TO: **ANAE RESSOS**
COMPANY: **VEOLIA (AUSTRALIA) PTY LTD**
FROM: **ISAAC FARRUGIA & MICHAEL ASSAL**
DATE: **11 FEBRUARY 2024**
JOB NO: **N1906**
SUBJECT: **BANKSMEADOW WASTE TRANSFER TERMINAL FACILITY – ON-GOING ODOUR AUDIT PROGRAM: JULY 2023**

1. Introduction

The following technical memorandum documents the findings and recommendations from an on-going, six-monthly odour audit program (the **Audit**) being conducted by The Odour Unit Pty Ltd (**TOU**) at the Veolia (Australia) Pty Ltd (**Veolia**) Waste Transfer Terminal Facility, 34/36 McPherson Street, Banksmeadow, New South Wales (**BTT Facility**). The Audit documented in this memorandum report covers the outcome of the visit conducted by TOU at the BTT Facility on 4 & 5 July 2023. This report for the Audit documents the following:

1. The results and findings from odour sampling and testing of the roof discharge stack as found during the Audit visit;

2. Documentation of field observations made during the visit that are relevant to odour management as well as the outcomes from smoke testing;

3. A review of the relevant documentation, including the service logs for the preventative maintenance works undertaken on the building ventilation air extraction system and logged odour complaints between December 2022 and July 2023; and

4. The field ambient odour assessment (**FAOA**) survey results were undertaken within the BTT Facility at both downwind and upwind locations.

2. Relevant Background

The BTT Facility was completed in June 2016 and is designed, at full capacity, to receive up to 400,000 tonnes per annum of putrescible waste, consisting of mixed waste, including food from the municipal and commercial sectors. All received waste is delivered to the BTT Facility in enclosed waste collection trucks before being compacted and placed in sealed containers for rail transport to Veolia's site at Woodlawn for subsequent treatment, recycling, energy recovery, and disposal where required. The BTT Facility is also approved to receive up to 100,000 tonnes per annum of non-putrescible (dry) waste from the municipal, commercial, and industrial sectors for transfer to a new material recycling facility currently being scoped in Camellia.

The following report should be read in conjunction with previously issued documents relating to the BTT Facility, where applicable, including:

1. A TOU report titled *Banksmeadow Waste Transfer Terminal Facility – Odour Audit Final Report* dated 26 May 2017 (the **May 2017 Report**);

2. An email-based summary report titled *Banksmeadow On-going Odour Investigation - 2 August 2017 Summary* dated 21 September 2017 documenting the works undertaken on 2 August 2017 at the BTT Facility (the **August 2017 Report**);

3. A TOU Report titled *Banksmeadow Waste Transfer Terminal Facility – On-going odour audit and investigation progress update: January/February 2018* issued on 23 February 2018 (the **February 2018 Report**);

4. A TOU report titled *Banksmeadow Waste Transfer Terminal Facility – On-going odour audit and investigation progress update: March to May 2018 (Rev 3)* issued on 31 May 2018 (the **March/May 2018 Report**);

5. A TOU report titled *Banksmeadow Waste Transfer Terminal Facility – On-going odour audit and investigation progress update: June 2018* issued on 28 June 2018 (the **June 2018 Report**);

6. A TOU report titled *Banksmeadow Waste Transfer Terminal Facility – On-going odour audit and investigation progress update: October 2018* issued on 13 November 2018 (the **November 2018 Report**);

7. A TOU report titled *Banksmeadow Waste Transfer Terminal Facility – On-going odour audit and investigation progress update: April 2019* issued on 10 May 2019 (the **May 2019 Report**);

8. A TOU report titled *Banksmeadow Waste Transfer Terminal Facility – On-going odour audit and investigation progress update: October 2019* issued on 19 November 2019 (the **October 2019 Report**);

9. A TOU report titled *Banksmeadow Waste Transfer Terminal Facility – On-going odour audit and investigation progress update: May 2020* issued on 22 June 2020 (the **June 2020 Report**);

10. A TOU report titled *Banksmeadow Waste Transfer Terminal Facility – On-going odour audit and investigation progress update: October 2020* issued on 23 December 2020 (the **December 2020 Report**);

11. A TOU report titled *Banksmeadow Waste Transfer Terminal Facility – On-going odour audit and investigation progress update: May 2021* issued on 31 May 2021 (the **May 2021 Report**);

12. A TOU report titled *Banksmeadow Waste Transfer Terminal Facility – On-going odour audit and investigation progress update: November 2021* issued on 10 March 2022 (the **November 2021 Report**);

13. A TOU report titled *Banksmeadow Waste Transfer Terminal Facility – On-going odour audit and investigation progress update: June 2022* issued on 21 June 2022 (the **June 2022 Report**); and

14. A TOU report titled *Banksmeadow Waste Transfer Terminal Facility – On-going odour audit and investigation progress update: December 2022* issued on 31 May 2023 (the **December 2022 Report**).

3. Odour Audit Methodology

3.1 Odour Sampling and Testing

The odour sampling and laboratory analysis methodology are well documented in the May 2017 Report. As such, it is not reproduced in this memorandum report.

The point source sampling method was utilised to collect samples from a 10-millimetre (**mm**) tap point created in the common plenum chamber of the two fan modules servicing the building ventilation extraction system at the BTT Facility. An illustration of the location and sampling technique is presented in **Photo 1**.

