



# ELF Farm Supplies

## Annual Biofilter Testing

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SLR Project No.: 610.032929.00001

8 December 2025

Revision: R1.0



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## Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
R1.0	8 December 2025	Danny Echeverri	Graeme Starke	Danny Echeverri

## Basis of Report

This report has been prepared by SLR Consulting Australia (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Elf Farm Supplies Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid. Results relate to only to the items tested, calibrated, or sampled.

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## 1.0 Introduction

SLR Consulting Australia (SLR) was commissioned by Elf Farm Supplies (EFS) to conduct annual odour emission testing of the Biofilter Control System serving the EFS substrate facility located at 108 Mulgrave Road, Mulgrave NSW.

The purpose of the emission testing was to measure the odour concentration, emission rate and removal efficiency of the EFS biofilter and compare these against measurements taken in 2018 (as part of a site wide odour audit completed by SLR), which were subsequently adopted for the Odour Impact Assessment report prepared by The Odour Unit, dated 28 August 2015 (the OIA).

This report outlines the methodology and results of the biofilter odour monitoring. This report is limited to factual presentation of the monitoring data with minimal interpretation of results. This test report only includes the results from the locations nominated in **Section 1.1**.

### 1.1 Biofilter Testing Methodology

SLR conducted representative odour testing of the Biofilter in general accordance with:

- Australian Standards and New Zealand Standards (AS/NZS) 4323.4:2009 “*Stationary source emissions - Area source sampling - Flux chamber technique*”; and
- AS EN 13725:2025 – Stationary Source Emissions: Determination of Odour Concentration by Dynamic Olfactometry and Odour Emission Rate; and
- AS4321.1:2021 (and NSW EPA method TM-2 (USEPA method M2)) “*Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)*”.

#### 1.1.1 Biofilter Outlet Odour and Flow Testing

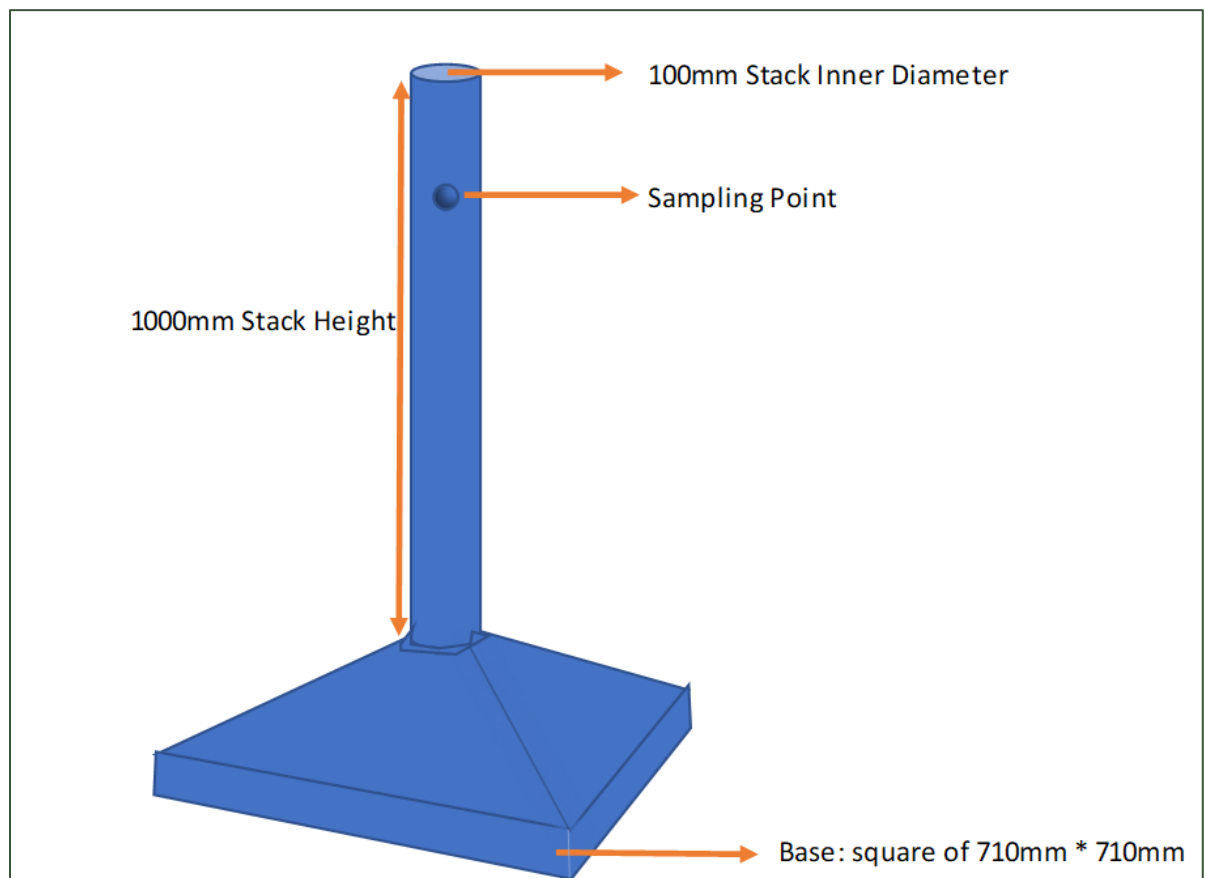
The AS/NZS 4323.4 flux chamber technique is typically used for non-aerated surfaces such as landfill sites, ponds etc. A flux chamber is placed on the surface and nitrogen supply sweep air is used to stimulate the odorous surface within the flux chamber from which an odour sample is collected. However, a biofilter system is aerated by a pressurised ventilation system. Therefore, SLR adopted the use of a Witches Hat hood (WHH) that do not require nitrogen sweep air to collect a representative odour sample. Refer to **Figure 1** for an illustration of the WHH being used on the EFS Biofilter bed. Refer to **Figure 2** for a schematic of the WHH used. Air flow measurements were undertaken using an anemometer to directly read average velocity from the outlet of the WHH from which the air flow rate from the WHH stack was calculated.



