due to the nature of the composting process, there are risks associated with the propagation of pathogens from contact water generation from the compost stockpiles and site activity. Council is legally required, under the ERS (2021), to ensure that there are no adverse impacts resulting from these risks to the wider environment, human health or amenity.

2.8 Human and Fauna Health

Council is legally obligated to ensure that impact to human and fauna health at the site and nearby offsite receptors is kept to a minimum. As there are inherent risks in handling contact water generated from the compost stockpiles which could harbor pathogens, Council must ensure their staff are suitably trained and vaccinated prior to handling any feedstocks or composted products.

The contact water generated from the composting process can harbour pathogens that can be toxic if ingested or transmitted by being physically touched. The key criterion for managing this risk is set out though the pasteurisation process required for high-risk organic wastes.

2.8.1 Pasteurisation

As per the EMP (SMEC, 2024), the pasteurisation process harbours viable pathogens. Thus, the compost material must be sufficiently pasteurised to minimise the risk of pathogens to human and fauna health. Further details can be found in the EMP (SMEC, 2024); and is thus not repeated here.

2.9 Product Requirements

Following the pasteurisation process, the compost material can be turned into pasteurised product, composted product or mature compost. Further details can be found in the EMP (SMEC, 2024).

The main contaminants of concern for the contact water based on the final product are summarised in Table 2–7 below.

Table 2–7: Physical and chemical requirement for composts and mulches extracted from Table 9 of EPA Publication 1558.1

Characteristic	Pasteurised product	Composted product	Mature Compost
Arsenic (dry mg/kg)	<20	<20	<20
Cadmium (dry mg/kg)	<1	<1	<1
Boron (dry mg/kg)	<100	<100	<100
Chromium (dry mg/kg)	<100	<100	<100
Copper (dry mg/kg)	<150	<150	<150
Lead (dry mg/kg)	<150	<150	<150
Mercury (dry mg/kg)	<1	<1	<1
Nickel (dry mg/kg)	<60	<60	<60
Selenium (dry mg/kg)	<5	<5	<5
Zinc (dry mg/kg)	<300	<300	<300
DDT/DDD/DDE (dry mg/kg)	<0.5	<0.5	<0.5
Aldrin (dry mg/kg)	<0.02	<0.02	<0.02
Dieldrin (dry mg/kg)	<0.02	<0.02	<0.02
Chlordane (dry mg/kg)	<0.02	<0.02	<0.02
Heptachlor (dry mg/kg)	<0.02	<0.02	<0.02
HCB (dry mg/kg)	<0.02	<0.02	<0.02
Lindane (dry mg/kg)	<0.02	<0.02	<0.02
BHC (dry mg/kg)	<0.02	<0.02	<0.02
PCBs (dry mg/kg)	Not detectable limit (0.2mg/kg)	Not detectable limit (0.2mg/kg)	Not detectable limit (0.2mg/kg)

3. Conceptual Site Model

A critical element of any risk assessment is the development of a preliminary Conceptual Site Model (CSM). The CSM describes the environmental setting, identifies contaminant sources (potential areas of concern and associated contaminants), modes of contaminant movement (migration pathways), the person/ecosystem components/environmental values potentially affected by the contamination (potential receptors) and how exposure may occur (exposure routes).

The development of the CSM is an iterative process, whereby the initial CSM is developed in the first stage of site assessment and revised as more detailed information on the site and the nature of contamination becomes available. The CSM is used to identify risks to human health, the environment and environmental values, as well as uncertainties or critical gaps in information that need to be addressed in subsequent stages.

The objective of the CSM is to summarise and encapsulate pertinent information derived from the many studies undertaken at the site and surrounding areas into a document which clearly identifies the following, and how they inter-relate:

- The history of activities and land development at the site and surrounding properties, including potentially contaminating activities and land uses.
- The progression and scope of investigation works undertaken by the client and other consultants about groundwater, surface water and amenities.
- The environmental setting at the site and surrounding properties.
- The inferred sources, nature and extent of contamination, including the various media potentially affected by the contamination.
- The mechanisms for transport and attenuation of the contaminants, and exposure of identified receptors to the contamination.
- The potential health and environmental risks which the identified contamination is inferred to pose.
- The potential contamination threat to the proposed future use based on results of environmental investigation work.
- For a risk to be present, a complete pathway must exist between the source of contamination and the receptor (i.e. complete source-pathway-receptor linkage).

3.1 Potential Sources

As per Figure 1 in Appendix A, the potential sources which may result in environmental impact at the site, relating to contact water, include the following:

- Class A contact water tank.
- Class B contact water dam.
- Organic stockpiles on the Convaero System and the compost maturation pad and windrows: sediment wash off, propagation of odour and pathogens.

3.2 Potential Migration Pathways and Exposure Pathways

The migration pathway is the mechanism by which a potential source of environmental impact can get from A to B; in this case, from the source/s to the receptor/s. Exposure pathways are the mechanism by which the environmental impact move to/enter the receptor/s.

A summary of the potential migration pathways and exposure pathways is provided below.

3.2.1 Contact Water Dam and Contact Water Tank

Potential contact water migration pathways include:

- Vertical migration through contact water dam into the groundwater table.
- Vertical migration from the contact water tank into the groundwater table.
- Overland flow into surface water.
- Washing down of machinery into surface water and into the groundwater table.
- Spills from machinery into surface water and into the groundwater table.

Potential groundwater exposure pathways include:

- Uptake by flora.
- Ingestion by humans and fauna.
- Impacts on groundwater quality.
- Impacts on livestock drinking water quality.
- Impacts on irrigation water quality.

3.2.2 Organic Stockpiles

3.2.2.1 Sediments

Potential sediment migration pathways include:

- Spills from machinery.
- Airborne migration.
- Physical movement.

Potential biological exposure pathways to humans and fauna include:

- Inhalation.
- Dermal contact.

3.2.2.2 Odour

Potential odour migration pathways include:

- Airborne migration.

Potential biological exposure pathways to humans and fauna include:

- Inhalation.

3.2.2.3 Pathogens

Potential pathogen migration pathways include:

- Airborne migration.
- Physical movement.
- Fauna and vermin interaction with organic stockpiles and windrows.
- Washdown of organic stockpiles.

Potential biological exposure pathways to humans and fauna include:

- Inhalation.
- Dermal contact.

3.3 Potential Receptors

Table 3–1 identifies the potential receptors that may be impacted by the identified environmental contaminants.

Table 3–1: Potential receptors

Potential Receptor	Onsite/Offsite
Flora and Fauna	Onsite and offsite
Surface water	Onsite and offsite
Groundwater	Onsite and offsite
Land	Onsite and offsite
Residential properties	Offsite
Humans (residents, workers)	Offsite
Human (staff, visitors, maintenance/construction workers)	Onsite

A summary of potential sources, receptors and pathways is specified in Table 3–2.

Table 3–2: Linkage of sources, receptors and potential pathways for onsite and offsite receptors

Environmental Aspect/Hazard (Source)	Pathways	Receptors	Onsite/Offsite	Potential Environmental Impacts	Complete Pathway	Comment
Contact water migration	Vertical migration through contact water dam into the groundwater table	• Groundwater users (e.g. humans, livestock and flora). • Groundwater dependent ecosystems.	Onsite and offsite	• Pollution of groundwater nearby residents. • Stressed flora and fauna. • Human health impacts. • Reduced quality of livestock drinking water. • Reduced quality of irrigation water.	Yes (potentially)	The contact water dam will have a compact clay liner (CCL).
Contact water migration	Vertical migration from the Convaero System/contact water tank into the groundwater table	• Groundwater users (e.g. humans, livestock and flora). • Groundwater dependent ecosystems.	Onsite and offsite	• Pollution of groundwater nearby residents. • Stressed flora and fauna. • Human health impacts. • Reduced quality of livestock drinking water. • Reduced quality of irrigation water.	Yes (potentially)	The contact water tank will be bunded on the Convaero System area which will also be bunded, thus minimising the likelihood that contact water will leave the Convaero System and/or contact water tank.
Contact water migration	Overland flow from the contact water dam into surface water	Local waterbodies and associated users.	Onsite and offsite	• Pollution of local surface waterbodies. • Health impacts on end users (e.g. humans, livestock and flora).	Yes (potentially)	The contact water dam will have an emergency overflow point, thus minimising the risk of contact water will leave the site.
Contact water migration	Overland flow from the Convaero System/contact water tank into surface water	Local waterbodies and associated users.	Onsite and offsite	• Pollution of local surface waterbodies.	Yes (potentially)	The contact water tank will be bunded on the Convaero System area which will also be bunded, thus minimising the

Environmental Aspect/Hazard (Source)	Pathways	Receptors	Onsite/Offsite	Potential Environmental Impacts	Complete Pathway	Comment
				• Health impacts on end users (e.g. humans, livestock and flora).		likelihood that contact water will leave the Convaero System and/or contact water tank.
Contact water migration	Washing down of machinery into surface water and/or into the groundwater table	• Groundwater users (e.g. humans, livestock and flora). • Groundwater dependent ecosystems. • Local waterbodies and associated users.	Onsite and offsite	• Pollution of groundwater nearby residents. • Stressed flora and fauna. • Human health impacts. • Reduced quality of livestock drinking water. • Reduced quality of irrigation water. • Pollution of local surface waterbodies. • Health impacts on end users (e.g. humans, livestock and flora).	Yes (potentially)	A washdown station is proposed but the water will be directed to the Class A contact water tank.
Contact water migration	Spills from machinery into surface water and/or into the groundwater table	• Groundwater users (e.g. humans, livestock and flora). • Groundwater dependent ecosystems. • Local waterbodies and associated users.	Onsite and offsite	• Pollution of groundwater nearby residents. • Stressed flora and fauna. • Human health impacts. • Reduced quality of livestock drinking water. • Reduced quality of irrigation water. • Pollution of local surface waterbodies.	Yes (potentially)	All feedstock and unpasteurised materials are to be contained on a concrete hardstand. Onsite machinery will be regularly maintained and serviced.

Environmental Aspect/Hazard (Source)	Pathways	Receptors	Onsite/Offsite	Potential Environmental Impacts	Complete Pathway	Comment
				• Health impacts on end users (e.g. humans, livestock and flora).		
Contact water migration	Airborne migration of odour from contact water generation, including the contact water dam, via inhalation	Humans and fauna.	Onsite and offsite	• Air pollution. • Biosecurity risk. • Impacts on humans and fauna.	Yes	Odour is expected from the generation of contact water from the aerobic composting process.
Contact water migration	Airborne migration of pathogens/contaminants from contact water generation via inhalation	Humans and fauna.	Onsite and offsite	• Air pollution. • Biosecurity risk. • Severe health impacts on humans and fauna.	Yes	Pathogens/contaminants are expected from the generation of contact water from the aerobic composting process.
Contact water migration	Physical movement of pathogens/contaminants from contact water generation via dermal contact	Humans and fauna.	Onsite and offsite	• Biosecurity risk. • Severe health impacts on humans and fauna.	Yes (potentially)	Pathogens/contaminants are expected from the generation of contact water from the aerobic composting process.

4. Contact Water Generation

Contact water is likely to be generated at numerous stages of the composting process at the site. Given this, there are two potential classes of contact water that can be generated onsite: Class A and Class B.

Class A contact water consists of any contact water generated from the unpasteurised process from the Convaero System. Any contact water generated from the Convaero System will be classified as Class A contact water and will feed into the proposed contact water tank. The Class A contact water does not include any surface water runoff from the transportation of compost material on the access road to the drop off station, storage area or otherwise.

In contrast, Class B contact water consists of any contact water generated from the pasteurised process. This includes surface water runoff that has percolated through the compost material from windrows of composting product and the compost maturation pad, as well as the access road along the perimeter of the concrete maturation pad. Additionally, it also encompasses the washdown from the compost maturation pad. Any contact water generated at these locations will be classified as Class B contact water and will be directed into the proposed contact water dam.

4.1 Water Balance Models

In accordance with BPEM, as part of the environmental assessment of the site, a water balance was created to better understand the estimated volume of contact water generated at the site and determine whether the proposed contact water infrastructure (i.e. the contact water dam and contact water tank) are sufficiently sized to safely manage such contact water.

The outcomes of the water balance will help determine whether the proposed contact water management options are the most appropriate for the site.

4.1.1 Input Data

To create the water balance models, required input data included:

- Climate data from the closest BoM weather station to the site (station ID: 085279, approximately 3,800 m west of the site).
- Technical specifications for the proposed Convaero System, including relevant mass balance data.
- Runoff coefficient for the site (assumed to be a factor of 0.95 for concrete).
- A pan evaporation (E_{pan}) factor of 0.7.
- The water balance models were inspired from the SKALA mass balance model, as per Appendix C.

Various assumptions were made, including:

Class A (unpasteurised contact water)

- The compost piles in the Convaero System are covered with a tarp.
- The tarp permits evaporation/water to escape from the Convaero System when it is dry.
- During rainfall events, nominal 5% of the rainfall infiltrates the tarp into the unpasteurised compost and become Class A contact water.
- The contact water tank volume is in the order of 30 kL.
- The contact water tanks starts off at 50% capacity.
- The total size of the Convaero System being considered is 6,000 m^2.
- No washdown/cleaning of the Convaero System was considered.
- No other leachate is generated (i.e. from surrounding hardstand).

Class B (pasteurised contact water)

- The area of the contact water dam is 916.67 m^2, based on a volume of 2,200 m^3 and a height of 2.4 m (3 m minus a 600 mm freeboard).
- It is assumed that the contact water dam has a permeability of $1x10^{-9}$ for a compacted clay liner (CCL) (i.e. 0.1 mm per day, assuming a head of one metre).
- The contact water pump at the contact water dam is not in operation.
- 1,000 L/day of runoff from washing/cleaning of the compost maturation pad goes to the contact water dam.
- The width of the access road around the compost maturation pad is 7.4 m.
- 130 L/day of contact water from the contact water dam will be used for uptake of the compost material on the compost maturation pad area. If insufficient volume is available, water will be sourced elsewhere.
- Any contact water falling directly onto the windrows in the compost maturation pad is absorbed by the compost.
- Any contact water falling onto the compost maturation pad area other than the windrows will runoff into the compost water dam, which represents approximately a third of the compost maturation pad area.
- Evaporation from the compost in the windrows is considered negligible.

Various exclusions were made, including:

- A vehicle washdown area and a wheel washdown area have been excluded from the water balance models.
- Access roads for the Class A (unpasteurised) contact water has been excluded from the water balance model.
- The drop off station and storage area are not included in the Class A (unpasteurised) contact water balance model.
- No design specifications account for dispersive soils in the A2 and B soil horizons as any runoff onsite is from hardstand areas only.

4.1.1.1 Climate Data

Historic daily climate data from SILO (SILO, 2024) was used for the generation of the water balance models, as outlined in Section 2.2.

4.1.2 Water Balance Outputs

Two separate water balance models were created for the site for each class of contact water generated (i.e. Class A and Class B), as per Figure 4–1 to Figure 4–2.

As per the Class A water balance model, the frequency of overflow is approximately 0.03% of the time modelled. Furthermore, the Class A water balance model shows that 99.99% of the modelled overflow is less than 7.07 kL per day, with an average modelled spill volume of 4.25 kL and a maximum modelled spill volume of 7.8 kL. Under the highest daily rainfall rate of 122.8 mm, a spill volume of 2.64 kL was anticipated. This is less than the anticipated daily rainfall rate of 133 mm for a 1-in-20 year storm event at the site. Hence, as the Convaero System will be bunded between 135 and 250 mm and so can store up to 810 m^3 (6,000 m^2 x 0.135 m), it is expected that the Convaero System will be sufficiently sized to accommodate this overflow.

As per the Class B water balance model, there is no overflows for the time modelled. Hence, the contact water dam is anticipated to be sufficiently sized to accommodate any contact water generation from the pasteurised compost.

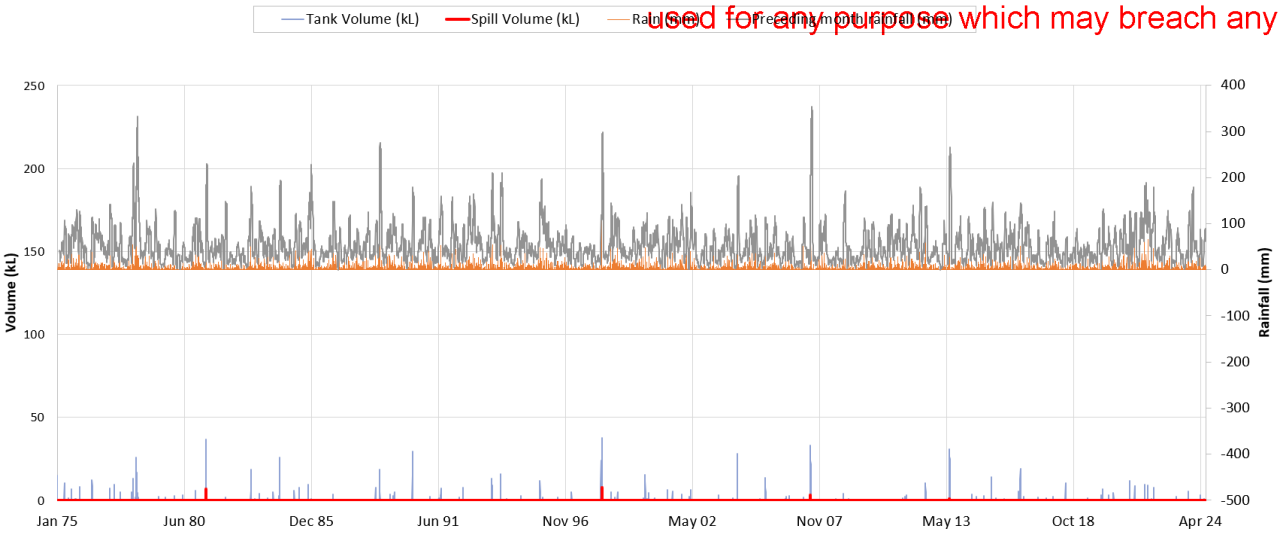

Figure 4–1: Tank volume (kL), spill volume (kL), rainfall (mm) and preceding month rainfall (mm) for the Class A water balance model

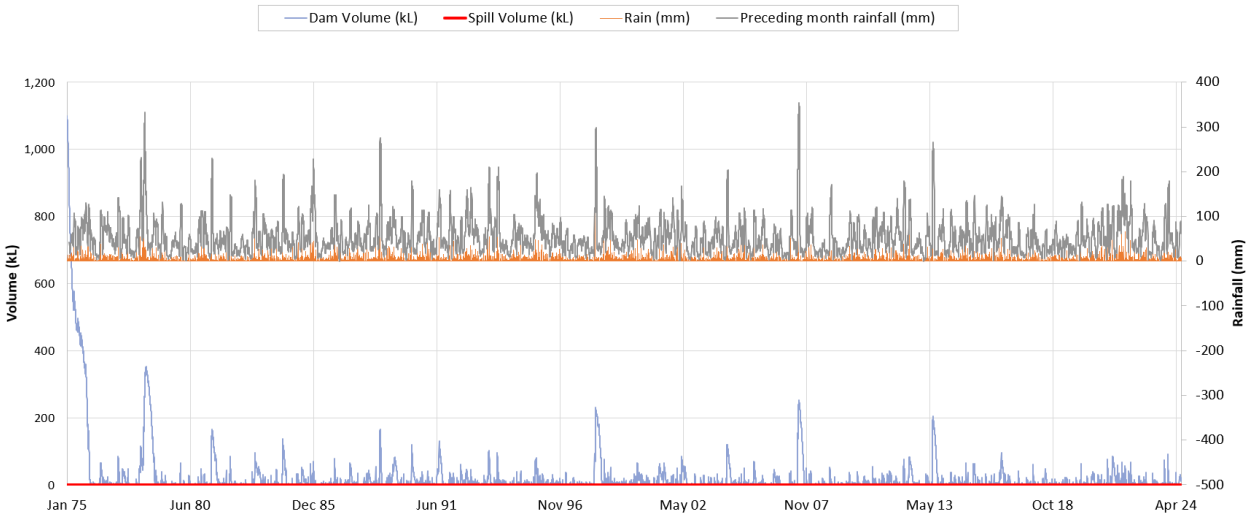

Figure 4–2: Tank volume (kL), spill volume (kL), rainfall (mm) and preceding month rainfall (mm) for the Class B water balance model

The complete water balance model outputs can be found in Appendix B.

4.1.3 Water Balance Discussion

As per Section 4.1.2, Class A and Class B water balance models were investigated to assess the risk of contact water overflow.

As per the Class A water balance model, there are no anticipated overflows which exceed the combined holding capacity of the contact water tank and the Convaero System. Similarly, as per the Class B water balance model, there are no anticipated failures.

5. Proposed Contact Water Infrastructure

5.1 Contact Water Collection System

Presently, there is no contact water collection system infrastructure at the site. However, the proposed infrastructure will include drainage channels allowing the pasteurised contact water to drain by gravity to the contact water dam and the unpasteurised contact water to drain by gravity to a separate, undefined tank.