3.2 Odour Audit Log Sheet

An extract of the log sheet utilised as part of the Audit visit is provided in **Figure 1**, which was developed in previous audits conducted at the BTT Facility.

3.3 Field Ambient Odour Assessment Survey

The methodology followed for the FAOA survey is well documented in the February 2018 Report. As such, it is not reproduced in this memorandum report. For the Audit, TOU extended the FAOA survey measurement period to five-minute intervals, with discrete measurement readings collected every ten seconds (i.e., 30 'sniffs' per measurement location point). The product of this measurement methodology is an intensity frequency pie graph. The odour impact criterion (i.e., the threshold that would be considered as increasing the likelihood of odour annoyance at downwind receptors) is set to an odour intensity of greater than 2 (Weak) and at a frequency of 10% per measurement cycle per location. This criterion is considered suitable given the industrial context of the BTT Facility. This detail is outlined in the FAOA map plot in **Figure 5** of **Section 4.5**.

3.4 Smoke Testing

The methodology for smoke testing is documented in the May 2018 Report. As such, it is not reproduced in this memorandum report.

3.5 Roof Discharge Stack Airflow Sensor Performance Evaluation

The methodology used to measure the airflow from the roof discharge stack was via a hot-wire anemometer at four (4) pre-drilled measurement locations, as illustrated in **Figure 2**. Notably, measurement point A is the location of the velocity sensor probe. These measurements were compared against the airflow sensor readings to determine the accuracy of the airflow sensor (refer to **Table 3**).

The verification of the accuracy of the velocity sensor located on the roof discharge stack has become a component of the bi-annual audits and is necessary due to suspected erroneous readings in previous assessments (refer to the May 2021 Report and the November 2021 Report). **Table 2** has been reproduced from the July 2022 Report to compare both the sensor reading and TOU's independent measurements against the

3.6 Review of relevant documentation

As part of the Audit, the following documentation was reviewed, namely:

- Fan maintenance reports between December 2022 and July 2023; and
- Odour complaints register between December 2022 and July 2023.

Photo 1 – An example of the roof discharge stack odour sampling point at the BTT Facility

Date		
Stack samples collected		
Waste tonnage on floor		
Observed local wind conditions		
Fan setting	**EF-01** **_____Hz** **_____Amps**	**EF-02** **_____Hz** **_____Amps**
Other comments		

Figure 1 – Odour audit logsheet showing the logging of key operational parameters and weather conditions

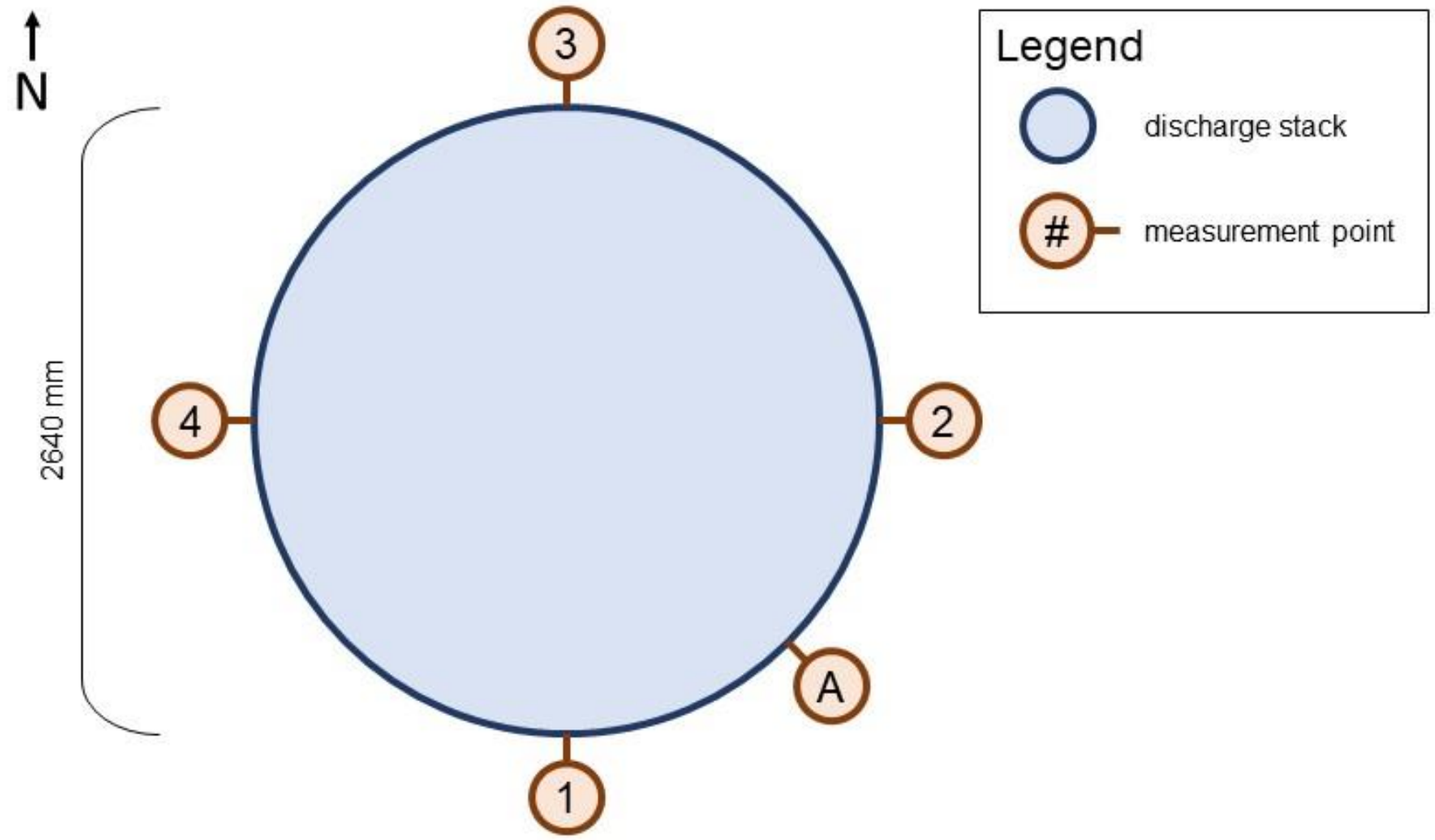


Figure 2 – Diagram displaying a cross-sectional view of the roof discharge stack and location of measurement points

4. Results

The following section summarises the results from the sampling and testing conducted at the BTT Facility on 4 & 5 July 2023. The odour laboratory results report is enclosed in **Appendix A**.

4.1 Roof Discharge Stack Odour Emission Results

The roof discharge stack odour emission results are presented in **Table 1**. The historical trend between waste tonnage on the floor and the stack odour emission rate at the BTT Facility until 4 & 5 July 2023 is presented in **Figure 3**.

4.2 Roof Discharge Stack Airflow Testing Results

The design velocity through the discharge stack is 20 m/s. Based on the reported outcomes since the June 2022 Report and TOU's independent physical measurements, the fan settings for EF-01 and EF-02 are required to be set to 50 Hz to achieve the target exit velocity of 20 m/s. A calibration to the velocity sensor was completed by the responsible mechanical contractor in 2022 to ensure that the displayed reading was consistent with the independent measurements collected by TOU, as the velocity sensor was displaying erroneous readings at that time.

As part of the Audit, TOU conducted further measurements to validate the accuracy of the existing velocity sensor located at the roof discharge stack, as this was investigated in the December 2022 Report. **Table 2** displays the sensor reading and independent measurements of airflow through the discharge stack at various fan speeds in March 2022. **Table 3** compares the velocity readings as obtained by TOU's portable instrument during the Audit. Based on the readings outlined in **Table 3**, it appears that the physical performance of the fans requires further investigation by a mechanical contractor as the 20 m/s is not being achieved at any of the fan settings (refer to **Section 6**).

4.3 Smoke Testing Results

Several smoke release points were undertaken to evaluate airflow patterns and fugitive emission release within the BTT Facility building enclosure. The smoke release points included the northern, middle, and southern areas of the BTT Facility building enclosure. A photo of a smoke testing point at the truck entry point of the BTT Facility, as occurred on 4 July 2023, is shown in **Photo 2.** A photo of the smoke testing within the BTT Facility building enclosure is shown in **Photo 3**. The observations made during smoke testing are as follows:

- No smoke was found to be emanating from the sealed breezeways around the perimeter of the BTT Facility building;
- The released smoke was found to be well-contained with the BTT Facility building enclosure, suggesting that odour release at ground level is minimal; and
- The released smoke was found to dissipate over time gradually. This indicates that there is a very good level of air exchange turnover within the BTT Facility building enclosure.

4.4 Odour Audit Log Sheet

The outcomes from the completion of the audit log sheet on 5 July 2023 are provided in **Figure 4**.

4.5 Field Ambient Odour Assessment Survey

The FAOA survey results, as occurred on 5 July 2023, are provided in **Figure 5** and **Table 4**.

4.6 General Observations

The walls and air collection grilles of the BTT Facility building have been cleaned since the December 2022 Report (refer to **Photo 4**). The truck entrance plastic strips were found to be in good condition at the time of the Audit (refer to **Photo 5**). The storage container area was found to be well-maintained at the time of the Audit (refer to **Photo 6**).

Table 1 – Comparison of stack odour emission results and recorded waste tonnage on the floor between January 2018 and July 2023