As per EPA Victoria Publication *1588.1: Designing, constructing and operating composting facilities*, the unlicenced discharge of contact water from the site to surface waters, groundwater or land is an offence under the *Environment Protection Act 2017*. Appropriate preventative infrastructure that can be implemented include sealed surfaces using a stable and low-permeability construction material (e.g. concrete), bunding and installing interception drains around the perimeter of the composting process and storage areas, and the use of contact water tanks and dams.

More specifically, any contact water storage infrastructure used onsite should be (EPA Victoria, 2017):

- Sufficiently designed to accommodate runoff from the total process area which is impacted by contact water from a 1-in-20 year storm event.
- Be suitably redundant to accommodate contact water generation during periods of persistent rainfall.
- Where appropriate, be lined to provide a hydraulic conductivity of less than $1x10^{-9}$ m/s.
- Where appropriate, maintain a minimum freeboard depth to minimise the risk of overtopping.
- Be maintained in an aerobic state to minimise the generation of odour from the nutrient-rich contact water.

5.2 Contact Water Tank

5.2.1 Contact Water Tank Objective

The objective of the contact water tank is to store contact water generation and surface water runoff from inside the drop off station, storage area and Convaero system area. Such water will be used to clean/wash the Convaero System.

This is summarised as the water that has not been pasteurised.

5.2.2 Contact Water Tank Details

It is proposed to construct a contact water tank located in the south-west boundary of the site, minimising the risk of contact water runoff offsite.

The proposed contact water tank is expected to have an operational volume of at least 30 kL, as per the Class A (unpasteurised) contact water balance model. The contact water tank will be fitted with a suitable pump to allow for the collected runoff to be used to clean/wash the Convaero System.

5.2.3 Contact Water Tank Inspection and Maintenance

During the routine site inspections, the contact water tank will be assessed for evidence of failure, including overflow, leaking or cracking. If any signs of failure are evident, this will be reported to the relevant site personnel and actioned as appropriate. This may include:

- Implementing engineering controls to immediately resolve any structural integrity issue.
- Engaging a licenced external contractor to safely collect and transport the contact water offsite to a lawful place authorised to receive such waste material.

5.3 Contact Water Dam

5.3.1 Contact Water Dam Objective

The objective of the contact water dam is to be the emergency overflow point and collect any contact water generation and surface water runoff from the compost maturation pad, access road to the compost maturation pad and washdown from windrows.

This is summarised as the water that has been pasteurised but is not considered Stormwater.

5.3.2 Contact Water Dam Details

It is proposed to construct a contact water dam located in the south-east boundary of the site, minimising the risk of contact water runoff offsite.

The proposed contact water dam will be engineered and constructed using a CCL and general fill, to minimise the risk of potential groundwater contamination. The proposed contact water dam is expected to have an operational volume of 2,200 kL and will operate as the main extraction point for any offsite contact water disposal.

5.3.3 Telemetry

It is anticipated that the contact water dam will be fitted with a telemetry-linked depth water level data logger, to provide instantaneous information on the depth of contact water. Such information will be accessible via the appropriate technology provider (e.g. DataStream). Alarm heights will be determined as appropriate.

Quarterly reviews of the accuracy of the telemetry system should be undertaken to ensure it remains within ±0.05 m accuracy. This is to be undertaken by recording the contact water level within the contact water dam, noting the date, time and comparing with the reported depth values (e.g. those reported in DataStream) for that period. If recalibration is required, Council is to engage the telemetry provider and licenced surveyor to re-establish an accurate level.

5.3.4 Contact Water Dam Inspection and Maintenance

During the routine site daily and monthly inspections as per the EMP (SMEC, 2024), the contact water dam will be assessed for evidence of failure, including erosion, flooding or cracking. If any signs of failure are evident, this will be reported to the relevant site personnel and actioned once raised.

Contact water monitoring is proposed to be undertaken on a quarterly basis, in accordance with analytes presented in Table 2–6. PFAS will also be analysed in contact water to enable future assessment of risk.

5.4 Contact Water Extraction System

Presently, there is no active contact water extraction system at the site. However, it is proposed to have a pump installed at the contact water dam and contact water tank.

Details of the pump and extraction system will be developed as a portion of Detailed Design of the site.

5.5 Contact Water (Leachate) Monitoring Bores

Presently, there are no contact water (leachate) monitoring bores at the site.

5.6 Contact Water Action Level

An action level is the maximum allowable contact water level at the site. Presently, there are no specific contact water action level for the site. However, as per BPEM, the maximum head of leachate is not to exceed 0.5 m below the designed spillway.

5.7 Contact Water Extraction

Contact water from the contact water tank is to be recycled through the pasteurisation process as part of the operation.

If necessary, contact water from the contact water dam can be extracted via a vacuum track for licenced disposal offsite. Council is required to engage a preferred supplier to undertake extraction if contact water levels in the contact water dam exceed the high alarm height.

5.8 Groundwater Monitoring

The number, design and location of the groundwater monitoring bores, and including the relevant upstream groundwater monitoring bores for data collection, is yet to be determined. Relevant timelines for groundwater bore establishment will be determined by Council.

It is proposed that groundwater monitoring for the site will be undertaken at the same frequency as the stormwater and contact water monitoring (quarterly). The groundwater monitoring program will be updated as per recommendations and improvements, either from groundwater quality trends or feedback from the consultant/auditor.

6. Stormwater

6.1 Stormwater Infrastructure

Stormwater drains and infrastructure will be installed throughout the site not impacted by composting activities to capture any rainfall runoff and directed to the stormwater dam, which is separate to the contact water dam. This will aid in minimising the risk of contamination impacts on stormwater from rainfall runoff falling on certain areas of the site.

6.2 Stormwater Monitoring

If there is evidence of the site becoming potentially contaminated from site activities, it is recommended that Council organises a sample collection from a stormwater location and have it sent to a National Association of Testing Authorities (NATA)-accredited laboratory for analysis. As per **Error! Reference source not found.**, the analytes outlined in the Standard Suite will be assessed.

It is also recommended that stormwater monitoring is undertaken following extreme weather events (i.e. >10 mm/h or >25 mm in any 24-hour period).

7. Surface Water

7.1 Surface Water Infrastructure

Any surface water generation at the site is collected and directed to the existing or proposed clean water dam via clean water swale drains, as per drawing 30049148-101 in Appendix A.

The clean water swale drains will drain to the existing clean water dam to the east of the site or the proposed clean water dam located in the northern boundary of the site. The proposed clean water dam has a spillway to allow any overflow to drain via a proposed clean water channel to the existing culvert offsite.

7.2 Surface Water Monitoring

If there is evidence of surface water that has become contaminated from site activities, it is recommended that Council organises a sample collection from a surface water location and have it sent to a NATA-accredited laboratory for analysis. As per **Error! Reference source not found.**, the analytes outlined in the Standard Suite will be assessed.

It is also recommended that stormwater monitoring is undertaken following extreme weather events (i.e. >10 mm/h or >25 mm in any 24-hour period).

8. Trigger Action Response Plan

A Trigger Action Response Plan (TARP) has been developed to support the monitoring program for the site, as presented in the table below.

Table 8–1: [Insert Table Caption]

Monitoring Type	Trigger Levels	Action Response Plan
Groundwater	An exceedance of the adopted criteria outlined in Table 2–6, particularly where the analyte has not previously exceeded criteria. • Increasing groundwater analytes trends over time. An increase is considered to be three consecutive monitoring rounds. • The identification of a change in the groundwater flow direction at the Site. • The identification of new groundwater receptors in the vicinity of immediately down-gradient of the Site. • The identification of monitoring network repairs or data gaps. If any of the above trigger values are observed during the quarterly monitoring or daily/monthly site inspections, the Action Response Plan in the next column should be implemented.	If the trigger levels in the previous column are exceeded during a monitoring event, considerations should be given to the following: • Confirmation that the result is accurate/correct. • A review of groundwater chemical trends should be completed to confirm whether elevated concentrations of contaminants of concern are anomalous results, representative of background groundwater quality or representative of ongoing or increased impacts to the groundwater environment. • Consideration to the potential change to the risk profile, in consultation with the environmental consultant. • Consideration if remedial actions are required, in consultation with the environmental consultant. Contingencies to address the trigger value exceedances include additional groundwater and gauging events, review of the monitoring network/ frequency, an assessment of any increased risks, development of management or remediation responses and update of the EMP.
Surface Water/ Stormwater	• Stormwater discharged from the Site must not be contaminated. • Presence of significant litter, sediment and vegetation in on-site surface water infrastructure that may impact the function and quality of surface water. • After a storm event (>25mm daily rainfall) damage to stormwater infrastructure is noted (caused by erosion for example) and the function of the infrastructure is impacted. • Presence of surface depression capable of ponding water on the landfill cap. • Overgrown portions of the drain. • Cracking and erosion at the base of the drain and ponds. If any of the above trigger values are observed during the daily/monthly site inspections, the Action Response Plan in the next column should be implemented.	If there is evidence of surface water that has become contaminated from site activities, it is recommended that Council organises a sample collection from a surface water location and have it sent to a NATA-accredited laboratory for analysis. As per Table 5–1, the analytes outlined in the Standard Suite will be assessed. It is also recommended that stormwater monitoring is undertaken following extreme weather events (i.e. >10 mm/h or >25 mm in any 24-hour period). The following contingency plan should also be actioned if any of the trigger levels in the previous column are observed: • Inspect after a storm event (>25mm daily rainfall) to ensure that infrastructure has not been impacted, i.e. by erosion, and remains in good working order. If litter, sediment and excess vegetation are identified, organise clearing of stormwater drains. If required, organise clearance of stormwater drains. • Any overgrown portions of the swale drain shall be cleared to ensure that the drain remains free flowing. • All stormwater diversion features are to be inspected for damage on a regular basis and after any significant storm event.
Contact Water (Leachate)	An action level is the maximum allowable contact water level at the site. Presently, there are no specific contact water action levels for the site. However, as per BPEM, the maximum	If the required freeboard in the contact water pond is not being met, the operator should arrange for a vacuum truck to come and remove water from the pond and dispose of it at an appropriately licenced facility.

Monitoring Type	Trigger Levels	Action Response Plan
	head of leachate is not to exceed 0.5 m below the designed spillway. Currently there are no leachate bores onsite.	

9. Quality Assurance and Quality Control (QA/QC)

It is recommended that Council undertake the quality assurance (QA) and quality control (QC) measures to ensure accurate and reliable data are being reported by the NATA-accredited analytical laboratory, as per Table 8-1.

Table 9–1: Quality control testing frequency

Quality Control Test	Prepared by	Recommended minimum frequency
		Non-PFAS[1]
Intra-laboratory duplicates	Field	1 in every 20 samples (5%) tested[2]
Inter-laboratory duplicates	Field	1 in every 20 samples (5%) tested[2]
Trip Blank	Laboratory	Project dependant[3], minimum 1 per batch per media type
Trip Spike	Laboratory	Project dependant[3], minimum 1 per batch per media type if testing for volatile contaminants
Equipment rinsate	Field	1 rinsate per piece of reusable sampling equipment per day
Field blank	Field	Project dependant[4], minimum 1 per media type per day if volatile contaminants are of particular concern

Notes:

[1] ASS4482.1 – 2005 Table 4 Acceptance criteria for quality control samples

[2] Minimum duplicate frequency to be tested, noting additional duplicates are recommended to be collected to provide some flexibility during sample selection, in the event corresponding primary samples are not selected by the project manager.

[3] Consult the project manager for guidance on frequency of trip blank, trip spike, and field blank noting this is project dependent. Below is a general guide:

a) Trip blank/spike – Minimum assumes sampling for volatile contaminants of concern during a sampling event of duration less than 1 week. As a guide, the number of trip blanks/spikes should be increased for sites suspected of hydrocarbon impact, if the site is remote and/or there are long transport times to laboratories, etc. These situations may need to increase spikes as high as one set per ice chest.

b) Field blanks – Field blanks can apply in other situations to check that contaminants are not being introduced due to say a dusty site, volatiles, aerosols, etc.

10. General Environmental Duty (GED)

Under the Act, the general environmental duty (GED) is the underlying principle that all Victorians have a responsibility to prevent and reduce the risk to human health and the environment from pollution or waste as far as reasonably practicable.

When determining the meaning of 'reasonably practicable', Council should consider:

- The likelihood of the risks associated with the specific activity eventuating and causing harm to the environment or the health of the community.
- How extreme the impact could be if the risk was not eliminated.
- The cost, tools and resources available to eliminate or reduce such risks.

Further to the GED, the Act also outlines a duty to manage contaminated land. This includes:

- Identifying the presence of suspected contamination.
- Investigating and assessing the extent of contamination, utilising professional support.
- Providing and maintaining risk mitigation measures, such as:
  - Implementing interim controls while the contamination is being assessed.
  - Undertaking site clean up to maintain the suitability of the site for its current use.
  - Reviewing the suitability of the controls to ensure they remain effective.

In relation to the perceived potential sources of contamination, Council should:

- Systematically identify potential sources of contamination that may impact the land either now or in the future.
- Systematically assess risks of contamination to human health and the environment.
- Enforce suitable controls to reduce potential impacts, including elimination of specific activities, suitable management measures and equipment modification.
- Systematically review the suitability of such controls to ensure their effectiveness.

11. Risk Assessment

An Environmental Aspects and Impacts Risk Register was completed for the site which is outlined in the EMP (SMEC, 2024).

As per Section 3, the following complete or potentially complete pathways and their considered risk of impact to receptors were identified in the conceptual site model:

- Contact water migration from spills caused by machinery into surface water and/or into the groundwater table is considered to be a medium risk of impact to groundwater users, groundwater dependent ecosystems and local waterbodies and associated users onsite and offsite.
- Contact water migration from airborne migration of odour from contact water generation, including the contact water dam, via inhalation is considered to be a low risk of impact to humans and fauna onsite and offsite.
- Contact water migration from airborne migration of pathogens/contaminants from contact water generation via inhalation is considered to be a medium risk of impact to humans and fauna onsite and offsite.
- Contact water migration from physical movement of pathogens/contaminants from contact water generation via dermal contact is considered to be a medium impact to humans and fauna onsite and offsite.

11.1 Monitoring and Controls

As per the Environmental Aspects and Impacts Risk Register included in the EMP (SMEC, 2024), controls for contact water migration include:

- All incoming material, including feedstock and unpasteurised materials, is to be contained on a concrete hardstand, with contact water capture.
- All works are to be completed on the dedicated hardstand area.
- All immature compost is contained in a covered, clay-lined hardstand location.
- All immature and non-pasteurised compost must be stored in the vessels with contact water directed to the contact water tank.
- Any contact water generated from the pasteurised compost is to be directed to the lined contact water dam constructed in line with the recommendations contained in EPA Publication 1588.1.
- The contact water dam must be equipped with a pump and treatment to manage contact water overflow, including an emergency spillway.
- Bunding and grading of the Convaero System to the contact water tank, as well as bunding around the contact water tank.
- Bunding and channelling of compost maturation pad to direct contact water to the lined contact water dam.
- Contact water dam designed to manage a 1-in-20 year rainfall event as per EPA recommendations.
- Regular inspections of the site for contact water flow and blockages.
- Regular maintenance of machinery.
- Spill kits to be set up at refilling and maintenance areas.
- Monthly inspection of contact water dam and contact water tank.
- Separation of contact water and stormwater.
- Biannual quality monitoring of contact water quality.

12. Data Recording and Reporting

All monitoring results and data collected from the site should be retained by Council. It is recommended that Council complete quarterly monitoring reports with the potential to alter this frequency depending on auditor review of the monitoring data. With the quarterly monitoring reports, it is recommended that Council complete an Annual Monitoring Report, summarising the data from the previous year's monitoring. This information should be made available as appropriate, including for potential auditors or other relevant parties, to aid in the safe management of the site. This may include an assessment of the adequacy of the current monitoring requirements and may need to altered depending on auditor feedback.

12.1.1 Contact Water Dam

Contact water levels are recorded and captured via the installed telemetry unit. These contact water records should be maintained for seven years by Council. Council must notify EPA in the event of any contact water overflowing from the dam's batters through the emergency vegetated spillway into the contact water emergency spillway infrastructure. If contact water levels are required to be recalibrated as noted in Section 5.3.3, Council must maintain record this and note it in the Annual Monitoring Report.

12.1.2 Contact Water Disposal

Council must maintain a record of all contact water disposal undertaken by licenced contractors. All disposal receipts are to be retained by Council for review.

12.1.3 Sampling Results

It is recommended that Council updates all groundwater, surface water and stormwater sampling results in the Annual Monitoring Report.

12.2 Inspections

It is Council's responsibility to maintain and monitor the contact water infrastructure at the site. Contingency methods and their agreed timeframes for implementation should be developed as part of the site's EMP (SMEC, 2024). To minimise the risk of overflow or contact water impacting the surrounding environment, Council shall inspect the contact water infrastructure at the site at the following frequencies:

Weekly

- Check the DataStream log over the week for any alarms or alerts.
- If high alarm level is reached in the contact water dam, Council to organise extraction from the contact water dam.

Monthly

- Visual inspection of the contact water tank, including:
  - Checking for evidence of overflow, leaks or cracks.
  - Recording any strong or offensive odours permeating from the contact water tank.
- Visual inspection of the contact water dam, including:
  - Checking for evidence of overflow.
  - Checking liner and batter for signs of degradation.
  - Checking for presence of litter.
  - Inspecting for signs of fowling or algae.
  - Recording any strong or offensive odours permeating from the contact water dam.
- Record the contact water freeboard within the contact water dam, noting the date and time.

  - This record is to be compared with the 'depth' level recorded in DataStream.
  - If major discrepancies are noted (±0.05 m), engage a licenced surveyor and telemetry provider to recalibrate the level sensor.
  - All recalibrations must be recorded and noted in the Annual Monitoring Report.
- Ensure access to the contact water dam is maintained and entry is clear of vegetation.
- Inspection for the presence of contact water in the stormwater runoff areas.
- Inspection of telemetry system for signs of vandalism or damage.
- Inspection of contact water drainage pipes, including the stormwater culverts, for any signs of blockage, damage or leakage.
- Inspection of the clean water swale drains for any signs of blockage.

Biannually

- Biannual quality monitoring of contact water quality.

Annually

- Engage telemetry contractor to undertake remote system diagnostics, to ensure the system is operational and accurate, checking battery stability and solar panel operation.
- Resurvey contact water dam height and adjust alarm levels as required.
- Download data from DataStream and store in Council's records system.
  - Review data and note total occurrences of high alarm alerts throughout the annual period.

Following Extreme Weather Events

- Review telemetry data for events of high alarms during extreme weather events.
- Inspection of telemetry system for signs of damage.
- Visual inspection of the contact water tank, including:
  - Checking for evidence of overflow, leaks or cracks.
  - Recording any strong or offensive odours permeating from the contact water tank.
- Visual inspection of the contact water dam, including:
  - Recording the contact water freeboard within the contact water dam, noting the date and time.
  - Checking for evidence of overflow.
  - Checking liner and batter for signs of degradation.
  - Recording any strong or offensive odours permeating from the contact water dam.
- Review site access and clear any debris preventing access.
- Record any strong or offensive odours permeating from stormwater.
- Collect stormwater and surface water samples for analysis.
- Inspection of contact water drainage pipes, including the stormwater culverts, for any signs of blockage, damage or leakage.
- Inspection of the clean water swale drains for any signs of blockage.

13. Conclusions and Recommendations

This Contact Water Management Plan details the contact water infrastructure located at the site and the required works by Council towards maintaining responsible contact water management.

SMEC provides the following recommendations:

- Construction of a 30 kL contact water tank for contact water generated from the unpasteurised process.
- Construction of a contact water dam for contact water generated from the pasteurisation process.
- Implementation of a pumping system in the proposed contact water dam and contact water tank.
- Implementation of a telemetry system.
- Incorporation of relevant contingency methods and agreed timeframes for implementation into future revisions of the EMP.
- Incorporation of relevant inspection requirements into future revisions of the Annual Monitoring Report and the EMP.
- Annual updates to the Annual Monitoring Report incorporating the sampling results.
- Onsite contact water generation is highly dependent on operational practice.
- Council to enforce proper water management practices onsite in accordance with the assumptions and guidance provided in the CWMP.