Sample No.	Sampling Date	Sampling Time (hrs)	Measured stack odour concentration (ou)	Tonnage on waste floor (tonnes)	Stack design discharge airflow (m^3/s)	Calculated stack odour emission rate ($ou.m^3/s$)	Calculated stack odour emission rate per tonne of waste on the floor ($ou.m^3/s$)	Relevant comments
1	Monday, 8 January 2018	0930	1,450	390	109	158,100	405	--
2		1040	1,450			158,100	405	--
3	Tuesday, 9 January 2018	0940	1,720	150	55	94,080	627	Single fan operating
4		1002	1,450			79,320	529	
5	Wednesday, 10 January 2018	0942	861	30	55	47,100	1,570	Single fan operating
6		1015	939			51,360	1,710	
7	Thursday, 11 January 2018	0930	1,580	120	109	172,200	1,440	--
8		1029	1,720			187,500	1,560	--
9	Friday, 12 January 2018	0950	790	120	109	86,110	718	--
10		1032	395			43,060	359	--
11	Monday, 15 January 2018	0950	1,330	300	109	145,000	483	--
12		1100	1,450			158,100	527	--
Post-fan optimisation and service works								
13	Wednesday, 16 May 2018	1030	152	300	109	16,600	55	--
14		1035	197			21,470	72	--
Odour sampling campaign: June 2018								
1	Monday, 18 June 2018	0945	181	360	109	19,800	55	Refer to the June 2018 Report
2		1025	362			39,500	110	
3	Tuesday, 19 June 2019	0930	332	320		36,200	113	
4		0955	332			36,200	113	
5	Wednesday, 20 June 2018	0910	362	250		39,500	158	
6		0940	256			27,900	112	
7	Thursday, 21 June 2018	0925	181	350		19,700	56	
8		0950	235			25,600	73	
9	Friday, 22 June 2018	0925	91	200		9,920	50	
10		0950	91			9,920	50	
Odour audit as conducted on 11 October 2018								
1	Thursday, 11 October 2018	1145	152	500	114	17,300	35	Refer to the November 2018 Report
2		1325	181			20,600	41	
Odour audit as conducted on 10 April 2019								
1	Wednesday, 10 April 2019	1051	91	150	115	10,500	70	Refer to the May 2019 Report
2		1207	91			10,500	70	
Odour audit as conducted on 2 October 2019								
1	Wednesday, 2 October 2019	1405	157	180	104	16,400	91	Refer to the October 2019 Report
2		1500	91	100		9,460	95	
Odour audit as conducted on 6 May 2020								
1	Wednesday, 6 May 2020	1018	304	120	113	34,400	286	Refer to the May 2020 Report
2		1110	235			26,600	221	
Odour audit as conducted on 1 October 2020								
1	Tuesday, 1 October 2020	1024	416	270	117	48,700	180	Refer to the October 2020 Report
2		1145	362			42,400	157	

Table 1 (continued) - Comparison of stack odour emission results and recorded waste tonnage on the floor between April 2021 and July 2023

Sample No.	Sampling Date	Sampling Time (hrs)	Measured Stack Odour Concentration (ou)	Tonnage On Waste Floor (tonnes)	Stack Design Discharge Airflow (m^3/s)	Calculated Stack Odour emission rate ($ou.m^3/s$)	Calculated stack odour emission rate per tonne of waste on the floor ($ou.m^3/s$)	Relevant comments
Odour audit as conducted on 28 April 2021								
1	Wednesday, 28 April 2021	0830	332	180	55	18,200	101	Refer to the April 2021 Report
Odour audit as conducted on 14 May 2021								
2	Friday, 14 May 2021	0915	197	150	143	28,200	188	Refer to the May 2021 Report
Odour audit as conducted on 1 June 2022								
1	Wednesday, 1 June 2022	1130	128	250	82	6,080	24	Refer to the June 2022 Report
2		1305	74			10,500	42	
Odour audit as conducted on 21 December 2022								
1	Wednesday, 21 December 2022	0958	181	120	78	5,750	48	Refer to December 2022 Report
2		1003	208			9,950	83	
Odour audit as conducted on 4 July 2023								
1906-01-001	Tuesday, 4 July 2023	0924-0927	52	120	87	4,500	37	Refer to **Appendix A**
1906-01-002		0927-0930	64			5,540	46	

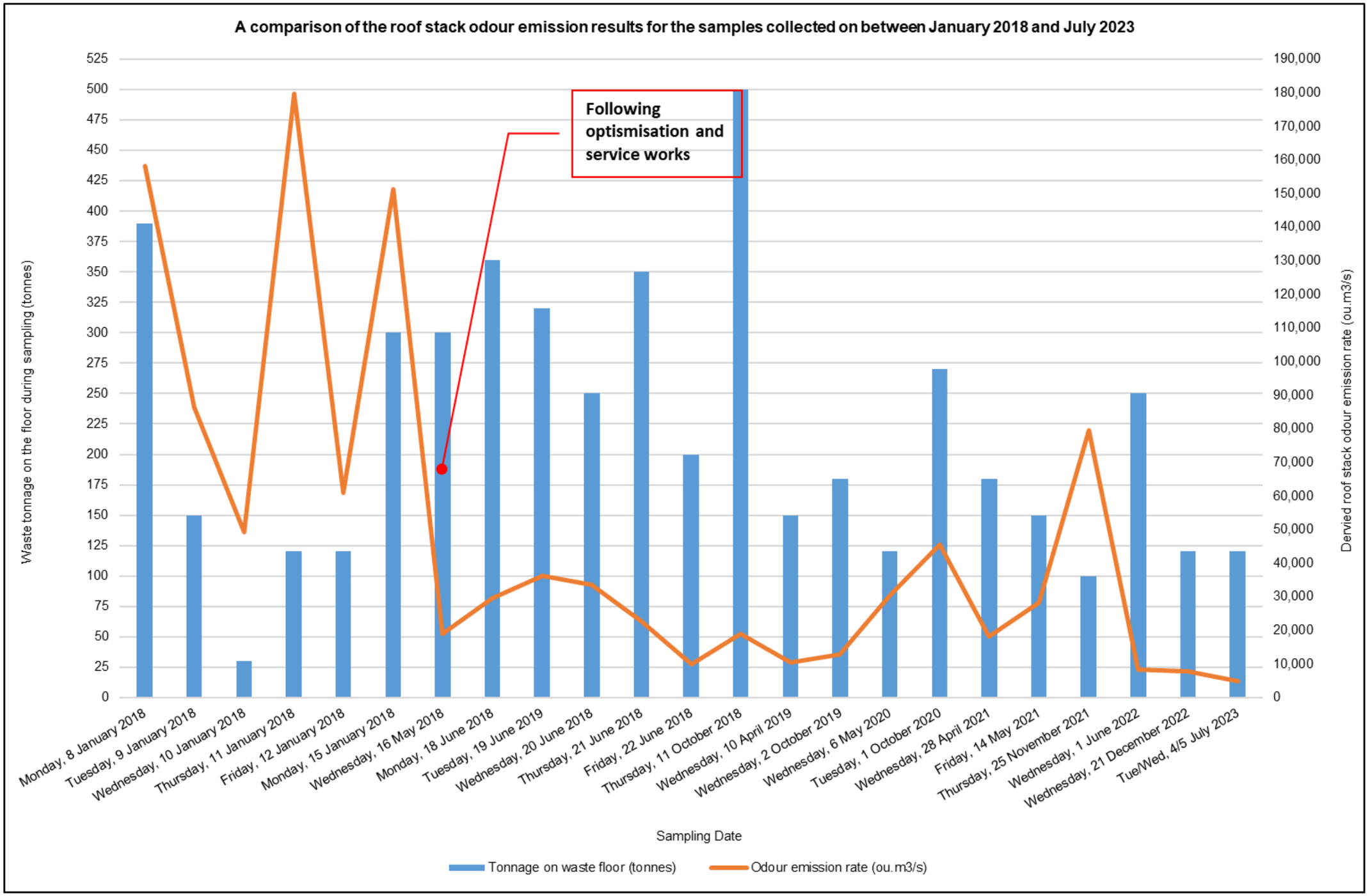


Figure 3 – Comparison of the roof stack odour emission rate between December 2022 and July 2023

Table 2 – Roof Discharge Stack Airflow Calibration Screening Reference Results: 18 March 2022				
Fan setting (Hz)	**Sensor reading**		**Independent measurement**	
	Velocity (m/s)	**Airflow (m^3/hr)**	**Velocity (m/s)**	**Airflow (m^3/hr)**
18-Mar-22	**Measurement point A**			
35	25.0	493,000	14.3	281,000
40	29.0	571,000	16.0	315,000
45	30.0	591,000	18.0	355,000
48	30.0	591,000	19.6	385,000
50	30.0	591,000	20.2	398,000

Table 3 – Roof Discharge Stack Airflow Verification Results: 5 July 2023							
Sensor reading		**Independent measurement**					
Velocity (m/s)	**Airflow (m^3/hr)**	**Velocity (m/s)**			**Airflow (m^3/hr)**		
50 Hz		**40 Hz**	**45 Hz**	**50 Hz**	**40 Hz**	**45 Hz**	**50 Hz**
n/o	--	14.2	15.8	17.6	278,000	311,000	347,000

Note: airflows are calculated from the air velocity measured and the stack diameter.
n/o: not observed

Photo 2 – Smoke testing at the truck entry point of the BTT Facility building enclosure on 4 July 2023

Photo 3 – A picture of the BTT Facility waste floor area during smoke testing on 4 July 2023

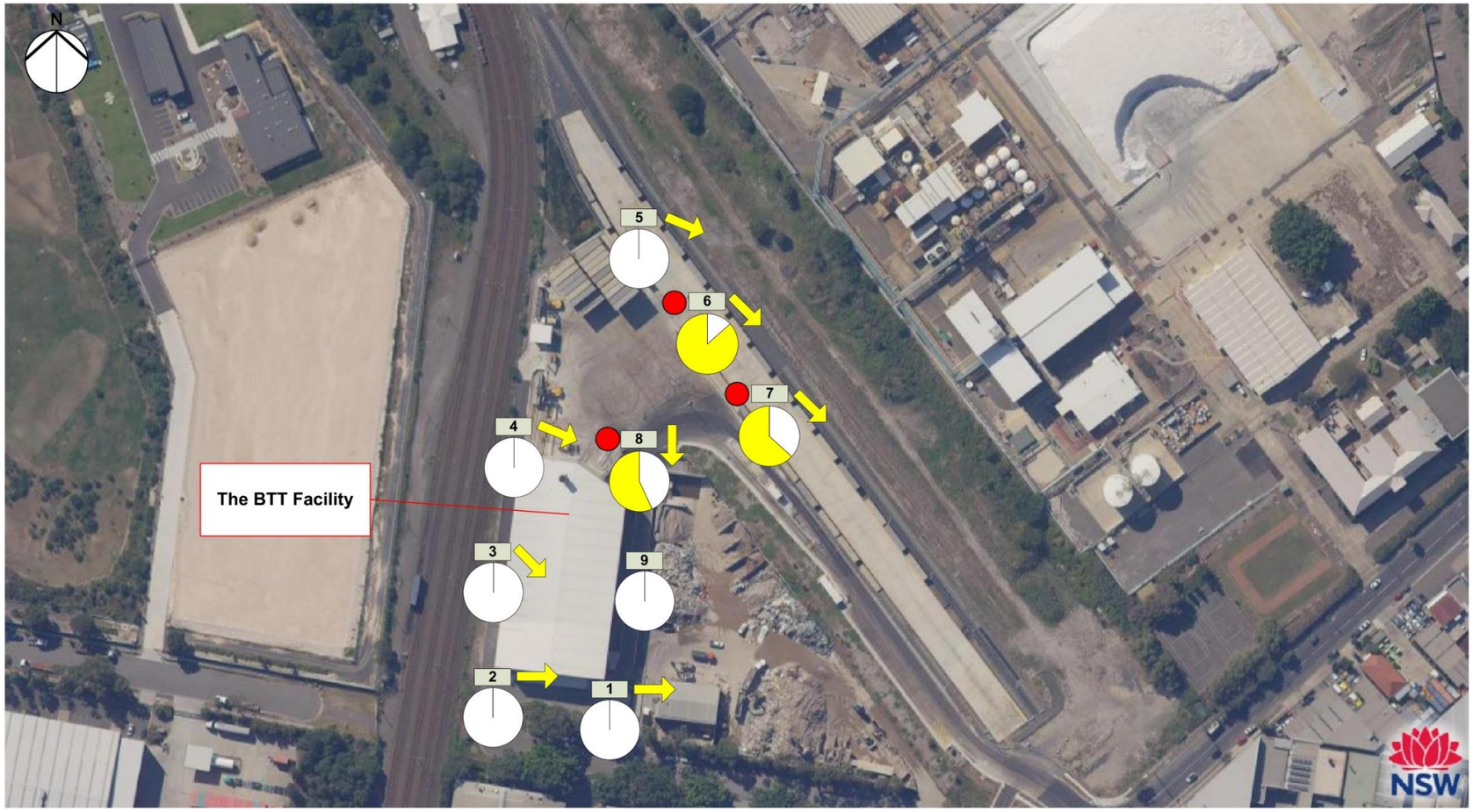
Photo 4 – A view of the ventilation collection points: 4 July 2023 (Note: The walls and collection grilles have been cleaned since the December 2022 Audit)