Hallelujah

14. References

Bureau of Meteorology (BoM) (2024a), *Climate Data Online*, http://www.bom.gov.au/climate/data/index.shtml, date visited: 7 June 2024

Bureau of Meteorology (BoM) (2024b), *Design Rainfall Data System (2016)*, http://www.bom.gov.au/water/designRainfalls/revised-ifd/, date visited: 7 June 2024

EPA Victoria (2015), Siting, design operation and rehabilitation of landfills, Publication 788.3, August 2015

EPA Victoria (2017), Designing, constructing and operating composting facilities, Publication 1588.1, June 2017

Golder (2018), *Hydrogeological assessment (HA) – Bairnsdale Landfill*, 5th September 2018

Nolan Consulting (2021), *Section 212 Audit – Audit of Landfill Operation 200 Johnstons Road, Bairnsdale*, September 2021

SILO (2024), https://www.longpaddock.qld.gov.au/silo/, date visited: 8 July 2024

SMEC (2024), *Environmental Management Plan*, June 2024

Visualising Victoria's Groundwater (VVG) (2024), https://www.vvg.org.au/, date visited: 7 June 2024

Appendix A

Figures

CONTACT WATER DAM
Proposed - 4300m²

TREE BUND

COMPOST MATURATION
PAD & WIND ROWS

LOOP TRACK

ACCESS TRACK

DROP OFF STATION
(SORTING FACILITY)

PUBLIC DROP
OFF FACILITY

CLEAN WATER DAM
Original - 1330m²
Proposed -2600m²

15 CARPARK SPACES
(REVERSE 45° PARKING)

AMENITIES /
LUNCH ROOM

MC10

ACCESS TRACK

ACCESS TRACK

LOOP TRACK

MEMBRANE COVERED,
PRESSURE AERATED
PROCESS WITH
PROCESS CONTROL

SCREENING & PRODUCT
STORING AREA

Note: FACILITY IS ~800m
FROM FARMHOUSE

EXISTING CLEAN
WATER DAM

LIMIT OF WORKS
ACCESS TRACK

WEIGH BRIDGE

SITE OFFICE

JOHNSTONS ROAD

EXISTING CLEAN
WATER DAM

TREE BUND

LEGEND

DESIGN

- MC10 — CONTROL ALIGNMENT
- 182.0 — MAJOR CONTOURS (0.5m INTERVAL)
- MINOR CONTOURS (0.1m INTERVAL)
- PAVEMENT AREAS
- CONCRETE HARDSTAND AREAS
- RIP-RAP AREAS
  (FOR DETAILS REFER DRG'S 241 TO 244)
- CLEAN WATER SWALE DRAIN
- STORMWATER CULVERTS & HEADWALLS
- LINE MARKING
- FIRE WATER TANKS BY OTHERS
- WIND ROWS
- INDICATIVE DRAINAGE FLOWS
- TREE

EXISTING

- 182.0 — MAJOR CONTOURS (0.5m INTERVAL)
- MINOR CONTOURS (0.1m INTERVAL)

NOT FOR CONSTRUCTION

SCALE 1:1250 12.5 0 25 50

AT A1 SIZE DRAWING

DRAWING FILE LOCATION / NAME
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EAST GIPPSLAND COMPOST FACILITY
DESIGN LAYOUT
CIVIL WORKS PLAN

INFORMATION DOCUMENT

30049148_250526_EGCF_OPT1_REV3_MN

FIGURE NUMBER	1	REVISION	10-10-2025
FIGURE TITLE	Proposed site plan - EGSC Composting Facility Concept Design		
PROJECT NUMBER	30043569	CRS	EPSG:7855

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PAGE SIZE A3

CREATED BY AB17779 SOURCES Base Map - Metromap

SMEC AUSTRALIA PTY LTD
ABN 47 065 475 149

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FIGURE NUMBER	2	REVISION	10-10-2025
FIGURE TITLE	Sensitive receptors - EGSC Composting Facility Concept Design		
PROJECT NUMBER	30043569	CRS	EPSG:7855

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PAGE SIZE A3

CREATED BY AB17779 SOURCES Base Map - Metromap

SMEC AUSTRALIA PTY LTD
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Appendix B

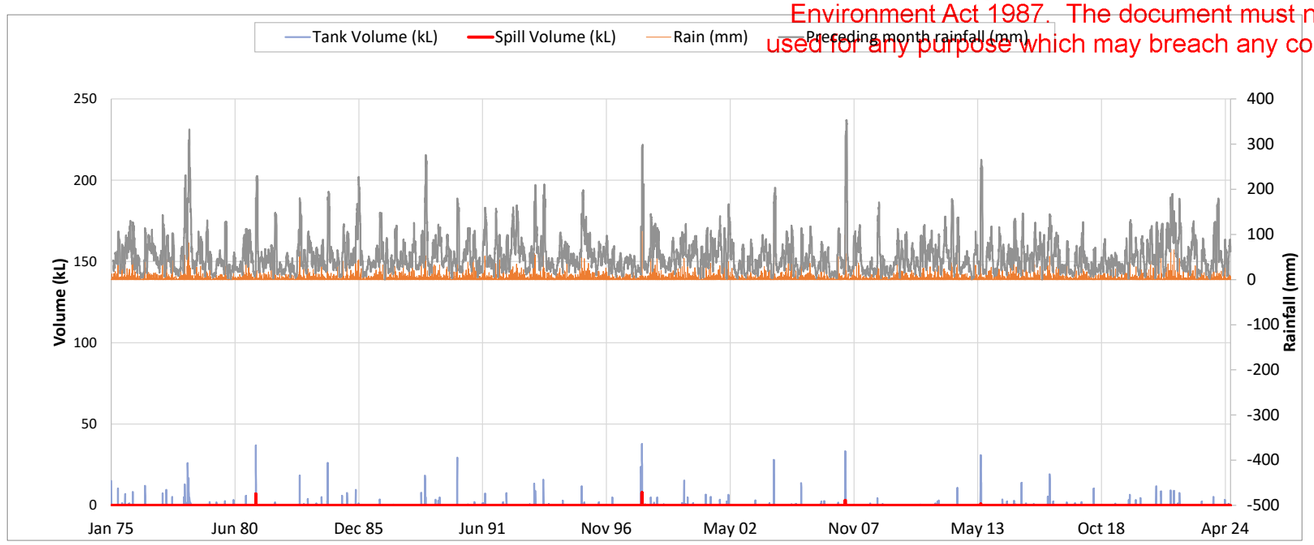
Water Balance Models

Input Parameters	
Tank storage volume (kL)	30
Tank starting volume	50%

	Area (m^2)	Leachate Infiltration (%)		
Area Active Face (m^2)	6,000	5%	300	*based on Convaero System tarp cover*
Area Intermediate Cover (m^2)	0	50%	0	*per NSW EPA Solid Waste Landfill Guidelines*
Area Final Cover (m^2)		10%	0	*per NSW EPA Solid Waste Landfill Guidelines*
Area Leachate Pond	0	100%	0	
			300	m^2

Effective Leachate Contributing area (m^2)	**300**	
Evaporation Area (m^2)	**6,000**	
Incoming tonnage (t/pa)		
Absorbtive losses (kL water/tonne waste placed)	0	*per NSW EPA Solid Waste Landfill Guidelines*
Pan evaporation coefficient	70%	

Count of spills	5		
Frequency of spills	0.00028	0.03%	
Average of spills	4.248	kL	
Maximum spill	7.8	kL	
Proportion of spills less than or equal to:			
10.00%	0.00000	kL	
90.00%	0.00000	kL	
99.00%	0.00000	kL	
99.95%	0.00000	kL	
99.99%	7.07217	kL	

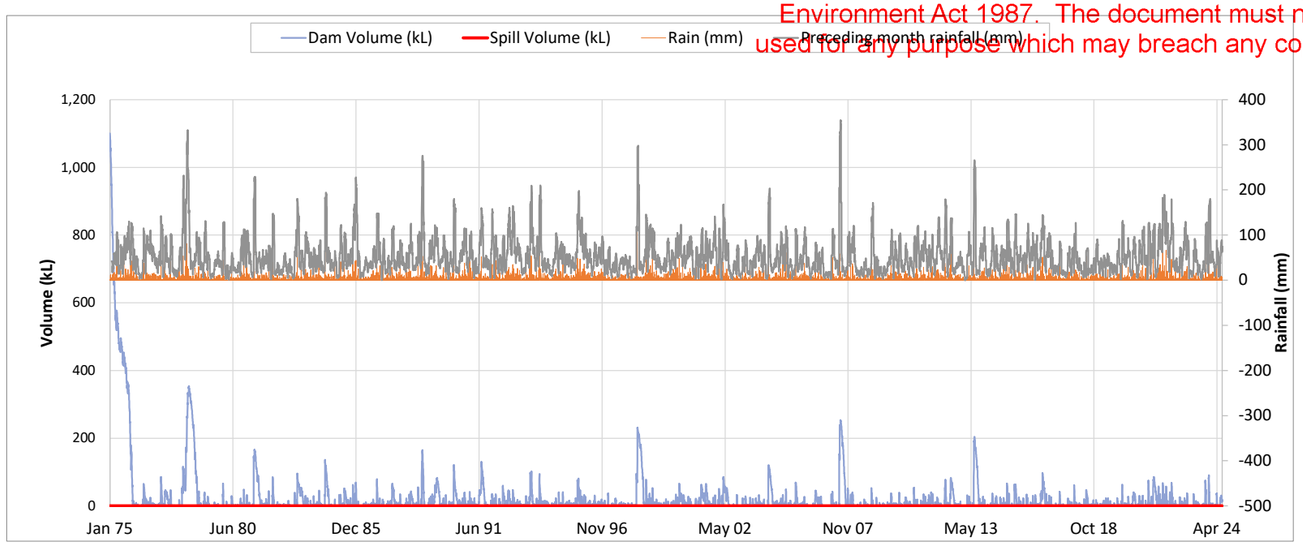


Input Parameters	
Contact water dam storage volume (kL)	2200
Contact water dam starting volume	50%

	Area (m^2)	Leachate Infiltration (%)		
Area Active Face (m^2)	917	100%	917	
Area Intermediate Cover (m^2)	0	50%	0	*per NSW EPA Solid Waste Landfill Guidelines*
Area Final Cover (m^2)		10%	0	*per NSW EPA Solid Waste Landfill Guidelines*
Area Leachate Pond	0	100%	0	
			917	m^2

Effective Leachate Contributing area (m^2)	**916.67**	
Evaporation Area (m^2)	**2,200**	
Incoming tonnage (t/pa)		
Absorbtive losses (kL water/tonne waste placed)	0	*per NSW EPA Solid Waste Landfill Guidelines*
Pan evaporation coefficient	70%	

Count of spills	0	
Frequency of spills	0.00000	0.00%
Average of spills	N/A	kL
Maximum spill	N/A	kL
Proportion of spills less than or equal to:		
10.00%	0.00000	
90.00%	0.00000	
99.00%	0.00000	
99.95%	0.00000	
99.99%	0.00000	



Appendix C

SKALA Environmental Plans

SKALA ENVIRONMENTAL

Eggersmann

SMEC for East Gippsland (Bairnsdale) - 25,000TPA Scenario - Mass Balance

Customer	MEC (for East Gippslan
Site	Bairnsdale
Material	

Date	11/04/2024
Revision	1
Revd' by:	JG

Process Parameters / Assumptions			
Number of bays	6	Reception Hall	25 x 35m
Bay length (m)	40		
Bay width (m)	10		
Bay wall height (m)	1.5		
Pile height (m)	2.5		
Retention time, total (d)	40	21/18	
Turns during Aeration phase (Convaero)	1		

FEEDSTOCK - Input at Gate

Substrate	t/a	m³/t	DM
Food & Garden Organics	14,880	1.82	45%
Garden Organics	10,120	2.5	50%
Future			
Future 2			
Total	25,000		47%

* Pre-treatment line splits FOGO & GO ?

Residual Waste - Contamination

	t/a	m³/t	DM
Contamination, FOGO	298		
Contamination, GO	202		
Total	500		

* Assumed 2% contamination, target lower

Add Water

	t/a	Notes
Process Water, Stage 1	1,725	Process Water
Process Water, Stage 2	863	Fresh Water
Process Water, drained	1,311	Process Water

FEEDSTOCK - Input to Convaero, Stage 1, 20 days

Substrate	t/a	DM
Food & Garden Organics	14,582	45%
Garden Organics	9,918	50%
Process water	1,725	0%
Future 2		
Total in	**26,225**	**44%**
Total out	**20,193**	**52%**

Convaero output, Stage 1 (before adding water again)

Evaporation, drainage & degradation loss	6,032	TPA

Add Process Water

	t/a	DM
Process Water	863	

FEEDSTOCK - Input to Convaero, Stage 2, 20 days

Substrate	t/a	DM
Food & Garden Organics	21,057	49%
Garden Organics		
Future 1		
Future 2		
Total	**21,057**	

Total Output- CONVAERO = input maturation (open windrows)

	t/a	DM
Combined feedstock (mixed)	15,735	56%

Convaero output

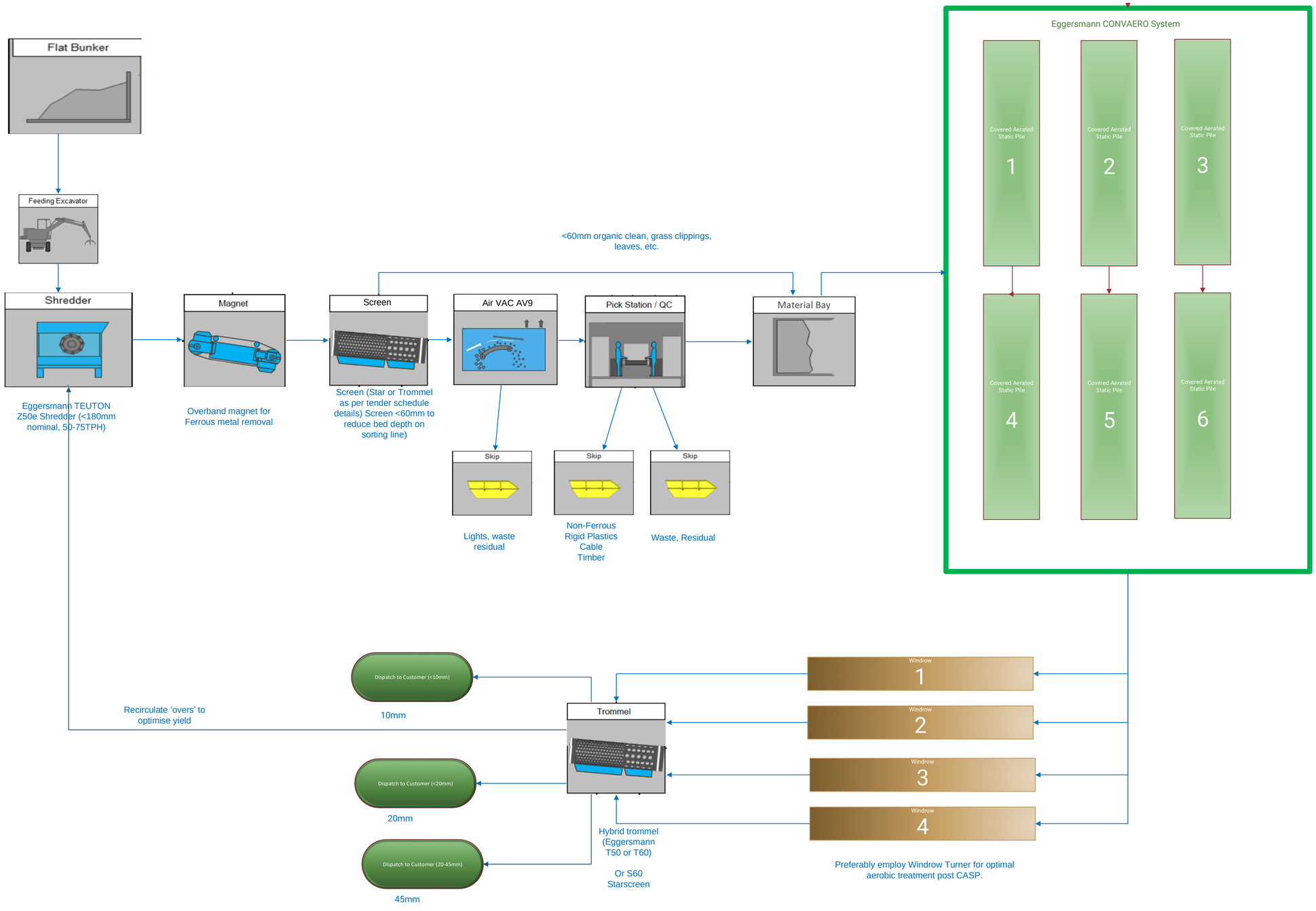
Fresh Compost	15,735	56% DM
Total evaporation, drainage & degradation loss	11,353	TPA

MATURATION (Refer to Windrow Turning Calculations)

SKALA ENVIRONMENTAL

SMEC
Member of the Surbana Jurong Group

EAST GIPPSLAND SHIRE COUNCIL



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Odour sampling and testing standards applied

- EN 13725 “Air Quality - Determination of odour concentration by dynamic olfactometry”
- VDI 3884 as “Supplementary instructions for application of EN 13725”
- EN 17025 for the international standard for quality systems in testing and calibration laboratories; used as the basis for accreditation of laboratories
- VDI 3880 “Olfactometry Static sampling” if sampling direct from passive area/ plane source is carried out, the ventilated VDI 3880 sampling chamber has to be used for sampling

Note: All odour sources with air velocity of V < 30 m/h are regarded as passive sources.

The composting bays are operated with interval aeration.
In non-aerated state (fan off) the surfaces (heap or membrane) are still emitting odour and passive source sampling with ventilated sampling chamber has to be applied.
In active aerated state (fan on) the air velocity from the surface is in the range of 7 to 9 m/h and therefore well below the limit where sampling from active source could be applied. As a result, for odour sampling from aerated and membrane covered bays, aerated but open bays as well as from (passive) maturation windrows the ventilated sampling chamber method has to be applied.

Eggersmann Recycling Technology

Data Source

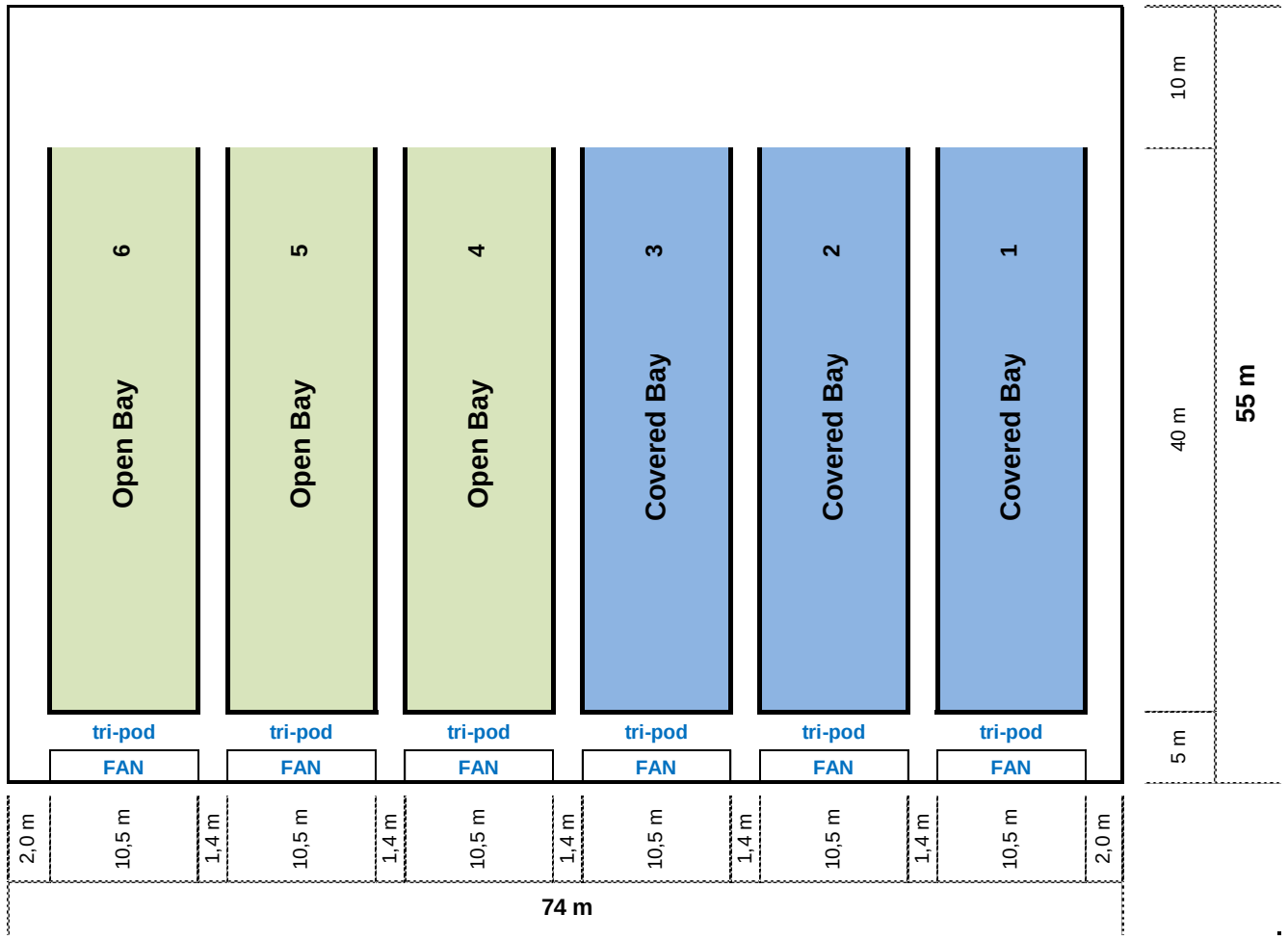
The odour emission data used for determining the emission level are from reports generated for own projects and comparable projects (open windrows) as well as from scientific research projects with sampling at membrane covered systems.

The used data can be regarded as conservative, when several sets of data were available, the higher value has been used.

Most of samples were tested according EN13725 at an ECOMA TO8 olfactometer.

Some earlier data were generated with a TO7 olfactometer.