Photo 5 – A view of the truck entrance & plastic strips: 5 July 2023

Photo 6 – A view of the storage container area: 5 July 2023

Figure 4 – Completed audit logsheet as occurred on 4 & 5 July 2023		
Date	**4 & 5 July 2023**	
Stack samples collected	Stack Discharge 1 of 2 collected between 0924 and 0927 hrs on 4 July 2023 Stack Discharge 2 of 2 collected between 0927 and 0930 hrs on 4 July 2023	
Waste tonnage on floor	Approximately 250 tonnes on 4 July 2023 as given by the client	
Observed local wind conditions	4 July 2023: Overcast, heavy cloud cover, significant rainfall. 5 July 2023: Sunny, light cloud cover, no rainfall. Calm (< 0.5 m/s) to light (0.5 – 2.0 m/s) winds, predominately from the north-westerly. The local ambient temperature was observed to be approximately 21 °C.	
Fan setting	**5 July 2023**	
	EF-01 ____45.0____Hz ____n/r _____Amps	**EF-02** ____45.0_____Hz ____ n/r _____Amps
Other comments	▪ EF-1 discharge stack reading = 21.0 m/s (per velocity sensor). ▪ EF-2 discharge stack reading = 21.0 m/s (per velocity sensor). ▪ Measured stack velocity at discharge point (duct dimensions) = 14.2 m/s (average) ▪ Fan backpressure = n/m ▪ Twenty-five (25) filled waste containers were present on the concrete pad on the morning of 5 July 2023. ▪ Both compactors were operating during the visit. ▪ Air extraction system fresh air louvres were observed to have been cleaned. ▪ BTT Facility personnel discussed with TOU that the fan becomes noisy when set to 50 Hz and speculate that the fan belt is loose.	

n/m = not measured
n/r = not recorded



VDI 3882.1 Intensity	
0	Not detectable
1	Very weak
2	Weak
3	Distinct
4	Strong
5	Very Strong
6	Extremely Strong

Odour Character

- A – bin juice, sour
- B – other non-waste odours

Legend

- 99 – Measurement location
- Intensity Frequency Pie Graph
- Local Wind Direction

Prevailing Local Wind Conditions

Sunny, light cloud cover, no rainfall.

Calm (< 0.5 m/s) to light (0.5 – 2.0 m/s) wind speeds.

Predominantly northerly to westerly winds.

THE ODOUR UNIT

Veolia – Banksmeadow, NSW
Field Ambient Odour Assessment Survey
Odour Impact Map

Field Ambient Odour Assessment Survey
Session Date: 05.07.2023 Session Time: 1000 hrs – 1101 hrs
Area: 1 Odour Impact Criterion: Intensity ≥ 2, Frequency ≥ 10%
Drawn By: I. Farrugia Revision: A Date: 08.02.2024

Figure 5 – FAOA survey odour impact map as conducted on 5 July 2023 between 1000 hrs and 1101 hrs (refer to **Table 4** for details)

Table 4 – FAOA survey log sheet: 5 July 2023 between 1000 hrs and 1101 hrs

Grid Reference Position	Time (hrs)	Wind Direction	Wind speed (m/s)	Odour Present (Y / N)	Odour character	VDI 3940 Intensity Scale 0-6 Range Detected	Is odour intensity ≥ 2 (Weak) and frequency of detection ≥ 10%	Comments
1	1000-1005	W	0.5	N	nil detection	0	N	--
2	1007-1012	W	0.5	N	nil detection	0	N	--
3	1010-1015	NW	0.5	N	nil detection	0	N	--
4	1021-1026	WNW	0.5	N	nil detection	0	N	--
5	1028-1033	WNW	0.5	N	nil detection	0	N	--
6	1035-1040	NW	0.5-1.5	Y	bin juice, sour	0 – 1	N	▪ Localised odour within the BTT boundary
7	1042-1047	NW	1	Y	bin juice, sour	0 – 1	N	▪ Localised odour within the BTT boundary
8	1049-1054	N	0.5	Y	bin juice, sour	0 – 1	N	▪ Localised odour within the BTT boundary
9	1056-1101	Calm	<0.5	N	nil detection	0	N	--

5. Odour Audit Findings

Based on the results and observations documented in **Section 4** of this memorandum report, the following findings are made:

- The roof discharge stack was found to be operating at an adequate odour performance level.
- The physical performance of the roof discharge fans appears to be sub-optimal, as explained in **Section 4.2**. This will be validated in the next odour audit;
- Based on the roof discharge stack odour emissions performance as found during the Audit, downwind odour impacts were very unlikely. The status quo is expected to be maintained under the current operating and maintenance practices at the BTT Facility;
- A localised Very Weak (Odour Intensity of 1) was detectable within the boundary of the BTT Facility at several measurement location points (refer to **Figure 5**) during the FAOA survey. The odour character was 'bin juice, sour' and the likely source was the activities at the BTT Facility occurring at the time;
- It is understood that the BTT Facility continues to implement an active service and maintenance program for the waste containers (refer to the *NSW Resource Recovery – Container Maintenance*). It is also understood that the road sweeper is utilised twice daily. As such, given the current odour mitigation and management practices and stack testing results as found in the Audit, the localised odour within the BTT Facility detected during the FAOA survey is not expected to be problematical at nearby, off-site downwind locations;
- The smoke testing conducted within the BTT Facility building enclosure indicated positive results and suggested that the building ventilation air extraction system at the BTT Facility is operating effectively. It was noted that the collection grilles for the ventilation collection system (refer to **Photo 4**) and internal building walls have been cleaned since the December 2022 Audit;
- Three (3) formal odour complaints were logged between December 2022 and July 2023. The three (3) complaints were logged by IXOM personnel, either directly via email and occurred on 13 & 14 December 2022 and 3 February 2023;
- The service logs indicate that all required maintenance works on the building ventilation air extraction system at the BTT Facility since the previous December 2022 Report have been adequately undertaken, and the system is operating in a satisfactory condition, with the potential exception of one or both fans servicing the roof discharge stack. It was noted that the airflow velocity sensors were damaged in the report dated 7 March 2023 and that a replacement was to be organised. Despite these adjustments, EF-01 and EF-02 are still unable to achieve their design flows; and
- The plastic panels at the truck entry point of the BTT Facility building enclosure were intact and in good condition, and the storage container area was well maintained.

6. Follow-up Recommendations

Based on the findings documented in **Section 5**, the following recommendations are made:

- Investigate the reliability and accuracy of the velocity sensor servicing the roof discharge stack with the mechanical contractor. This will be reviewed as part of the next odour audit. If found to be ineffective, it may be necessary to change the equipment model of the velocity sensor, which TOU can provide guidance on if required; and

- The reduced fan performance, and the observed excessive fan noise during operation, should be investigated. If any issues are identified, they should be addressed as soon as practicable to maintain the current low-risk rating of odour emission.

7. Concluding Remark

Given the results and findings as documented in this memorandum report, TOU is of the view that the BTT Facility is operating in a manner that is unlikely to adversely impact the local amenity from an odour viewpoint under the measured and current operating circumstances as found in the Audit. Notwithstanding this, as part of good practice, the follow-up recommendations should be implemented as soon as practicable to maintain this low-risk rating.

The next odour audit is due in **February 2024**.

The Odour Unit Pty Ltd

Signed by:

Michael Assal MEngSc, B. Eng (Hon)/B.Sc, AMIChemE, MIEAust, CAQP
Operations Manager

Isaac Farrugia B. Eng (Chem.)
Consultant Engineer

Attachment:

- **Appendix A** – Odour Laboratory Results Reports: 4 July 2023

THE ODOUR UNIT

APPENDIX A -

ODOUR LABORATORY RESULTS REPORT: 4 JULY 2023

☒ **Sydney Laboratory**
The Odour Unit Pty Ltd
Level 3, 12/56 Church Avenue
MASCOT NSW 2020
P: +61 2 9209 4420
E: info@odourunit.com.au
ABN: 53 091 165 061

☐ **Brisbane Laboratory**
The Odour Unit (QLD) Pty Ltd
2/57 Neumann Road
CAPALABA QLD 4165
P: +61 7 3245 1700
E: qldinfo@odourunit.com.au
ABN: 87 102 255 765

Odour Concentration Measurement Report

Sampling and Laboratory Information

Organisation	Veolia Environmental Services	Telephone	+61 409 638 436
Contact	A. Ressos	Email	anae.ressos@veolia.com
Sampling Site	Banksmeadow, NSW	Sampling Personnel	TOU (JS)
Sampling Method	AS/NZS 4323.3	Laboratory Location	Mascot NSW