East Gippsland | Bairnsdale Composting Facility with CONVAERO System



25,000 t/a FOGO & GO

481 t/week

40 process days
(6 weeks in bays with one turning)

4 weeks maturation in open windrows

with turner

- 6 bays
- 40 x 10 m each
- Capacity 481 t each
- 4 open windrows
  e.g. 65 x 8 m

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Considerations in odour emission evaluation:

- Input in bay 6 h plus 10 hour covered on filling day
- **19 process days in covered and aerated bay**, turning 5 h by wheel loader to another bay on day 20
- **20 process days in open, aerated bay**,
  moving fresh compost 5 h by wheel loader open windrows to on day 21
- 28 process days maturation in open windrows with 1 turning
- Raw compost moving 4 h by wheel loader to screening

	per batch		full site*			
	Ø OU/s	Ø OU/s	Ø OU/s	Ø OU/s	days	hours
Phase 1 (covered bays)	2.863	2.012	8.588	6.329	19,9	477
Phase 2 (open bays)	3.039		9.118		21,3	512
Phase 3 (open windrows)	701		2.804		29,6	711

*... 3 bays covered, 3 bays open, 4 open windrows

OU... Odour Units

no screening considered, only transport to maturation

East Gippsland | Bairnsdale Composting Facility with CONVAERO System

Eggersmann Recycling Technology

Batch status notation	Time of emission for prozess step	Time of emission for prozess step	Average odour concentration	CONVAERO project specific surface	CONVAERO project specific	
	[h]	[s]	[OU/m³]		[OU/(m²s)]	[OU/s]
Input & covering (aerated)	6,0	21.600	22.000	490	49,9	24.444
Covered bay after filling	10,0	36.000	12.000	473	28,2	13.333
bay covered day 1&2	48,0	172.800	8.100	473	19,0	9.000
bay covered day 3 - 14	288,0	1.036.800	1.200	473	2,8	1.333
bay covered day 15 - 19	120,0	432.000	980	473	2,3	1.089
Turning & cover 1 - day 20	5,0	18.000	25.000	490	56,7	27.778
bay open day 20 - 27	187,0	673.200	5.000	490	11,3	5.556
bay open day 28 - 35	192,0	691.200	2.000	490	4,5	2.222
bay open day 36 - 41 (8h)	128,0	460.800	500	490	1,1	556
Turning 2 day 41	5,0	18.000	3.500	490	7,9	3.889
Open windrow day 41- 47	179,0	644.400		950	1,0	950
Open windrow day 47 - 53	168,0	604.800		950	0,5	475
Turning day 54	4,0	14.400		950	9,0	8.550
Open windrow day 54 - 61	188,0	676.800		950	1,0	950
Open windrow day 62 - 68	168,0	604.800		950	0,2	190
Output	4,0	14.400	800	950	1,0	950
Total per batch	**1700,0**	**6.120.000**				

Phase 1 – 20 days

Phase 2 – 21 days

Phase 3 – 27 days

Eggersmann Recycling Technology

ALTERNATIVE: all bays covered – Considerations in odour emission evaluation:

- Input in bay 6 h plus 10 hour covered on filling day
- **19 process days in covered and aerated bay**, turning 5 h by wheel loader to another bay on day 20
- **20 process days in open, aerated bay**,
  moving fresh compost 5 h by wheel loader open windrows to on day 21
- 28 process days maturation in open windrows with 1 turning
- Raw compost moving 4 h by wheel loader to screening

	per batch		full site*			
	Ø OU/s	Ø OU/s	Ø OU/s	Ø OU/s	days	hours
Phase 1 (covered bays)	2.863	1.419	8.588	4.551	19,9	477
Phase 2 (covered bays)	1.072		3.217		21,3	512
Phase 3 (open windrows)	701		2.804		29,6	711

*... 6 bays covered, 4 open windrows

no screening considered, only transport to maturation

OU... Odour Units

East Gippsland | Bairnsdale Composting Facility with CONVAERO System

Eggersmann Recycling Technology

Batch status notation	Time of emission for prozess step	Time of emission for prozess step	Average odour concentration	CONVAERO project specific surface	CONVAERO project specific	
	[h]	[s]	[OU/m³]		[OU/(m²s)]	[OU/s]
Input & covering (aerated)	6,0	21.600	22.000	490	49,9	24.444
Covered bay after filling	10,0	36.000	12.000	473	28,2	13.333
bay covered day 1&2	48,0	172.800	8.100	473	19,0	9.000
bay covered day 3 - 14	288,0	1.036.800	1.200	473	2,8	1.333
bay covered day 15 - 19	120,0	432.000	980	473	2,3	1.089
Turning 1 - day 20	5,0	18.000	25.000	490	56,7	27.778
bay covered day 20 - 27	187,0	673.200	1.200	490	2,7	1.333
bay covered day 28 - 35	192,0	691.200	980	490	2,2	1.089
bay covered day 36 - 41 (8h)	128,0	460.800	500	490	1,1	556
Turning 2 day 41	5,0	18.000	3.500	490	7,9	3.889
Open windrow day 41- 47	179,0	644.400		950	1,0	950
Open windrow day 47 - 53	168,0	604.800		950	0,5	475
Turning 3 day 54	4,0	14.400		950	9,0	8.550
Open windrow day 54 - 61	188,0	676.800		950	1,0	950
Open windrow day 62 - 68	168,0	604.800		950	0,2	190
Output	4,0	14.400	800	950	1,0	950
Total per batch	**1700,0**	**6.120.000**				

Phase 1 – 20 days

Phase 2 – 21 days

Phase 3 – 27 days

Member of the Surbana Jurong Group

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31 October 2025

Mr Nathan Misiurka
Manager Sustainability and Waste Minimisation
East Gippsland Shire Council
PO Box 1618
BAIRNSDALE VIC 3875
nathanm@egipps.vic.gov.au

PJRA Reference: Ltr-002-1001.1-Rev.00

Dear Nathan,

Re: Update to Odour Assessment in relation to the proposed composting facility for East Gippsland Shire Council

We refer to an email from Emily McAsey of SMEC Pty Ltd (SMEC) of 30 October 2025, regarding the odour assessment conducted by Peter J Ramsay & Associates (PJRA) for the East Gippsland Shire Council (Council). The assessment was for a proposed composing facility (the Facility) located at 200 Johnstons Road, Forge Creek, Victoria (the Site). This is documented in the draft design for the Facility prepared by SMEC.

In response, you requested that we review the updated layout and revise the dispersion modelling accordingly. A summary of our updated findings is provided below.

1. DISPERSION MODELLING

The dispersion modelling was repeated based on the new equipment layout and was reported in the letter from PJRA to Council dated 5 June 2025 (PJRA 2025)[1]. The Site layout has not changed from the updated dispersion modelling discussed in Letter 001.

2. REVISED FIGURES

The figures from the Odour Assessment showing the Site Layout were not updated. These figures have now been updated and replacements for Figure 2 and Figure F2 are provided showing the new site layout.

[1] **PJRA 2025**, letter from Peter J Ramsay & Associates Pty Ltd to Nathan Misiurka, East Gippsland Shire Council, *Re: Odour Assessment in relation to the proposed composting facility for East Gippsland Shire Council*, PJRA Ref.: Ltr-001-1001.1-Rev.00, 5 June 2025.

Dispersion modelling was updated based on this new Site Layout and the results are provided in PJRA 2025.

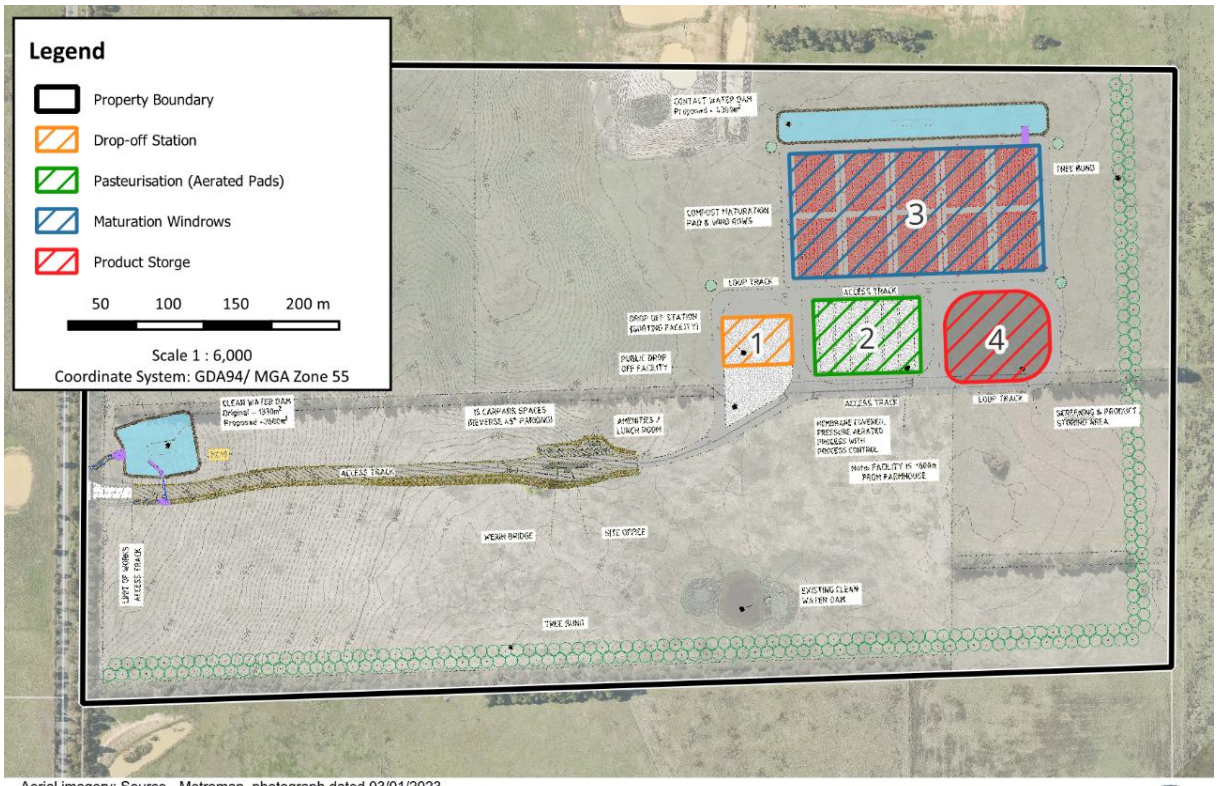

Figure 1 Revised 'Figure 2' for Odour Assessment

The Figure F1 attached to this report provides the updated site layout that was modelled in PJRA 2025 and is consistent with the proposed site layout for the composting facility provided on 30 October 2025. The revised site layout moves the odour generating processes further away from the nearest residential receptors and results in a decrease in odour impact when compared to the outcome of the previous odour assessment which was provided in the report dated 16 October 2024[2].

3. CLOSING

The proposed revision to the layout of the Facility at the Site as provided by SMEC and modelled in PJRA 2025 decreases the risk of offensive odour impact to nearest existing residential receptors compared to the assessment in PJRA 2024.

[2] **PJRA 2024**, *Odour Assessment in Relation to Proposed Bairnsdale Composting Centre,* prepared by Peter J Ramsay & Associates Pty Ltd for East Gippsland Shire Council, PJRA Ref.: Rpt-1001.1-Rev.00, 16 October 2024.

The revision moves the proposed activity area for the composting facility further away from the nearest residences, thereby providing an increase in separation distance.

The dispersion of odour generated from the proposed facility has been modelled in PJRA 2025 and the results of the revision to the proposed Site Layout have been considered.

The risk of offensive odour impacts remains low and acceptable and there is no change to the conclusion from the report prepared by PJRA dated 16 October 2024 (PJRA 2024) and the site layout is consistent with the scenario modelled and documented in PJRA 2025.

Should you wish to discuss any aspect of this advice, please do not hesitate to contact us on 03 9690 0522.

Yours sincerely,

Peter J Ramsay & Associates

Peter J Ramsay & Associates Pty Ltd

Enclosed:

Figure F1 Revised Site Layout as Modelled in PJRA 2025

USE OF REPORT

The preparation of the letter has been undertaken for the purpose of providing the results of an odour assessment in relation to the proposed Bairnsdale Composting Centre at 200 Johnstons Road, Forge Creek, VIC 3875 and the report cannot be used for any other purpose. The report has been prepared solely for the benefit of East Gippsland Shire Council. The report is provided on the condition that it is not made available to any other party except with the prior written consent of Peter J Ramsay & Associates Pty Ltd (which consent may or may not be given at its discretion).

DISCLAIMER

This report is provided on the condition that Peter J Ramsay & Associates Pty Ltd disclaims all liability to any person other than East Gippsland Shire Council in respect of the actions, errors, or omissions of any such person in reliance, whether in whole or in part, upon the contents of this report.

Attachment A

Legend

- Property Boundary

DESIGN

- MC10 — CONTROL ALIGNMENT
- 182.0 — MAJOR CONTOURS (0.5m INTERVAL)
- MINOR CONTOURS (0.1m INTERVAL)
- PAVEMENT AREAS
- CONCRETE HARDSTAND AREAS
- RIP-RAP AREAS (FOR DETAILS REFER DRG'S 241 TO 244)
- CLEAN WATER SWALE DRAIN
- STORMWATER CULVERTS & HEADWALLS
- LINE MARKING
- FIRE WATER TANKS BY OTHERS
- WIND ROWS
- INDICATIVE DRAINAGE FLOWS
- TREE

Data Sources

Aerial Imagery: Metromap Aerometrex Ltd., photograph taken 11/05/2023
Property Boundary: DataShare Victoria, Department of Environment, Land, Water and Planning (DELWP), Accessed 14/03/2024
Site Plan: SMEC 2025, General Arrangement Plan, Drawing No.: 30049148_250526, Revision 03, Prepared for East Gippsland Shire Council

N

50 100 150 200 m

Scale 1 : 3,500 @ A3
Coordinate System: GDA94/MGA Zone 55

SITE PLAN

Odour Assessment in Relation to Proposed Barinsdale Composting Centre

200 Johnstons Road,
Forge Creek, VIC 3875

East Gippsland Shire Council

Project:	1001.1
Date:	30/10/2025
Revision:	Rev.00
Designed:	FR
Drawn:	FR
Reviewed:	NW

Figure **F1**

File: C:\Users\fraser.rathmell.PJRA\OneDrive - PJRA\GIS\Projects\1001.1\Maps\Working\1001.1 Working.qgz

Report

EAST GIPPSLAND SHIRE COUNCIL

ODOUR ASSESSMENT IN RELATION TO PROPOSED BAIRNSDALE COMPOSITING CENTRE

200 Johnstons Road, Forge Creek, Victoria

16 October 2024

Environment, Health & Safety, and Sustainability Consultants

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Distribution Record

Recipient	Report Status	Revision Number	Date Issued
Milena Beames Project Supervisor Project Planning & Design East Gippsland Shire Council	Draft	Rev.A	28 July 2024
Peter J Ramsay & Associates Internal Copy	Draft	Rev.A	28 July 2024
Milena Beames Project Supervisor Project Planning & Design East Gippsland Shire Council	Final	Rev.00	16 October 2024
Peter J Ramsay & Associates Internal Copy	Final	Rev.00	16 October 2024

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The preparation of the report has been undertaken for the purpose of providing the results of an odour assessment in relation to the proposed Bairnsdale Composting Centre at 200 Johnston's Road, Forge Creek, VIC 3875 and the report cannot be used for any other purpose. The report has been prepared solely for the benefit of East Gippsland Shire Council. The report is provided on the condition that it is not made available to any other party except with the prior written consent of Peter J Ramsay & Associates Pty Ltd (which consent may or may not be given at its discretion).

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EXECUTIVE SUMMARY

An odour assessment was undertaken by Peter J Ramsay & Associates Pty Ltd, on behalf of East Gippsland Shire Council, of the proposed Bairnsdale Composting Centre which is to be located at 200 Johnstons Road, Forge Creek, Victoria. The odour assessment is to accompany a Development Licence application for the Site.

A Level 1, Level 2, and Level 3 odour assessment was undertaken in accordance with EPA Publication 1883 *Guidance for Assessing Odour.* The Level 3 assessment included the use of odour dispersion modelling in accordance with relevant Environment Protection Authority Victoria guidelines.

Based on the results of the Level 3 odour assessment, the potential odour impact from the proposed Bairnsdale Composting Centre is assessed to be low and acceptable.

LIST OF ABBREVIATIONS

AERMOD: American Meteorological Society and U.S. Environmental Protection Agency Regulatory Model

BOM: Bureau of Meteorology

CBD: Central Business District

EGSC: East Gippsland Shire Council

EP Act: Environment Protection Act 2017

ERM: Environmental Resources Management

ERS: Environment Reference Standard

FOGO: Food Organics Garden Organics

FZ: Farming Zone

FZ1: Farming Zone – Schedule 1

GED: General Environmental Duty

IRAEs: Industrial Residual Air Emissions

OEF: Odour Emission Factor

OER: Odour Emission Rate

OL: Operating Licence

OPS: Odour Pathway Score

ORS: Odour Receiving Environment Score

OSS: Odour Source Score

OU: Odour Unit

PCRZ: Public Conservation and Resource Zone

RCoW: Rural City of Wangaratta

SRTM: Shuttle Radar Topography Mission

WOPF: Wangaratta Organics Processing Facility

1. INTRODUCTION

On 14 March 2024, Peter J Ramsay & Associates (PJRA) was engaged by East Gippsland Shire Council (EGSC), to undertake an odour assessment in relation to the proposed composting centre (the 'Facility') located at 200 Johnstons Road, Forge Creek, Victoria (the 'Site'). The odour assessment is to accompany a Development Licence application for the Site.

2. BACKGROUND

The Site is located in the locality of Forge Creek within the East Gippsland Shire and is subject to the East Gippsland Planning Scheme which was last updated 16 February 2024 (the Planning Scheme). The Site is zoned as Farming Zone – Schedule 1 (FZ1) under the Planning Scheme and is bordered in all directions by Farming Zone (FZ). To the northeast and the south of the Site a small parcel of Public Conservation and Resource Zone (PCRZ) is present. A summary of the planning zones in relation to the Site is shown in **Figure 1.**

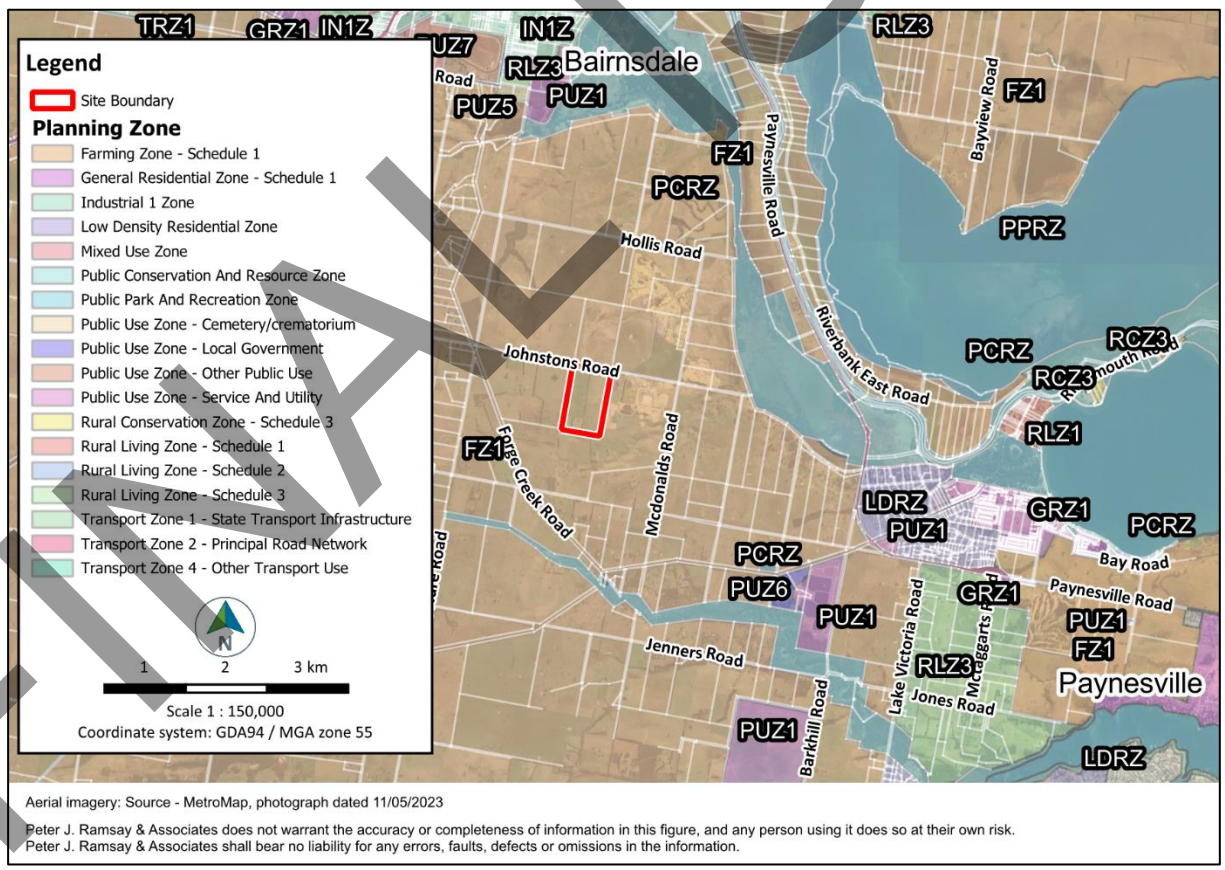

Figure 1 **East Gippsland planning zone overlays in relation to the subject Site**

EGSC is proposing to establish an organic waste composting facility with a design capacity of 25,000 tonnes per annum (tpa) including up to 4,500 tpa of food waste. The Site is located immediately west of the existing Bairnsdale Regional Landfill which is operated by EGSC under the EPA Operating Licence (OL000072826) issued 30 June 2010.

The operation of the Facility is to comprise five process stages which are expected to take approximately 13-16 weeks to produce a mature compost. These process stages are:

- Unloading and contamination removal;
    - Unloading and contamination removal is undertaken in the drop-off station shed which is located at the northeastern portion of the Site. Vehicles are weighed upon entering the Facility and directed to unload waste material in the drop-off station shed. Waste material is spread out in the shed and gross contamination is removed by staff manually and using front-end loaders. Contaminated material is collected in waste skips prior to disposal at the Bairnsdale Regional Landfill. Liquids captured during this process are collected as primary contact water and managed on-site.
- Shredding;
    - Sorted waste material is loaded into a slow-speed shredder using a front-end loader. Shredding activities are undertaken within the drop-off station shed to minimise the spread of litter and odour from exposure to wind. Shredded product is uniform in size upon completion.
- Pasteurisation;
    - Once the waste material has been shredded it is loaded onto the forced aeration-covered pasteurisation pads. This process comprises covering the waste material with a tarp and monitoring process parameters including temperature, air, and moisture. It is expected that this process will take approximately 5-7 days to ensure pathogens and weed propagules are adequately destroyed.
- Stabilisation and maturation; and
    - Following pasteurisation, the waste material is transferred to the maturation pads using a front-end loader. The maturation pads are lined with windrows to slowly decrease the temperature to allow further destruction of complex compounds. The waste material in the windrows is regularly watered and turned using either a self-propelled windrow turner or a tracker-pulled windrow turning unit to ensure that the material remains aerobic. Generally, mature compost will be achieved after approximately 12 weeks, however the process may run longer if it is operationally necessary for the Facility.
- Screening/grading.

- Once the compost has reached maturity, the final phase is screening and grading of the product which includes the removal of large roots, rocks, and other undegraded material from the compost. A front-end loader is used to transfer the material into a trommel which will screen to 12-16 mm. Screened material (i.e., finished product) is stored in a stockpile until it is loaded into a vehicle for sale. The stockpiles are to be continuously monitored for heat, dust, and stormwater impacts. Remaining oversized material is either redirected for further shredding or sent for disposal at the Bairnsdale Regional Landfill.

A summary of the Facilities process flow is provided in **Figure 2** below.

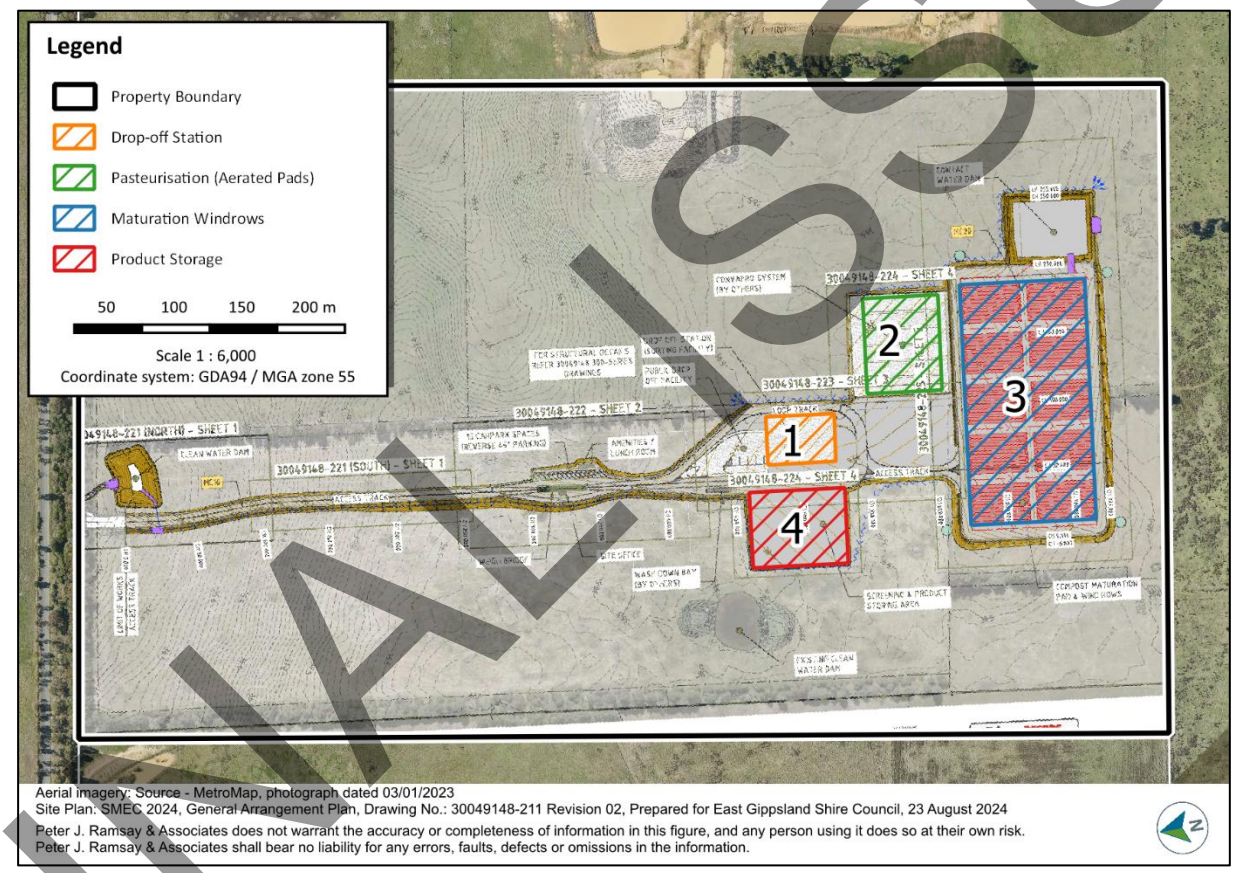

Figure 2 Site plan and process flow diagram

3. LEGISLATION AND GUIDELINES

3.1 Environment Protection Act 2017

The Environment Protection Act 2017 (EP Act) is the principal legislation for the management of the environment in Victoria. The EP Act provides a framework to achieve improvements in the environment.

The cornerstone of the EP Act is the general environmental duty (GED) which places obligations on Victorians to understand and minimise risks of harm to human health and the environment from pollution and waste. The GED is carried out through either the elimination of risks of harm as far as reasonably practicable, or the reduction of those risks as far as reasonably practicable.

Odour is defined in the EP Act as a pollution:

> *"pollution includes any emission, discharge, deposit, disturbance or escape of—*
>
> *(a) a solid, liquid or gas, or a combination of a solid, liquid or gas, including but not limited to smoke, dust, fumes or odour; …"*

Further, the EP Act provides the following definition of harm:

> *(1) In this Act, harm, in relation to human health or the environment, means an adverse effect on human health or the environment (of whatever degree or duration) and includes—*
>
> *(a) an adverse effect on the amenity of a place or premises that unreasonably interferes with or is likely to unreasonably interfere with enjoyment of the place or premises; or*
>
> *(b) a change to the condition of the environment so as to make it offensive to the senses of human beings; or*
>
> *(c) anything prescribed to be harm for the purposes of this Act or the regulations.*
>
> *(2) For the purposes of subsection (1), harm may arise as a result of the cumulative effect of harm arising from an activity combined with harm arising from other activities or factors.*

As defined in the EP Act, offensive odours constitute harm to human health and the environment. The EP Act requires that the risk of harm from offensive odour be eliminated or reduced as far as reasonably practicable.

3.2 Environment Reference Standard

The Environment Reference Standard (ERS) is made under the EP Act and provides a basis for assessing environmental conditions, including ambient air. The ERS requires that the environmental values of the ambient air environment including local amenity and aesthetic enjoyment; and life, health and well-being of humans are protected. Specifically, the ERS defines the following objective in relation to odour:

> *"An air environment that is free from offensive odours from commercial, industrial, trade and domestic activities".*

3.3 Separation Distance Guideline

The EPA *Separation distance guideline* (August 2024) provides guidance to protect the community from human health and amenity risks associated with unintended offsite odour and dust generated by industry.

The Separation distance guideline states that unintended emissions may occur due to the nature of the operation, minor changes in weather conditions, minor accidents, or minor equipment failure. However, the unintended emissions described in the Separation distance guideline do not extend to those resulting from major abnormal weather conditions, major accidents, or major equipment failure from activities.

The Separation distance guideline recommends the use of EPA Publication 1588 when determining separation distances for composting facilities and provides a summary table of separation distances which has been reproduced as **Table 1** below. Based on reference facility 2 from **Table 1**, the EPA recommended separation distance is considered between 1,100-1,400 metres.

Table 1 Recommended separation distances for composting facilities (EPA, 2024)

No.	Types of feedstock acceptable (See publication 1588)	Technology	Size of the plant (tonnes/year)	Recommended separation distance (metres)
1	Lowest risk wastes	• Suitable control of site access and organic waste deliveries to the site • Open air receival • Open turned windrow composting • Open air maturation	1,200 5,000 12,000 20,000 36,000 50,000 > 50,000	400 650 1,100 1,500 2,000 2,200 Case by case
2	Up to medium risk waste	• Suitable control of site access and organic waste deliveries to the site • Dedicated area for receiving incoming wastes that is managed to control for odour and vector risks • Outdoor covered windrow composting with forced aeration and with suitable semi-permeable covers for achievement of odour control and physical exclusion of vectors • Suitable infrastructure and system for collection and management of putrescible leachate • Forced aeration • Open air maturation	1,200 5,000 12,000 20,000 36,000 50,000 > 50,000	400 600 850 1,100 1,400 1,600 Case by case
3	Up to high-risk wastes	Suitable control of site access and organic waste deliveries to the site Receival directly to processing bunkers Outdoor covered windrows/batches in bunkers for composting, with suitable semi-permeable covers for achievement of odour control and physical exclusion of vectors, (e.g., PTFE semi-permeable covers) Forced aeration composting with automated control of aeration to maintain aerobic composting conditions in each composting batch Suitable infrastructure and system for collection and management of putrescible leachate Open air maturation	1,200 5,000 12,000 20,000 36,000 50,000 >50000	200 400 600 750 950 1,000 Case by case
4	Up to highest risk wastes	• Under cover receival • Enclosed aerobic composting • Under cover air maturation with	1200 5000 12000	200 350 430

No.	Types of feedstock acceptable (See publication 1588)	Technology	Size of the plant (tonnes/year)	Recommended separation distance (metres)
		• Odour capture and treatment equipment.	20000	500
			36000	550
			50000	600
			>50000	Case by case

3.4 EPA Publication 1588 – Designing, constructing, and operating composting facilities

EPA Publication 1588 *Designing, constructing, and operating composting facilities* (EPA Publication 1588) provides guidelines the composting industry. Section 4 of EPA Publication 1588 provides the basis for determining separation distances for composting facilities. The examples of separation distances provided in the guideline are shown below.

Table 2 Separation distance examples (adapted from EPA Publication 1588.1)

Types of feedstock	Technology being used	Size of the plant	Recommended separation distance (metres)
Green waste Vegetable organics Grease inceptor trap waste	Open air receival Enclosed aerobic composting with secondary odour capture andtreatment equipment Open air maturation	1,200 tonnes per annum	>300
		14,000 tonnes per annum	>500
		36,000 tonnes per annum	>800
		55,000 tonnes per annum	>1,000
		75,000 tonnes per annum	>1,200
		90,000 tonnes per annum	>1,400
Green wastes	Open air receival Open turned windrow Open air maturation	1,200 tonnes per annum	>600
		14,000 tonnes per annum	>1,100
		36,000 tonnes per annum	>2,000
		50,000 tonnes per annum	>2,000

The reference facilities provided in the Separation distance guideline as outlined in **Table 1** are considered a better representation of the proposed Bairnsdale Composting Centre.

3.5 EPA Publication 1883 – Guidance for Assessing Odour

EPA Publication 1883, *Guidance for Assessing Odour*, released June 2022 (EPA Publication 1883) provides guidance for assessing the risk to amenity from impact due to odorous emissions. This

Publication has been referred to, to inform the methods for assessing the risks and impacts associated with the odour from the Plant, details are provided in **Section 5**.

The publication outlines that an odour risk assessment must be conducted when *"a separation distance is to be varied or assessed*" and during "*Planning assessments including; buffer area overlays, local council planning permit applications, precinct structure planning and rezoning applications.*" The primary method recommended by the guideline is to assess the risk of odour through a staged approach comprising three levels of assessment. Of which, a Level 1 Assessment can be relied upon when conditions provided in the guideline are met, generally for industries with the least potential for odour impacts, whilst Level 2 or 3 Assessment should be undertaken for odour sources with higher potential for impacts.

3.6 Clause 53.10-1 of the East Gippsland Planning Scheme

Clause 53.10 provides threshold distances for uses and activities that may have adverse impacts. The threshold distance is determined based on the potential adverse impacts, when proposing new activities or modification to the existing activities within the threshold distance. No threshold distance is specified for composting and other organic materials recycling facilities. However, all applications relating to use of land for composting of organic materials must be referred to Environment Protection Authority under section 55 of the Act.

4. SITE CONTEXT

4.1 Site Locality

The Site is situated in Forge Creek, a pastoral enclave within the East Gippsland Shire of Victoria. It is approximately 30 kilometres to the west of Lakes Entrance and approximately 240 kilometres east of the Central Business District (CBD) of Melbourne.

4.2 Surrounding Land Uses

The Site is zoned as Farming Zone – Schedule 1 (FZ1), and is encompassed entirely by Farming Zone (FZ). To the north, the site is proximate to the urban centre of Bairnsdale, while the Bairnsdale Airport is situated to the west, residing within Transport Zone 4 (TRZ4). The township of Paynesville lies to the east, comprising both residential and commercial zones.

There are five rural dwellings located within approximately 1,000 metres of the property boundary of the site. These are identified in **Figure 3** below, and further referred to in **Section 5.3.5**.

Figure 3 Sensitive receptors located within approximately 1,000 metres of the Site

4.3 Topography

The topography of the area surrounding the Site is predominantly flat at an elevation of approximately 30 meters above sea level. Towards the western portion of the Site the land gradually rises to an elevation of 40 meters. Moving eastward from the Site there is a gradual descent in elevation until reaching sea level. Jones Bay and Eagle Point Bay are situated to the east of the site.

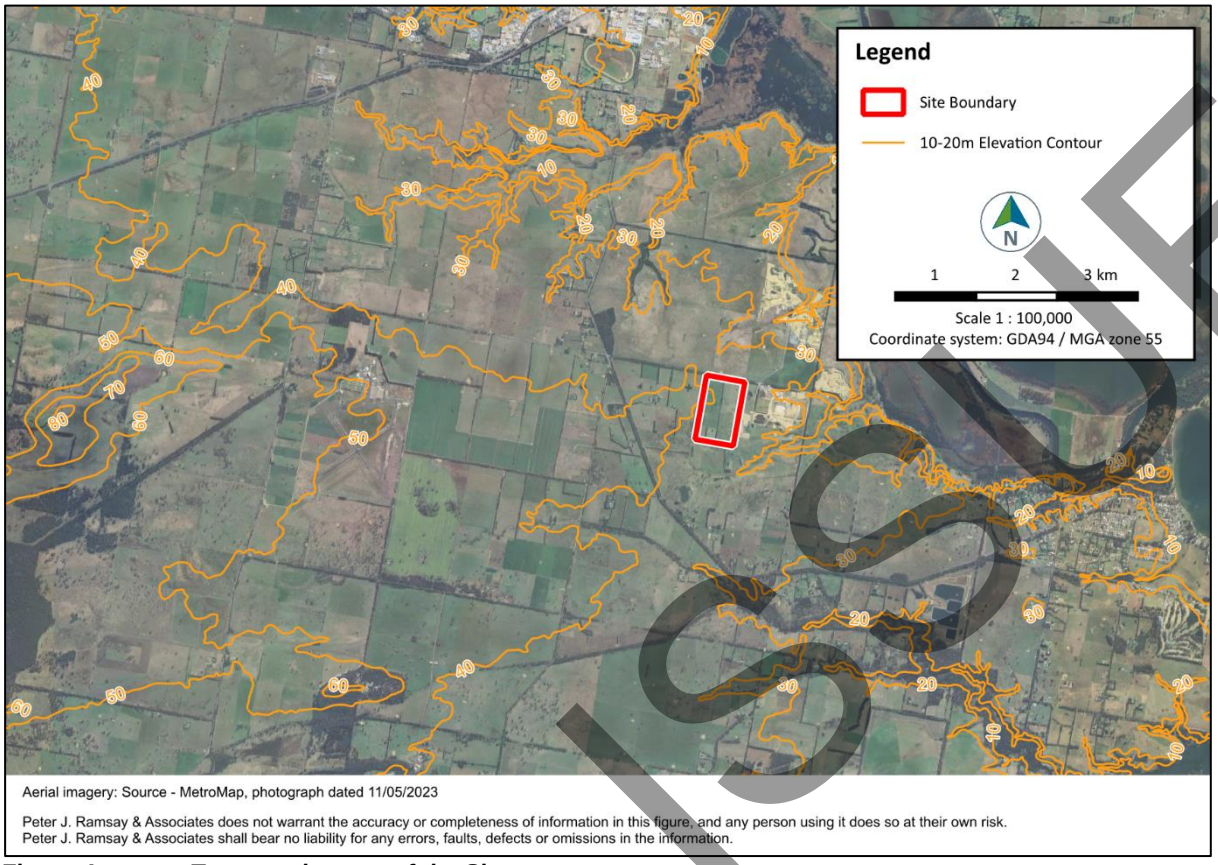

Figure 4 Topography map of the Site

4.4 Meteorology

Meteorological data were obtained from the Bairnsdale Airport Bureau of Meteorology (BOM) station, station number: 085279 (the 'Station') which is located approximately 5,000 metres west of the Site. Forge Creek has similar topographical characteristics to the Station and is a suitable representative of meteorological conditions at the Station.

The effect of wind on dispersion patterns can be evaluated using general wind distributions and atmospheric stability data. The general wind conditions at a site can be displayed by means of wind rose plots. These provide the incidence of winds from different directions for various wind speed ranges. Key aspects are the prevailing wind direction and the relative incidence of more stable light wind conditions under 2 m/s. Winds over 5 m/s provide good dispersive conditions.

The wind roses produced from meteorological data, as shown in **Figure 5** and **Figure 6,** indicate that the predominant winds on a 5 yearly average are typically from the northwest (≈14%) and the west (≈12%). During summer winds are predominantly easterly, while during winter winds are predominantly north-westerly.

Figure 5 **Seasonal wind roses based on 5-year data from BOM station number: 085279**

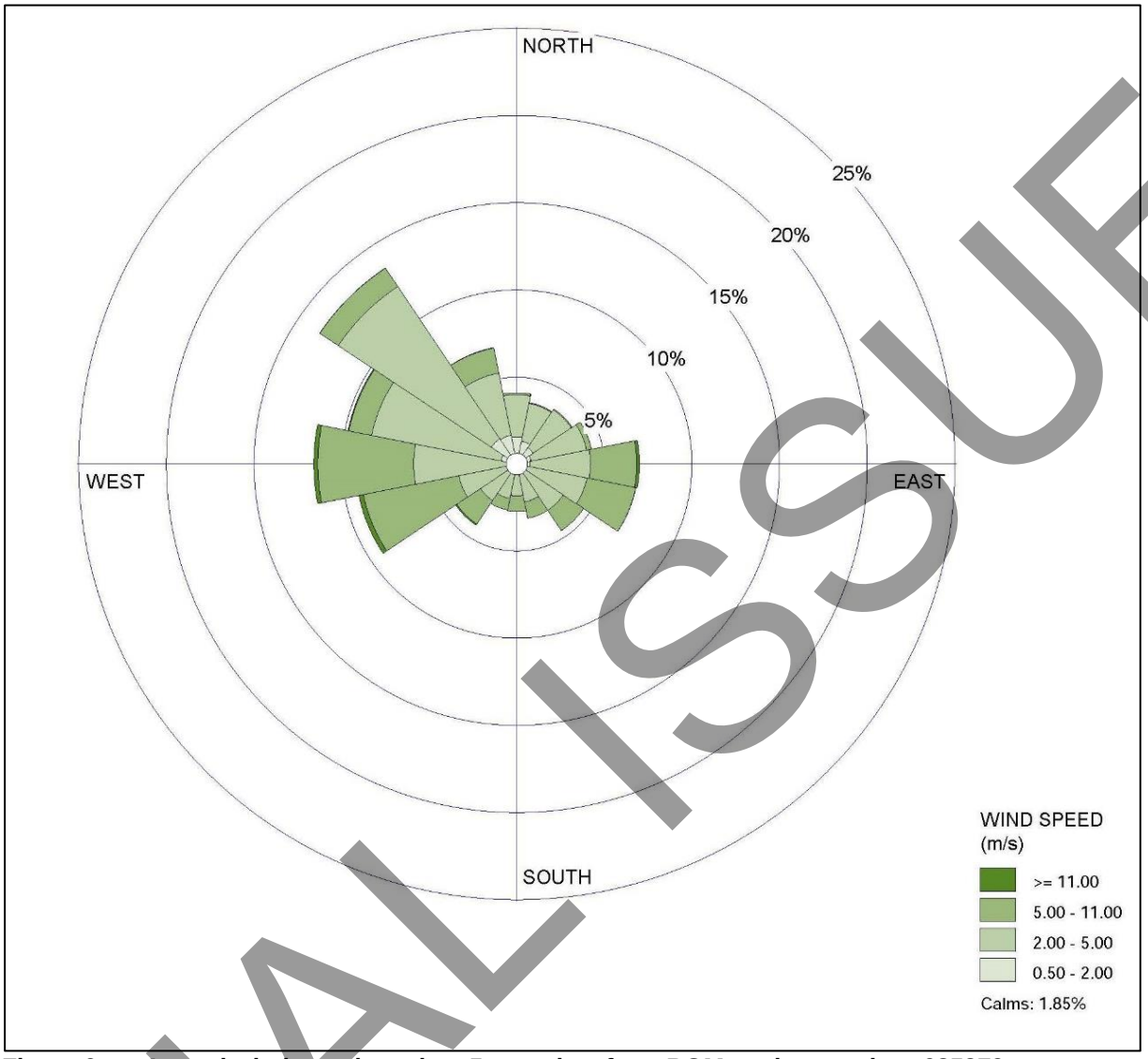

Figure 6 Annual wind rose based on 5-year data from BOM station number: 085279

5. ODOUR RISK ASSESSMENT

5.1 Level 1 Assessment

The Level 1 Assessment outlined in EPA Publication 1883 comprises three tests which are preliminary screening tools to determine if a more detailed assessment is necessary. If at any stage the tests are passed, then the risk of odour is considered to be low, and no further assessment is necessary. If all of the tests are failed, then the risk assessment must proceed to a Level 2 Assessment.