Order and Project Information

Order requested by	A. Ressos	Order accepted by	M. Assal
Date of order	Refer to correspondence	TOU Project #	N1906
Order number	Refer to correspondence	Project Manager	M. Assal
Signed by	A. Ressos	Panel Operator	A. Schulz

Investigated Item	Odour concentration in odour units 'ou', determined by sensory odour concentration measurements, of an odour sample supplied in a sampling bag.
Identification	The odour sample bags were labelled individually. Each label recorded the testing laboratory, sample number, sampling location (or Identification), sampling date and time, dilution ratio (if dilution was used) and whether further chemical analysis was required.
Method	The odour concentration measurements were performed using dynamic olfactometry according to the Australian/New Zealand Standard: Stationary source emissions – *Part 3*: '*Determination of odour concentration by dynamic olfactometry* (AS/NZS 4323.3). The odour perception characteristics of the panel within the presentation series for the samples were analogous to that for butanol calibration. Any deviation from the Australian standard is recorded in the 'Comments' section of this report.
Measuring Range	The measuring range of the olfactometer is $2^2 \leq \chi \leq 2^{18}$ ou. If the measuring range was insufficient the odour samples will have been pre-diluted. The machine is not calibrated beyond dilution setting 2^{17}. This is specifically mentioned with the results.
Environment	The measurements were performed in an air- and odour-conditioned room. The room temperature is maintained at 22 °C ±3 °C.
Measuring Dates	The date of each measurement is specified with the results.
Instrument Used	The olfactometer used during this testing session was: TOU-OLF-004
Laboratory Precision	The precision of this laboratory (expressed as repeatability) for sensory quality must be $r \leq 0.477$ in accordance with the AS/NZS 4323.3. $r = 0.461$ Compliance – Yes
Laboratory Accuracy	The accuracy of this laboratory for sensory quality must be $A \leq 0.217$ in accordance with the AS/NZS 4323.3. $A = 0.216$ Compliance – Yes
Lower Detection Limit (LDL)	The LDL for the olfactometer has been determined to be 16 ou, which is 4 times the lowest dilution setting.
Traceability	The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. The assessors are individually selected to comply with fixed criteria and are monitored in time to keep within the limits of the standard. The results from the assessors are traceable to primary standards of n-butanol in nitrogen. Note Disclaimers on last page of this document.

Accredited for compliance with ISO/IEC 17025 - Testing.
This report shall not be reproduced, except in full.

Date: Wednesday, 26 July 2023 Panel Roster Number: SYD20230704_048

A. Schulz
Authorised Signatory

THE ODOUR UNIT

Accreditation Number: 14974

Odour Sample Measurement Results
Panel Roster Number: SYD20230704_048

Sample ID / Location	Laboratory ID	Sampling Date & Time	Analysis Date & Time	Panel Size	Valid ITEs	Final Odour Concentration (ou)
1906-01-001 – Stack outlet (1 of 2)	SC23367	04.07.2023 0924-0927 hrs	04.07.2023 1429 hrs	5	10	52
1906-01-002 – Stack outlet (2 of 2)	SC23368	04.07.2023 0927-0930 hrs	04.07.2023 1502 hrs	5	10	64

Samples Received in Laboratory – From: TOU (I. Farrugia) Date: 04.07.2023 Time: 1030 hrs

Note: The following are not covered by the NATA Accreditation issued to The Odour Unit:

1. The collection of samples by a method that is not prescribed by AS/NZS 4323.3.
2. Final results that have been modified by the dilution factors where parties other than The Odour Unit have performed the dilution of samples.

THE ODOUR UNIT

Accreditation Number: 14974

Odour Panel Calibration Results

Reference Odorant	Reference Odorant Panel Roster Number	Concentration of Reference gas (ppb)	Panel Target Range for n-butanol (ppb)	Measured Concentration (ou)	Measured Panel Threshold (ppb)	Does this panel calibration measurement comply with AS/NZS 4323.3 (Yes / No)
n-butanol	SYD20230704_048	44,800	$20 \leq \chi \leq 80$	832	54	Yes

Comments: Odour characters (non-NATA accredited) as determined by odour laboratory panel:

Laboratory ID	Odour Character
SC23367	musty, bin juice, garbage
SC23368	musty, bin juice, garbage

Departures: Clause 9.5.3 (d) – Cross-sectional distribution of airflow and concentration from port-openings are not checked due to impracticality of the requirement .

Disclaimers:
1. Parties, other than The Odour Unit, responsible for collecting odour samples have advised that they have voluntarily furnished these odour samples, appropriately collected and labelled, to The Odour Unit for the purpose of odour testing.
2. The collection of odour samples by parties other than The Odour Unit relinquishes The Odour Unit from all responsibility for the sample collection and any effects or actions that the results from the test(s) may have.
3. Any comments included in, or attachments to, this Report are not covered by the NATA Accreditation issued to The Odour Unit.
4. This report shall not be reproduced, except in full, without written approval of The Odour Unit.

Report Status

Status	Version	Prepared by	Date	Checked by	Date	Change	Reason
Draft	0.1	I. Farrugia	26.07.2023	M. Assal	26.07.2023	--	--
Final	1.0	--	--	M. Assal	26.07.2023	--	--
Revised	1.1	--	--	--	--	--	--

END OF DOCUMENT