5.1.1 First Test

The first test is an estimation of the typical duration of emissions per year. This test does not consider wind direction frequencies nor emissions quantity. The duration of emissions assumes the worst-case scenario, in that sources will emit odour constantly at high enough concentrations during operation to cause impacts.

The proposed Bairnsdale Composting Facility is expected to operate 7:00am-5:00pm seven days per week, however odorous emissions are likely to occur continuously (24/7). Therefore odorous emissions may occur for more than 200 hours per year (> 2% of the time), and the odour could occur for more than 8 hours at a time.

As the first test is failed, the assessment must proceed to the second test.

5.1.2 Second Test

The second test is an estimation of the maximum time that odorous emissions may impact nearby sensitive receptors based on the total duration of emissions, and the duration of which sensitive receptors are downwind of the Plant in view of prevailing wind patterns in the area.

Sensitive receptors (i.e., residential dwelling) are present in most directions around the Site. Therefore, winds blowing from all directions are likely to direct odorous emissions towards sensitive receptors for more than 200 hours per year (>2% of the time). This test is failed, and the assessment must proceed to the third test.

5.1.3 Third Test

The third test of the Level 1 Assessment is to determine if the emission source may be classified as a minor emission source. The requirements to meet this classification are outlined below.

- *"• The source is stationary with a stack height of at least 10 m.*
- *The source height is at least 1.7 times the relevant building height(s), meaning there aren't any obstructions within a 15 m radius that could influence stack dispersion (including building wake effects).*
- *The emission source is situated on level terrain (free of terrain effects).*
- *The distance between the emission source and the receiving environment occupied by people is ≥ 100 m.*
- *At the source location, average wind speeds of < 1 m/s occur less than 20 % of the year.*
- *For stack heights > 50 m, the minor mass flow for the stack height of 50 m applies."*

As not all the requirements are met, the source cannot be classified as a minor emission source, therefore the risk assessment must proceed to a Level 2 Assessment.

5.2 Level 2 Assessment

A Level 2 assessment involves using a source/pathway/receiving environment approach by assigning a risk score to each of the following three attributes using the methodology provided in EPA Publication

1883. The risk scores are then translated to an overall risk score that provides a qualitative assessment of risk of odour and inform next steps. The following attributes are scored for this odour assessment:

- Hazard potential of the source (odour source score – OSS, **Section 5.2.1**)
- Exposure pathway between the source and sensitive locations (odour pathway score– OPS, **Section 5.2.2**)
- Sensitivity of the receiving environment (odour receiving environment score – ORS, **Section 5.2.3**)

The result of the assessment is a score between the values of 1 to 12. Based on the scores the following risk categories apply:

1 to 7 – Low Risk	The risk of odour is low; no further assessment is necessary.
8 or 9 – Medium Risk	These are borderline cases. One or more elements could trip the category to the high or low score and these cases should be further investigated.
10 or 11 – High Risk	A level 3 assessment is recommended to fully understand the risk.
12 – Very High Risk	A level 3 assessment is unlikely to demonstrate acceptable level of risk.

5.2.1 Odour Source Score – OSS

The Odour Source Score (OSS) is derived from consideration of the activity type, size of odour hazard, and offensiveness potential. An additional score may be added or subtracted based on the degree of effectiveness of odour controls at the Site.

Activity Type

Appendix A of EPA Publication 1883 categorizes industrial odour sources by their odour potential. *Composting using technology commensurate with waste type*, which is the industrial source relevant to the Site, is listed as *High odour potential*.

Size of Odour Hazard

The site is considered to be *medium size*, defined by the guideline as materials usage being in the thousands of tonnes/m^3 per year, and area of the sources being in hundreds of m^2.

Offensiveness Potential

The offensiveness potential is considered to be *unwelcome*, in that although odour is not likely to be perceived as toxic or unsafe, these odours are usually unwelcomed for most people.

Degree of Effectiveness of Odour Controls

The Site will utilise aerated static pile composting which is considered industry standard good practice. However, at the time of this assessment no secondary air filtration is proposed for the site. In view of this,

the degree of effectiveness of odour controls is considered moderate, and no points are subtracted or added to the OSS score.

OSS Final Score

The three categories received a score of 3, 2 and 2 respectively. The degree of effectiveness, being moderate, resulted in no points being subtracted or added to the score. Therefore, the OSS score is **3**.

5.2.2 Odour Pathway Score – OPS

An OPS score evaluates the transmittal pathway of odour from the sources to the receiving environment. The score considers distance between the sources and receptors, meteorology, terrain and buildings, and hours of operation.

Distance

The nearest sensitive receptor is located approximately 500 m west of the Site boundary. Therefore, the distance is considered long in accordance with the definition provided in Table 3 of the guideline: "*Receiving environment is kilometres or hundreds of metres from source.*"

Meteorology

The prevailing wind patterns as described in **Figure 6**, direct odorous emissions towards the receiving environment from the source approximately 10-20% of the time. Therefore, the meteorology is considered *Neutral* in accordance with the definition provided in Table 3 of the guideline: *"Even distribution of winds (10–20%) from source to receiving environment".*

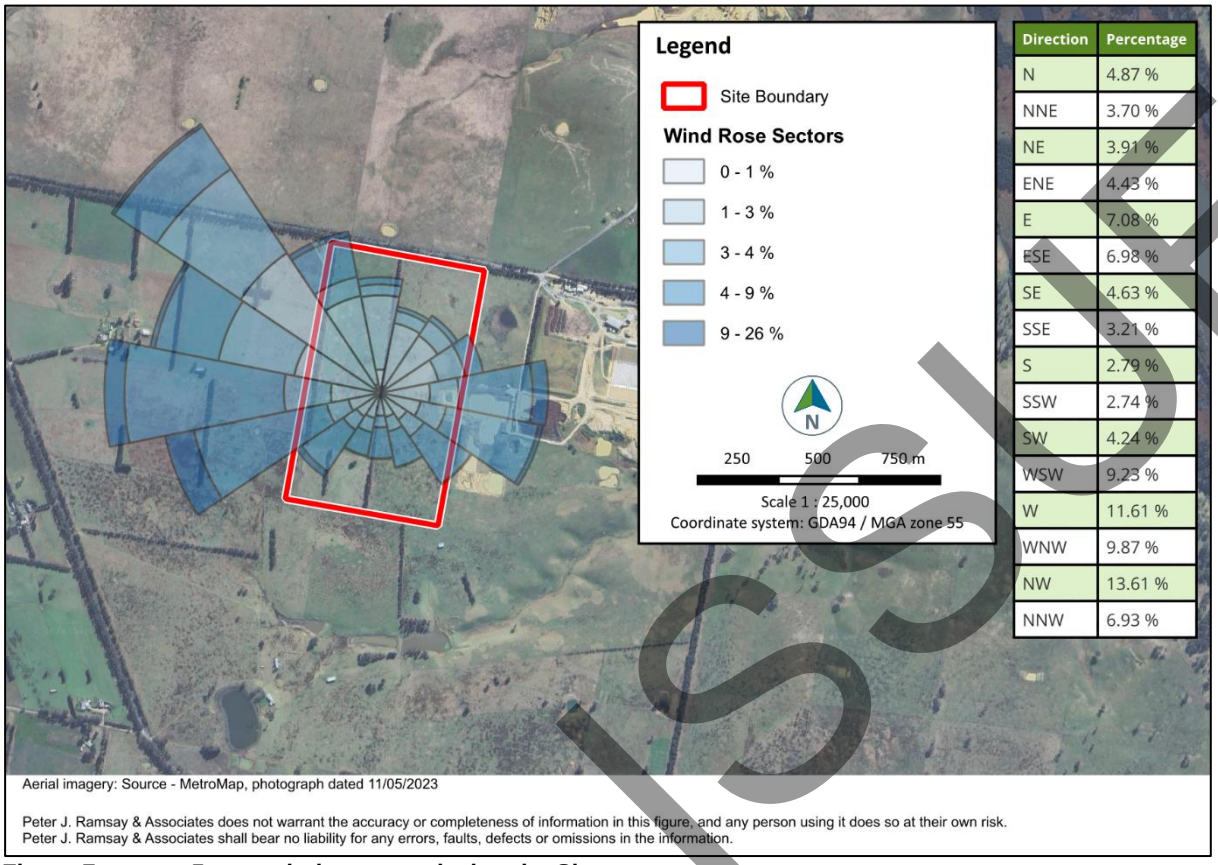

Figure 7 5 year wind rose overlaying the Site

Terrain

Topography in the area is relatively flat with most sensitive receptors being at the same altitude as the possible source of odour. Vegetation is considered to be moderate as some trees are situated between/within the lot boundaries. Therefore, the terrain is considered to be neutral.

Hours of Operation

The hours of operation are considered to be *High frequency* as defined in Table 3 of the guideline: *"Emissions continually occurring 24/7 or for long periods at a time."*

OPS Final Score

The distance, meteorology and hours of operation received scores of 1, 2, 2, and 3 respectively. Therefore, the OPS score calculated from Table 3 of the guideline is **3**.

5.2.3 Odour Receiving Environment Score – ORS

Odour Receiving Environment Score (ORS) is calculated with consideration of the land use in the receiving environment. And a weighting can be factored in consideration of the compliance history, the political or legal aspects, and the amenity impacts experienced by the people in the receiving environment.

The separation distance is to be assessed on a case-by-case basis, therefore the surrounding land use within 2,000 meters is assessed. The sensitivity of the receiving environment is *high* as the most sensitive land use is the residential areas located approximately 750 metres to the west of the Side.

ORS Final Score

From Table 4 of EPA Publication 1883 a sensitivity of *High* results in a score of **3**.

5.2.4 Results of Assessment

The overall source/pathway/receiving environment risk score is calculated by adding the OSS, OPS and ORS. According to Sections 4.2.1 to 4.2.3:

- OSS = 3
- OPS = 3
- ORS = 3

The total score from a Level 2 odour assessment is **9** and therefore the risk of odour is assessed to be *medium* according to EPA Publication 1883. It is not considered that there are any elements that can influence the score to a low or a high, therefore a level 3 assessment is recommended to fully understand the risk.

5.3 Level 3 Assessment

EPA Publication 1883 outlines that a Level 3 Assessment becomes necessary when there are *"issues that are complex or where the other levels of assessment have been exhausted because there is not enough evidence to establish what the odour risk is"*. Should a Level 3 Assessment be necessary, the publication provides a series of assessment tools that should be applied based on availability, accessibility of data, and agent of change principles. These tools are:

- Comparison with similar operations;
- Risk assessment using field odour surveillance data;
- Complaint data analysis;
- Community surveys; and
- Dispersion modelling.

The application of these tools, where available, is detailed below.

5.3.1 Comparison with similar operations

EPA Publication 1883 recommends that an analysis of data from facilities of similar size, throughput, operational conditions, technology, processes, topography, meteorology, and emission sources should be

undertaken when a new facility is proposed. A review of composting facilities in Victoria has indicated that there are no facilities that are entirely comparable to the proposed Bairnsdale Composting Centre.

5.3.1.1 Wangaratta Organics Processing Facility

Background

The Wangaratta Organics Processing Facility (WOPF) is located at 64 Byawatha Road West, North Wangaratta, Victoria and accepts FOGO waste to produce high grade compost material. The WOPF is owned and operated by the Rural City of Wangaratta (RCoW) under EPA Operating Licence OL000233541.

The WOPF has a design capacity of 12,000 tpa however currently processes approximately 6,000 tpa. It is located within proximity to the Bowser Landfill which is also operated by RCoW under EPA Operating Licence OL000020025. Nearby sensitive receptors range from approximately 650-1,240 metres from the site.

Technology used at the WOPF is similar to what is proposed at the Bairnsdale Composting Centre and includes the use of aerated static piles (windrows). An overview of the site layout of the WOPF is provided in **Figure 8**.

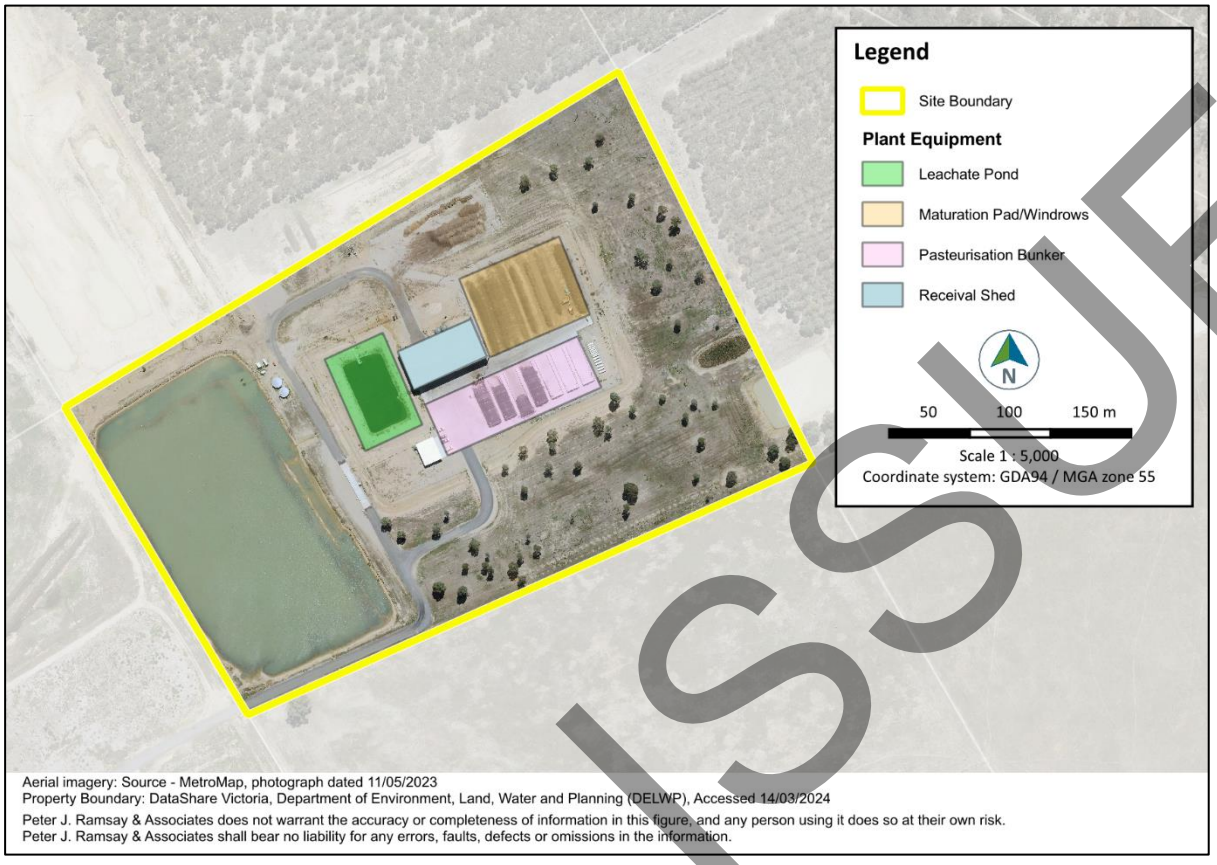

Figure 8 **Wangaratta Organics Processing Facility site layout.**

Comparison with Bairnsdale Composting Centre

The WOPF is similar in process to the proposed Bairnsdale Composting Centre. However, it is noted that the current scale of operations at the WOPF (≈6,000 tpa) is approximately 25% of what is proposed at Bairnsdale Composting Centre. In view of this, the WOPF is not directly comparable to Bairnsdale Composting Centre. That is, undertaking field odour surveillance of the WOPF is likely to provide an underestimate and an indication only of expected odour potential from the Bairnsdale facility.

Notwithstanding of this, it is noted that Ektimo (2022), completed a series of field odour surveys of the facility. The field odour survey program was designed such that the results would simulate the equivalent throughput of 12,000 tpa. This was done by way of RCoW operating four (4) aerated bunkers simultaneously and turning ten (10) of the windrows during the first day of surveillance (both were double the current operational practice). The results from the odour survey are provided in **Table 3** below.

Table 3 Summary of Ektimo field odour survey results

Odour Character	Odour Offensiveness Potential	Maximum Distance from Site Centroid (metres)		Work Day Activities Only? (8am-4.30pm)	Hours Per Day Odour Emissions Can Occur
		Obvious Odour (constant/frequent obvious)	Subtle Odour (constant/frequent subtle & transient obvious)		
Putrid Compost	Unsafe	360	413	Yes	7
		151	154	No	24
Fresh Compost	Unwelcome	204	262	Yes	7
		154	192	No	24
Fresh Greenwaste	Innocuous	124	204	Yes	7
		-	60	No	24
Max. Distance Obvious/Subtle:		360	413		

Ektimo (2022) found that the maximum extent of any obvious odour was 360 metres from the centroid of the site and the maximum extent of any subtle odour was 413 metres from the centroid of the site. The nearest rural dwelling is located 652 metres from the centroid of the site (600 metres from the site boundary), therefore Ektimo concluded that the risk of odour exposure at potential sensitive receptor location is negligible.

It is noted that Ektimo's field odour survey was designed to simulate a throughput of 12,000 tpa, which is less than what is proposed at the Bairnsdale Composting Centre. However, the distance to the nearest sensitive receptor from the Bairnsdale Composting Centre is approximately 870 metres from the centroid of the site (approximately 750 metres from the nearest odour source), which is more than double the extent of odour detected by Ektimo at Wangaratta.

5.3.2 Risk assessment using field odour surveillance data

EPA recommends the survey of odour levels in the field to provide an indication of odour frequency, intensity and character (FIC). Field odour surveys can be conducted of existing premises, a reference facility, or of other odour generating premises or sources in the area. As outlined in **Section 5.3.1**, it is considered that there are not any suitable reference facilities present in Victoria for field odour surveillance. Therefore, field odour surveillance has not been undertaken for this assessment; however, field odour surveillance previously undertaken by Ektimo at Wangaratta Organics Processing Facility is discussed in **Section 5.3.1**.

5.3.3 Complaint data analysis

Analysing odour complaints relating to an operation assists in identifying odour sources, their characteristics, and level of impact. It also serves as a benchmark for monitoring on compliance progress. Reliable data on complaints can indicate the relationship between odour frequency and complaint numbers.

Complaint data were sourced from EPA under the Freedom of Information Act 2017. Data requested included all odour complaints attributed to or perceived to be attributed to the Bairnsdale Regional Landfill during the period 4 April 2019 to 4 April 2024.

EPA concluded in an email of 11 June 2024 that it does not have any odour pollution reports within the period requested that are attributable to the Bairnsdale Regional Landfill.

5.3.4 Community surveys

Community surveys can provide valuable information about odour impacts from existing sources. The Bairnsdale Composting Centre is a proposed operation, therefore community surveys are not recommended. Further, there are no suitably comparable reference facilities in Victoria where community surveys would be appropriate (as outlined in **Section 5.3.1**).

5.3.5 Dispersion modelling

It is recommended in EPA Publication 1883 that odour dispersion modelling be undertaken *"to compare different emissions scenarios through the analysis of the relative variations in predicted ground level odour concentrations"*. Dispersion modelling should be conducted in accordance with EPA Publication 1550 *Construction of input meteorological data files for EPA Victoria's regulatory air pollution model (AERMOD)* and 1551 *Guidance notes for using the regulatory air pollution model AERMOD in Victoria*.

5.3.5.1 Model Selection

The site is at an approximate elevation of 10 m and the topography surrounding the site is relatively flat. Examination of meteorological data indicated that calms occur less than 5% of the time. Based on these considerations, it was considered appropriate to use the regulatory approved AERMOD dispersion model.

5.3.5.2 Model Domain

A 3,750 x 3,750 metre grid was used, with receptors placed 50 metres apart and the centre of the grid located near the centre of the site in accordance with the recommendations in EPA Publication 1551.

Topography was incorporated into the model using a digital elevation model with approximately 30 metres resolution, which has been gap filled. Since the terrain is relatively flat surrounding the site, the topographical resolution of the terrain was considered appropriate.

5.3.5.3 Meteorological Input Files

The meteorological data file used for the dispersion modelling was prepared by pDs Consultancy following EPA Publication 1550. The calculations for Stable Boundary layer were undertaken following the latest

formulations published by the United States Environmental Protection Agency. Site representative data were obtained from Bairnsdale Airport which is maintained by Australian Bureau of Meteorology.

5.3.5.4 Model Input Parameters

The predicted odour concentrations were modelled in accordance with EPA Publication 1550 and 1551. The standard output from AERMOD is a one-hour average concentration prediction. In view of the practical requirement that the approved US EPA version of AERMOD cannot be modified, three-minute average predictions were calculated post-processing.

Table 4 Summary of AERMOD Input Parameters

Model Input Parameters	
Meteorological Data	Obtained from BOM data at station 085279
Pollutant	Odour
Deposition	None
Depletion	None
Dispersion	Rural
Averaging Time	Hourly. Results were converted to 3-minute values post processing as recommended in EPA Publication 1550.
Terrain	Elevated, 30 m resolution, from SRTM1
Gridded Receptors	3,750 x 3,750 metres, 50 metre grid spacing
Discrete Receptors	Placed in accordance with **Figure 3**

5.3.5.5 Source Input References

In the absence of monitored odour emission data, specific odour emission rates (SOERs) were adapted from published literature and comparable projects in Victoria. These are summarised below.

Odour emission factors for the prediction of odour emissions from plants for the mechanical and biological treatment of MSW (Sironi et al., 2006)

SIRONI et al., (2006) undertook a study of odour concentration measurements sampled from the principal odour sources of 40 Italian waste mechanical and biological treatment facilities. The data were then used to estimate the odour emission factors (OEFs) relevant to single-process steps. These OEFs are provided in **Table 5** below.

Table 5 Summary of odour emission factors (adapted from Sironi et al., 2006)

Process	Geometric mean of OEF (10^6 $Ou_E{}^{t-1}$)	Median of OEF (10^6 $Ou_E{}^{t-1}$)
Waste receiving	12.553	11.051
Green waste receiving	3.015	3.296
Aerobic biological treatment	139.948	127.042
Green waste aerobic biological treatment	12.501	5.248
Curing	39.943	29.946
Overscreen storage	2.424	3.196
Final product storage	7.536	9.247
Aerobic biological treatment + receiving	118.879	124.590
Aerobic biological treatment + curing	68.717	94.217
All process steps	100.673	123.460

Independent Review: 'Odour Impact Assessment Geelong Resource Recovery Facility, Stonehaven, Victoria', Edge Group, dated August 2015 (ERM, 2017)

ERM (2017) was engaged by Golden Plains Shire Council to complete a review of the document entitled 'Odour Impact Assessment, Geelong Resource Recovery Facility, Stonehaven, Victoria' dated August 2015 and authored by Edge Group. The document assessed the proposed 36,000 tpa windrow green waste composting facility at the site.

The emission rates adopted by Edge Group and the subsequent commentary provided by ERM are shown in **Table 6**.

Table 6 Summary of odour emission rates and ERM commentary (adapted from ERM, 2017)

Process	OER included in the assessment	ERM Comment
Receival Pad	4 OU/m^2/s	"Considered to be an appropriate odour emission rate (may be conservative)"
Shredder	5741 OU/s	"Considered to be an appropriate odour emission rate…"
Shredded Green Waste Stockpile	-	"Shredded stockpile not included"
Windrows	0.17 OU/m^2/s	"This odour emission estimate appears to be too low based on data from Wodonga. The use of an average odour emission rate is incorrect due to the proportion of stage 1 and stage 2 windrows."
Trommel	4960 OU/s	"Considered to be an appropriate odour emission rate"
Leachate Pond	0.33 OU/m^2/s	"Considered to be an appropriate odour emission rate"

ERM generally considered the OERs appropriate, however it did not agree with the OER adopted for the windrows, citing that in facilities where ERM had undertaken emission sampling the average OER was 1.2 OU/m^2/s. Further, ERM discouraged the use of using an average OER for windrows as this would underestimate the emissions by approximately 20% by not accounting for windrow turning activities.

Lucas Heights Resource Recovery Park Project Air Quality Assessment (GHD, 2015)

GHD undertook an assessment of air quality associated with SITA Australia's proposed activities at the Lucas Heights Resource Recovery Park (LHRRP). The assessment included odour modelling using odour emission data obtained from an odour sampling program at the LHRRP. The assessment considered multiple scenarios, however the reference scenario summarised in **Table 7** below assumed a throughput of 50,000 tpa.

Table 7 Summary of OERs used in the GHD assessment (adapted from GHD, 2015)

Source	Surface area (m2)	SOER OUv/m2/s	OER OUv/s
Receivals area	564	4	2256
Shredding		5740	
Static stockpile – 1 month	2200	4.4	9680
Static stockpile – 4 month	10210	2	20420
Maturation windrows	4375	1.7	7438
Matured compost	730	0.6	438
Screening		4960	
Leachate pond	2500	0.26	650
TOTAL	**-**		**51582**

5.3.5.6 Source Input Parameters

Source input parameters have been selected to represent a conservative emission scenario. A full listing of all source input parameters used in the model is provided in **Table 8**.

Table 8 Summary of source input parameters for dispersion model

Source	Source Type	Area m^2	Height m (above ground level)	Emission Rate $OU/s/m^2$	Reference
Receival	Area	1,734	0	4	GHD (2015)
Shredding	Area	15	3	265.8	ERM/Edge Group (2017) - Assumes an emission rate of 3,987 OU/s based on a 25,000 tpa throughput, rather than 36,000)
Pasteurisation Bunkers	Area	3,823	1.1	2.1	Sironi et al. (2006) - Assumes an emission rate of 11,098 OU/s based on the geometric mean for aerobic biological treatment (139948000 OuE^{t-1}) and a throughput of 0.000793 tonnes per second.
Windrows	Area	16,158	1.1	1.7	GHD (2015)
Screening	Area	15	3	229.6	ERM/Edge Group (2017) - Assumes an emission rate of 3,444 OU/s based on a 25,000 tpa throughput, rather than 36,000)
Storage	Area	3,852	0	0.6	Sironi et al. (2006) - Assumes an emission rate of 733 OU/s based on the final product storage value (9247000 OuE^{t-1}) and a throughput of 0.000793 tonnes per second.

5.3.5.7 Results of AERMOD Simulations and Interpretation

In accordance with EPA Publication 1551, the 9th highest (99.9 percentile) concentration has been considered as the averaging time for odour is one hour or less. **Table** 9 below provides a summary of the 1st and 9th highest values at each of the nearby sensitive receptors for both 1-hour and 3-minute averaging periods[1]. The graphical depiction of this (by way of contour plot), is shown in **Figure 9**.

Table 9 Sensitive receptor summary

Rank	Peak (1-hr)	Peak (3-min)[1]	Units	Receptor ID	X (m)	Y (m)	ZELEV (m)	Peak Date	Start Hour
1ST	1.3	2.4	OU/m^3	1	553697	5807161	42.38	17/02/2021	8
1ST	1.0	1.9	OU/m	2	553460.4	5806635	43.84	22/01/2022	8
1ST	1.3	2.4	OU/m	3	553639.2	5806020	43.71	13/08/2020	8
1ST	1.6	2.8	OU/m	4	554159.3	5805657	40.02	7/10/2020	11
1ST	1.3	2.3	OU/m	5	555329.8	5805781	34.01	20/06/2018	9
9TH	0.8	1.5	OU/m	1	553697	5807161	42.38	8/07/2020	18
9TH	0.6	1.1	OU/m	2	553460.4	5806635	43.84	30/08/2019	21
9TH	0.7	1.2	OU/m	3	553639.2	5806020	43.71	28/04/2021	8
9TH	0.7	1.3	OU/m	4	554159.3	5805657	40.02	28/02/2019	9
9TH	0.8	1.4	OU/m	5	555329.8	5805781	34.01	7/10/2020	8

[1] 30-minute averaging period concentration values have been derived using the formula provided in Section 5 of EPA Publication 1551 ($c(t)=c(t_0)(t_0/t)^{0.2}$ or by multiplying by 1.82)

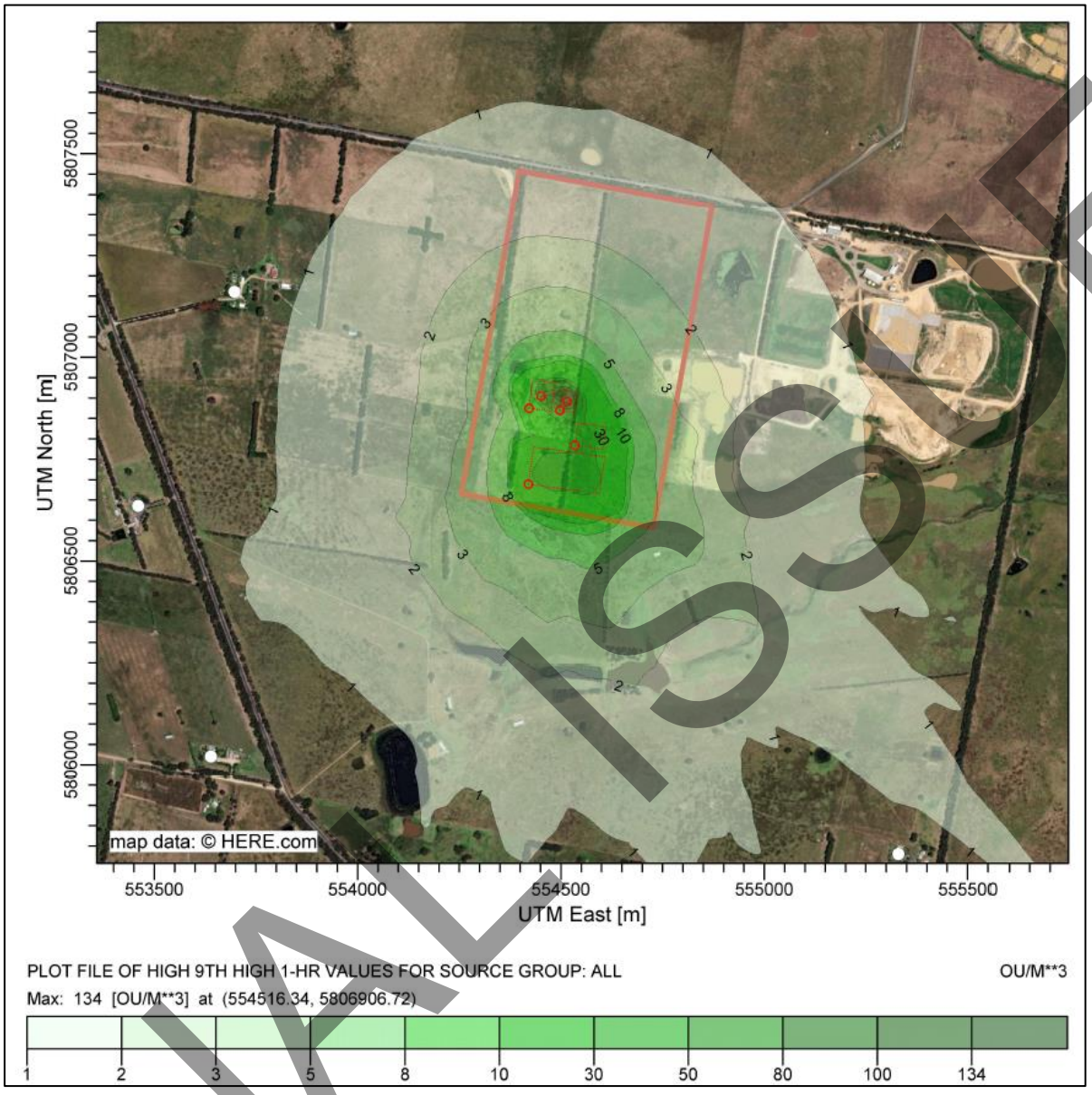

Figure 9 Contour plot of the 9th highest 1-hour values

6. DISCUSSION

A review of the EPA recommended separation distances for composting facilities indicates that five sensitive receptors may be located within the buffer of the proposed Bairnsdale Composting Centre. Therefore, a Level 1, Level 2, and Level 3 assessment of odour risk were undertaken in accordance with EPA Publication 1883 to determine whether a variation to the recommended separation distance would be justified.

The Level 1 assessment did not provide enough evidence to consider the risk of odour from the proposal to be low. The Level 2 assessment outcome was a score of 9 which correlates to a medium level of risk.

It was not considered that there were any elements that could influence the score to a low or a high, therefore a Level 3 assessment was necessary to further understand the risk.

The Level 3 assessment used multiple assessment tools which are recommended in EPA Publication 1883. A review of comparable facilities was undertaken which found that there were no facilities directly comparable to that proposed by Council at Bairnsdale; however, RCoW operates a facility that uses similar technology, just on a smaller scale. A series of field odour surveys of the Wangaratta Organics Processing Facility were undertaken by Ektimo for RCoW. The surveys found that the maximum extent of any obvious odour was 360 metres from the centroid of the site and the maximum extent of any subtle odour was 413 metres from the centroid of the site. The distance to the nearest sensitive receptor from the Bairnsdale Composting Centre is approximately 870 metres from the centroid of the site, however there is insufficient evidence to draw a correlation between the field odour survey results at Wangaratta and the potential odour impact at Bairnsdale.

An analysis of data on complaints was undertaken by requesting odour complaint data from EPA for the existing Bairnsdale Regional Landfill under the *Freedom of Information Act*. The request returned zero complaints in the last five years, so it is considered unlikely that residents at the rural houses neighbouring the landfill are impacted by odour.

Odour dispersion modelling was conducted in accordance with EPA Publication 1550 and EPA Publication 1551 using AERMOD, which is the approved regulatory model in Victoria. The model assumed an annual throughput of 25,000 tpa in accordance with the design capacity of the facility. Emission rates were sourced from published literature and similar assessments in Victoria. It is considered that the emission rates selected were suitably conservative in the absence of directly measured emission rates (e.g., monitored emission rates from a facility with similar technology and throughput). Where multiple emission rates were identified, the most conservative option was selected.

As outlined in **Section 3.2**, the ERS defines the odour objective as "*an air environment that is free from offensive odours from commercial, industrial, trade and domestic activities"*. One odour unit (1 OU) is a concentration of a gaseous substance at which at approximately 50% of the population would be able to discern the odour from odourless air. It is generally accepted that an odour would be considered subtle at concentrations between 2 OU and 10 OU, and obvious above 10 OU. This is indicated on **Figure 10** which shows the relationship between perceived odour intensity and odour concentration for butanol and hydrogen sulphide (as reported in the German Standard VDI 3882) using the Weber-Fechner law.

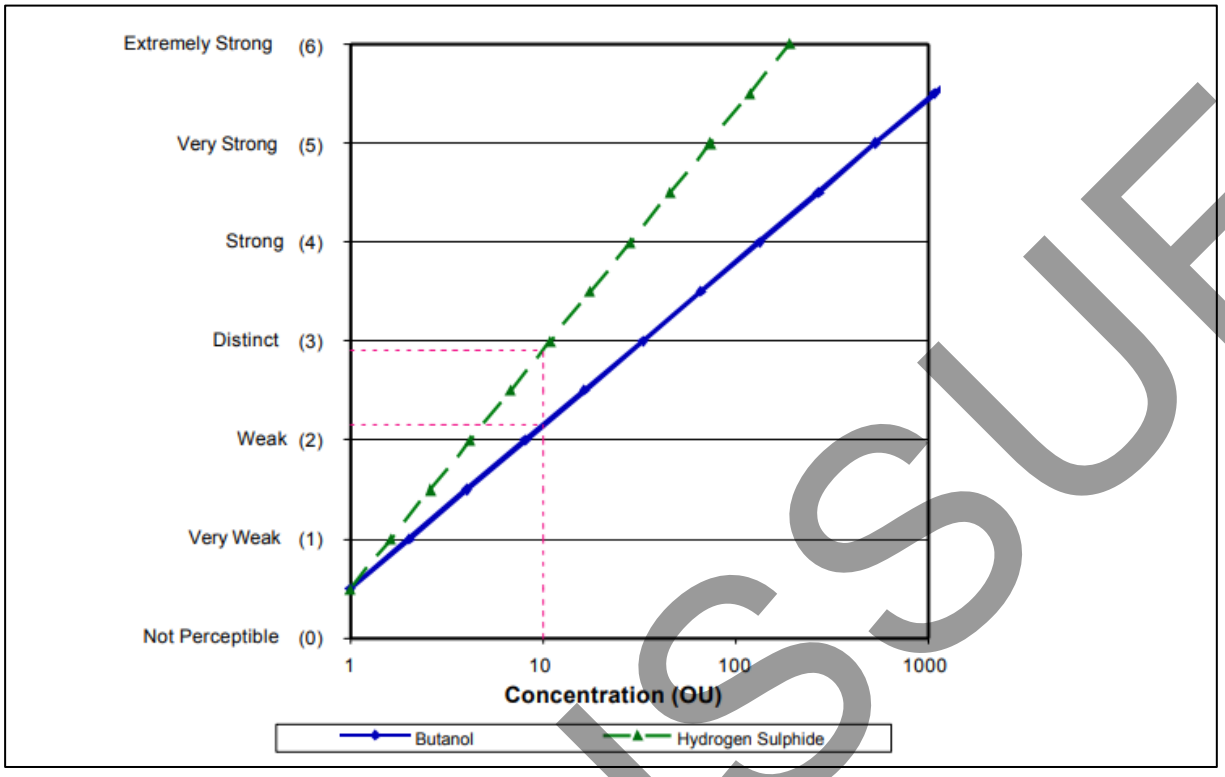

Figure 10 **Odour intensity and odour concentration relationship (Western Australia EPA, 2002)**

In view of this, the State Environment Protection Policy (Air Quality Management) (SEPP AQM) is referred to; however, it is noted that under the Environment Protection Act 2017 the State Environment Protection Policies no longer have a formal legal role. The SEPP AQM criteria for the protection of air quality amenity is provided in **Table 10** below. The general odour criterion is adopted for this assessment as a conservative 'screening level' approach.

Table 10 **SEPP AQM air quality amenity criteria**

Substance	Reason for Classification	Averaging Time	Design Criteria Mg/M3 8
Unclassified Indicators			
General odour	Amenity	3-minute	1 Odour Unit
1TSP (nuisance dust)	Amenity (nuisance)	3-minute	0.33

Using the 9th highest values (99.9th percentile), it was found that the 3-minute average was predicted to exceed 1 OU at nearby sensitive receptors (**Table 9)**. It is important to consider the likelihood of adverse odour impacts to nearby sensitive receptors, therefore a risk assessment should be completed to determine the extent of the potential risk.

EPA Publication 1883 provides the framework to assess the overall risk of offensive odour based on the odour's character, frequency, and intensity. The criteria for assessing the risk are shown in **Table 11** to **Table 15**.

Table 11 Risk of odour exposure potential (adapted from EPA Publication 1883)

	Negligible exposure	Almost no chance of odour exposure
	Low exposure	Odour exposure unlikely
	Moderate exposure	Likely chance of odour exposure
	High exposure	Highly likely to have odour exposure
	Very high exposure	Odour exposure near certain

Table 12 Risk of odour based on character, obvious odour intensity and frequency of predicted odour (adapted from EPA Publication 1883)

Frequency	Hours per year (indicative)	Obvious odour character		
		unsafe	unwelcome	innocuous
0.5 - 2.0%	< 200			
2.1% - 6.0%	200 to 525.			
6.1% - 10%	526 to 875			
> 10%	(> 875 hrs/yr.)			

Table 13 Risk of odour based on character, subtle odour intensity and frequency of predicted odour (adapted from EPA Publication 1883)

Frequency	Hours per year (indicative)	Subtle odour character (Obvious odour is < 2%)		
		unsafe	unwelcome	innocuous
0 - 2.0%	< 200			
2.1% - 6.0%	200 to 525.			
6.1% - 10%	526 to 875			
> 10%	(> 875 hrs/yr.)			

Table 14 Risk of offensive odour key (adapted from EPA Publication 1883)

Rating	Likelihood of offensive odour
Very high	Almost certain
High	Highly likely
Moderate	Likely
Low	Unlikely but still possible

Table 15 Risk of offensive odour (adapted from EPA Publication 1883)

Risk of odour exposure	Receiving environment sensitivity		
	High	Medium	Low
Very high exposure	Very high	High	Moderate
High exposure	High	High	Moderate
Moderate exposure	High	Moderate	Low
Low exposure	Moderate	Moderate	Low
Negligible exposure	Low	Low	Low

The risk assessment criteria provided in EPA Publication 1883 assume a 1-hour averaging period. As shown in **Table 9**, the 9th highest values at each sensitive receptor are less than 1 OU, so the peak odour intensity is considered subtle. **Table 16** below shows that the 200th highest value for the nearest sensitive receptor is 0.89 OU. As concentrations >1 OU occur at a frequency of less than 2% (<200 hours per year), the predicted risk of odour exposure is negligible. This results in a low risk of odour exposure for all receiving environments.

Therefore, the risk of odour exposure from the proposed Bairnsdale Composting Centre to nearby sensitive receptors is considered low and acceptable.

Table 16 Sensitive receptor summary (200th highest value)

Averaging Period	Rank	Peak	Units	Receptor ID	X (m)	Y (m)	ZELEV (m)	Peak Date	Start Hour
1-HR	200TH	0.73363	OU/m^3	1	553697.04	5807160.85	42.38	6/01/2018	1
1-HR	200TH	0.55987	OU/m^3	2	553460.35	5806635.18	43.84	10/04/2018	3
1-HR	200TH	0.50316	OU/m^3	3	553639.23	5806020.31	43.71	12/12/2018	6
1-HR	200TH	0.50311	OU/m^3	4	554159.31	5805656.81	40.02	7/09/2020	24
1-HR	200TH	0.5155	OU/m^3	5	555329.79	5805780.55	34.01	15/05/2020	5

7. CONCLUSIONS

- Level 1 and Level 2 odour assessments of the proposed Bairnsdale Composting Centre were undertaken in accordance with EPA Publication 1883. The outcome of the first two levels of assessment found that the potential odour risk is 'medium';
- A Level 3 odour assessment of the proposed Bairnsdale Composting Centre was subsequently undertaken in accordance with EPA Publication 1883. The assessment determined that:
    - Rural City of Wangaratta operate a facility with similar technology in Wangaratta, however at a design capacity of 12,000 tpa and an operational throughput of 6,000 tpa. Ektimo conducted a field odour survey of the facility in 2022 (under conditions designed to simulate 12,000 tpa throughput) and detected subtle odour up to 413 metres from the centroid of the site.
    - An analysis of complaint data from EPA in the Bairnsdale region found that there is not a history of any odour complaints relating to the neighbouring Bairnsdale Regional Landfill.
    - Odour dispersion modelling undertaken in accordance with EPA guidelines demonstrated that the predicted risk of odour exposure to nearby sensitive receptors is low. The modelling is intended to be interpreted qualitatively and is considered a 'screening level' approach. That is, the assumptions are conservative and may be an overestimate of the actual impact.
- In view of these findings, the risk of amenity impact of offensive odour from the proposed Bairnsdale Composting Centre to the surrounding sensitive receptors is low and acceptable.

Figures

PETER J RAMSAY & ASSOCIATES

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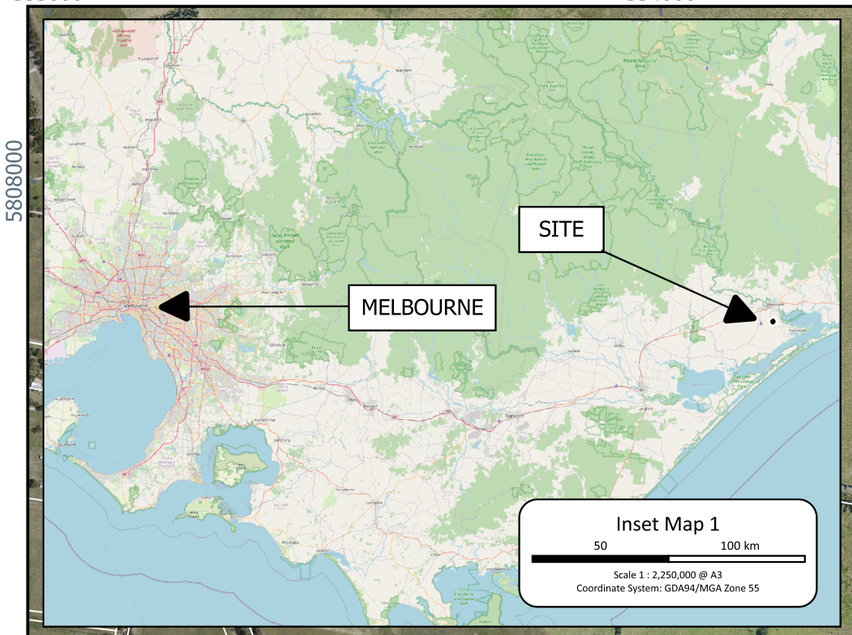


Bairnsdale Regional Landfill

1
2
3
4
5

LEGEND

- Property Boundary
- Sensitive Receptors

Data Sources

Aerial Imagery: Metromap Aerometrex Ltd., photograph taken 11/05/2023
Property Boundary: DataShare Victoria, Department of Environment, Land, Water and Planning (DELWP), Accessed 14/03/2024

N

200 400 600 m

Scale 1 : 10,000 @ A3
Coordinate System: GDA94/MGA Zone 55

LOCALITY MAP

Odour Assessment in Relation to Proposed Bairnsdale Composting Centre.

200 Johnstons Road,
Forge Creek, VIC 3875

East Gippsland Shire Council

Project:	1001.1
Date:	28/06/2024
Revision:	Rev.00
Designed:	JL
Drawn:	JL
Reviewed:	NW

Figure
F1

File: C:\Users\james.linfoot\PETER J RAMSAY and ASSOCIATES PTY LTD\GIS - Documents\Projects\1001.1\JL Model Files\Working\working-DESKTOP-A7FCHEN.qgz

554000 554250 554500 554750 555000

5807250 5807000 5806750

LEGEND

- Property Boundary

DESIGN

- MC10 — CONTROL ALIGNMENT
- 182.0 — MAJOR CONTOURS (0.5m INTERVAL)
- MINOR CONTOURS (0.1m INTERVAL)
- PAVEMENT AREAS
- CONCRETE HARDSTAND AREAS
- RIP-RAP AREAS (FOR DETAILS REFER DRG'S 241 TO 244)
- CLEAN WATER SWALE DRAIN
- STORMWATER CULVERTS & HEADWALLS
- LINE MARKING
- FIRE WATER TANKS BY OTHERS
- WIND ROWS
- INDICATIVE DRAINAGE FLOWS

Data Sources

Aerial Imagery: Metromap Aerometrex Ltd., photograph taken 11/05/2023
Property Boundary: DataShare Victoria, Department of Environment, Land, Water and Planning (DELWP), Accessed 14/03/2024
Site Plan: SMEC 2024, General Arrangement Plan, Drawing No.: 30049148-211 Revision 02, Prepared for East Gippsland Shire Council, 23 August 2024

N

50 100 150 200 m

Scale 1 : 3,500 @ A3
Coordinate System: GDA94/MGA Zone 55

SITE PLAN

Odour Assessment in Relation to Proposed Bairnsdale Composting Centre.

200 Johnstons Road,
Forge Creek, VIC 3875

East Gippsland Shire Council

Project:	1001.1
Date:	07/10/2024
Revision:	Rev.01
Designed:	JL
Drawn:	JL
Reviewed:	NW

Figure **F2**

File: C:\Users\James PJRA\PETER J RAMSAY and ASSOCIATES PTY LTD\GIS - 1001.1\JL Model Files\Working\working-DESKTOP-A7FCHEN.qgz

Appendix A

PROJECT TITLE:
C:\Lakes\AERMOD View\Bairnsdale\Bairnsdale.isc

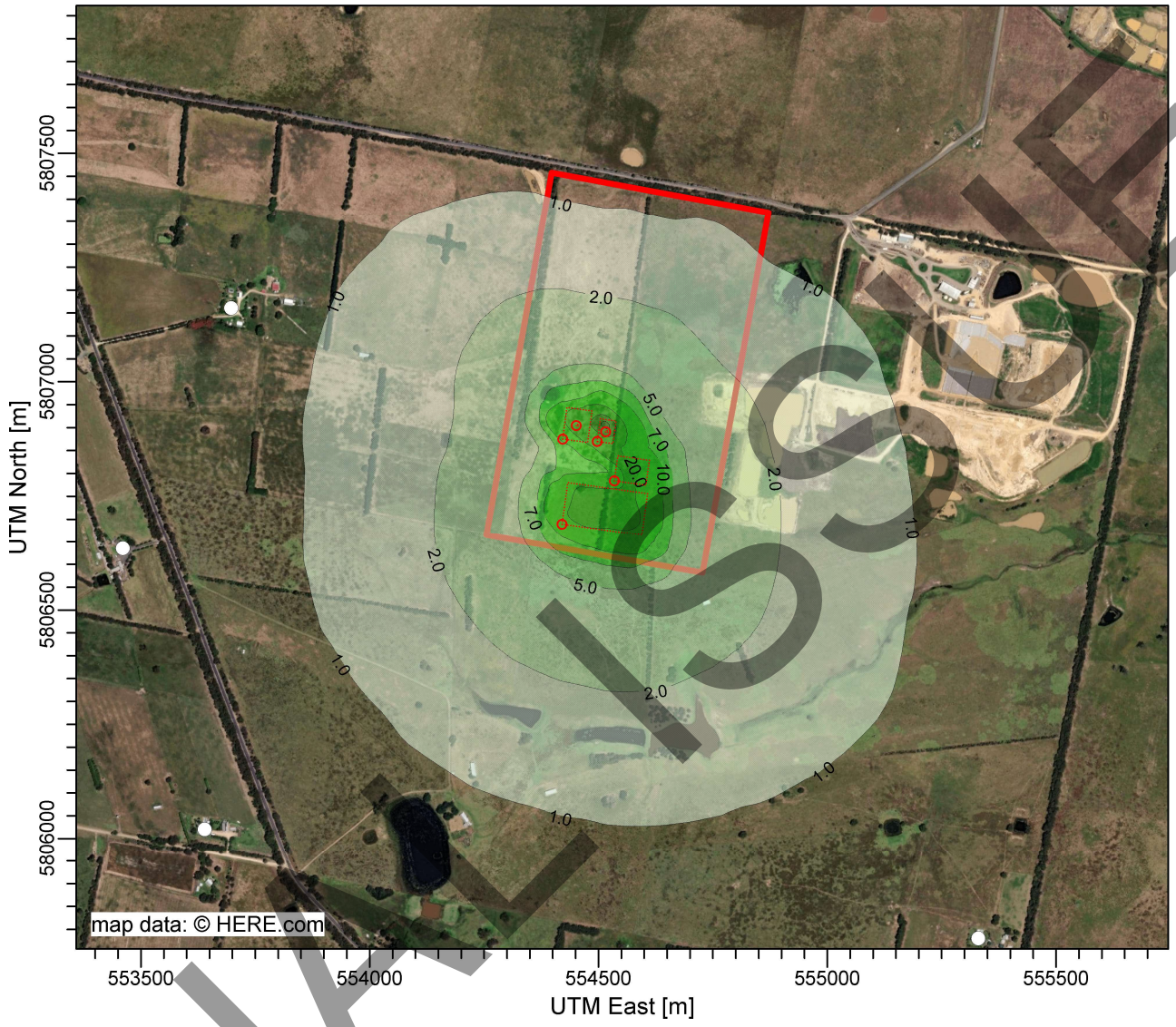
PLOT FILE OF HIGH 9TH HIGH 1-HR VALUES FOR SOURCE GROUP: ALL
OU/M**3
Max: 134 [OU/M**3] at (554516.34, 5806906.72)

1 2 3 5 8 10 30 50 80 100 134

COMMENTS:	SOURCES: **6**	COMPANY NAME: **Peter J Ramsay & Associates**	
	RECEPTORS: **5630**	MODELER: **JL**	
	OUTPUT TYPE: **Concentration**	SCALE: 1:15,000 (0 — 0.5 km)	
	MAX: **134 OU/M**3**	DATE: **10/10/2024**	PROJECT NO.: **1001.1**

Appendix B

PROJECT TITLE:
C:\Lakes\AERMOD View\Bairnsdale\Bairnsdale.isc



PLOT FILE OF HIGH 200TH HIGH 1-HR VALUES FOR SOURCE GROUP: ALL OU/M**3

Max: 79.8 [OU/M**3] at (554516.34, 5806906.72)

COMMENTS:	SOURCES:	COMPANY NAME:	
	6	**Peter J Ramsay & Associates**	
	RECEPTORS:	MODELER:	
	5630	**JL**	
	OUTPUT TYPE:	SCALE: 1:15,000	
	Concentration	0 0.5 km	
	MAX:	DATE:	PROJECT NO.:
	79.8 OU/M3**	**10/10/2024**	**1001.1**

Appendix C

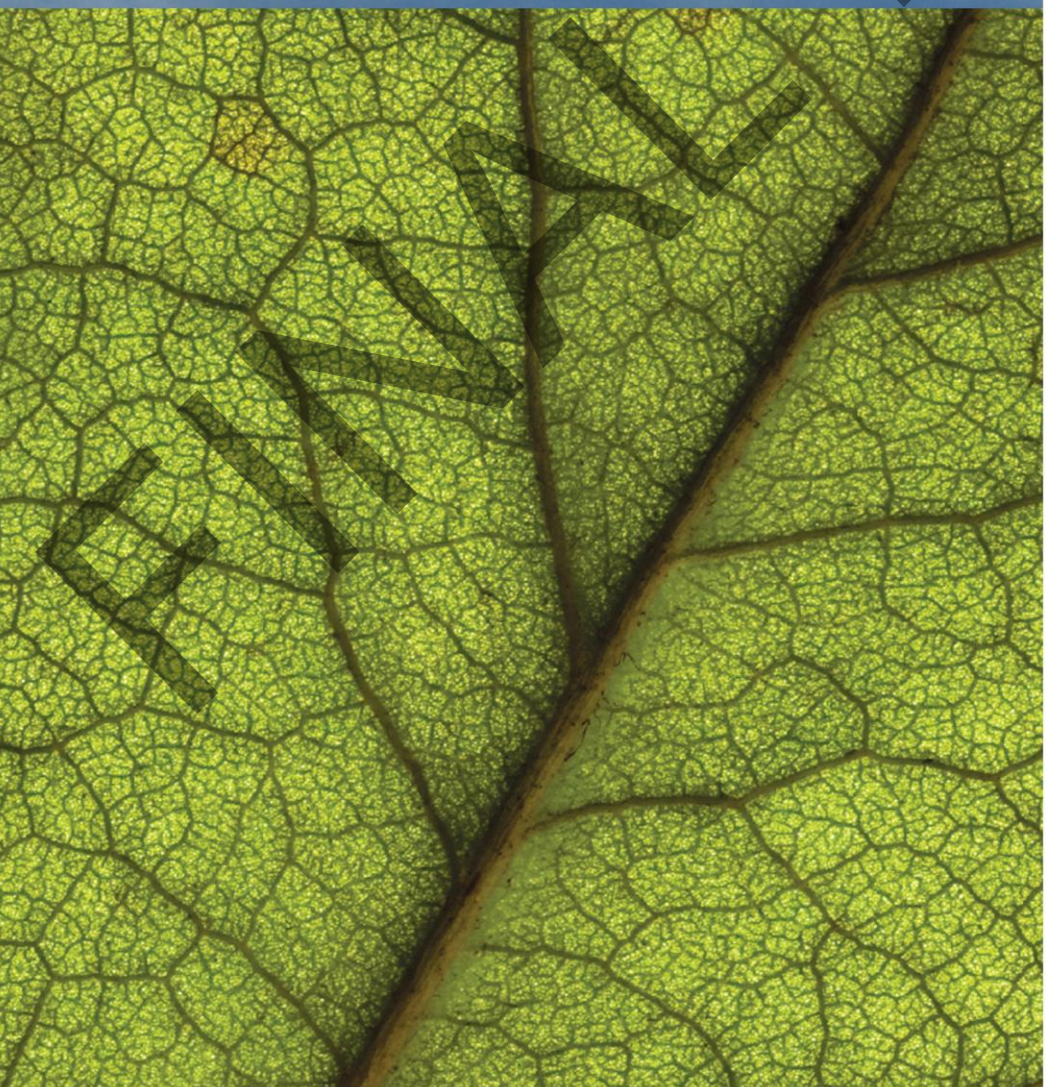
Source Pathway - Source Inputs

AERMOD

Area Sources

Source Type	Source ID	X Coordinate [m]	Y Coordinate [m]	Base Elevation (Optional)	Release Height [m]	Emission Rate [g/ (s-m^2)]	Length of X Side [m]	Length of Y Side [m]	Orientation Angle from North [deg]	Initial Vertical Dim. [m]
AREA	WINDROW	554420.40	5806689.00	39.00	1.10	1.70000	175.98	91.82	7.80	
AREA	ASP	554534.70	5806784.00	41.86	1.10	2.10000	69.71	54.84	7.80	
AREA	STORAGE	554421.60	5806875.00	40.41	0.00	0.60000	55.26	69.71	7.80	
AREA	RECEIVAL	554497.30	5806870.00	41.74	0.00	4.00000	34.86	49.73	7.80	
AREA	SHREDDER	554515.40	5806891.00	41.00	3.00	265.80000	5.00	3.00	7.80	
AREA	SCREENING	554451.45	5806904.50	40.93	3.00	229.60000	5.00	3.00	7.80	

Appendix D



Receptor Pathway

Receptor Networks

Note: Terrain Elavations and Flagpole Heights for Network Grids are in Page RE2 - 1 (If applicable)
Generated Discrete Receptors for Multi-Tier (Risk) Grid and Receptor Locations for Fenceline Grid are in Page RE3 - 1 (If applicable)

Uniform Cartesian Grid

Receptor Network ID	Grid Origin X Coordinate [m]	Grid Origin Y Coordinate [m]	No. of X-Axis Receptors	No. of Y-Axis Receptors	Spacing for X-Axis [m]	Spacing for Y-Axis [m]
UCART1	552616.34	5804956.72	75	75	50.00	50.00

Discrete Receptors

Discrete Cartesian Receptors

Record Number	X-Coordinate [m]	Y-Coordinate [m]	Group Name (Optional)	Terrain Elevations	Flagpole Heights [m] (Optional)
1	553697.04	5807160.85		42.38	
2	553460.35	5806635.18		43.84	
3	553639.23	5806020.31		43.71	
4	554159.31	5805656.81		40.02	
5	555329.79	5805780.55		34.01	

Plant Boundary Receptors

Appendix E

Results Summary

C:\Lakes\AERMOD View\Bairnsdale\Bairnsdale.isc

ODOUR - Concentration - Source Group: ALL

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start Hour
1-HR	1ST	202.88673	OU/M**3	554516.34	5806906.72	41.50	0.00	41.50	19/01/2022, 7
1-HR	9TH	133.80261	OU/M**3	554516.34	5806906.72	41.50	0.00	41.50	15/02/2021, 9
1-HR	200TH	79.82001	OU/M**3	554516.34	5806906.72	41.50	0.00	41.50	12/09/2020, 14

Appendix F

Sensitive Receptor Summary

C:\Lakes\AERMOD View\Bairnsdale\Bairnsdale.isc

ODOUR - Concentration - Source Group: ALL

Averaging Period	Rank	Peak	Units	Receptor ID	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start Hour
1-HR	1ST	1.33771	OU/M**3	1	553697.04	5807160.85	42.38	0.00	42.38	17/02/2021, 8
1-HR	1ST	1.01940	OU/M**3	1	553460.35	5806635.18	43.84	0.00	43.84	22/01/2022, 8
1-HR	1ST	1.30934	OU/M**3	1	553639.23	5806020.31	43.71	0.00	43.71	13/08/2020, 8
1-HR	1ST	1.56318	OU/M**3	1	554159.31	5805656.81	40.02	0.00	40.02	7/10/2020, 11
1-HR	1ST	1.25008	OU/M**3	1	555329.79	5805780.55	34.01	0.00	34.01	20/06/2018, 9
1-HR	9TH	0.80465	OU/M**3	1	553697.04	5807160.85	42.38	0.00	42.38	8/07/2020, 18
1-HR	9TH	0.63136	OU/M**3	1	553460.35	5806635.18	43.84	0.00	43.84	30/08/2019, 21
1-HR	9TH	0.67514	OU/M**3	1	553639.23	5806020.31	43.71	0.00	43.71	28/04/2021, 8
1-HR	9TH	0.73817	OU/M**3	1	554159.31	5805656.81	40.02	0.00	40.02	28/02/2019, 9
1-HR	9TH	0.76907	OU/M**3	1	555329.79	5805780.55	34.01	0.00	34.01	7/10/2020, 8
1-HR	200TH	0.73363	OU/M**3	1	553697.04	5807160.85	42.38	0.00	42.38	6/01/2018, 1
1-HR	200TH	0.55987	OU/M**3	1	553460.35	5806635.18	43.84	0.00	43.84	10/04/2018, 3
1-HR	200TH	0.50316	OU/M**3	1	553639.23	5806020.31	43.71	0.00	43.71	12/12/2018, 6
1-HR	200TH	0.50311	OU/M**3	1	554159.31	5805656.81	40.02	0.00	40.02	7/09/2020, 24
1-HR	200TH	0.51550	OU/M**3	1	555329.79	5805780.55	34.01	0.00	34.01	15/05/2020, 5