**Figure 1 Illustration of Witches Hat Hoods being used on EFS Biofilter Beds**



**Figure 2 Illustration of Witches Hat Hood Dimensions**



In order to account for the emission variability that is typically associated with biofilters, SLR divided the Biofilter outlet into two beds, identifying these as the eastern bed and the western bed. These two beds service the two biofilter inlets (refer **Section 1.1.2**). SLR then further divided these two beds into evenly distributed rows (length and width).

The eastern bed had a surface area of approximately 1,500 square meters (m<sup>2</sup>). SLR divided this bed into six equal rows along its length and three equal rows along its width (approximately 10 m by 9 m grid cells). This resulted in a grid of 18 sample areas evenly distributed across the eastern biofilter bed from the centre of which samples could be collected.

The western bed has a surface area of approximately 1,278 m<sup>2</sup>. SLR divided this bed into five equal rows along its length and three equal rows along its width (approximate 9 m by 9 m grid cells). This resulted in a total of 15 sample areas evenly distributed across the western biofilter bed from the centre of which samples could be collected.

EFS confirmed the total surface area of the Biofilter outlet bed is 2,778 m<sup>2</sup>.

The active area (at the moment of sampling) of the beds was measured as follows:

- eastern bed: approximately 21 m by 57 m (1,205 m<sup>2</sup>, approximately)
- western bed: approximately 24 m by 50 m (1,166 m<sup>2</sup>, approximately)

The number of sample points for each bed was kept consistent with sampling conducted as part of a site wide odour audit completed by SLR in 2018. The smaller active surface area resulted in a tighter grid (approximately 10 m by 7 for the eastern bed and 10 m by 8 for the Western bed).

Refer to **Figure 3** for an illustration of the Biofilter outlet beds (as sampled) distributed into their grids.



**Figure 3 Illustration of the Biofilter Outlet Distributed into 33 Grids**



Notes: The image above does not represent actual layout.  
 Odour samples were collected from cells highlighted green

The temperature and surface velocity were measured at the centre of each grid cell. The data was then assessed to determine if surface velocities measured for each north to south row were generally consistent with the average, or if there was evidence of breakthrough (high velocity) or blockage (low velocity). SLR considered surface velocities that differed by more than 20% from the average surface velocity measured to be *inconsistent*. Where a north to south row demonstrated an inconsistent result(s), SLR collected a single odour sample from that north to south row from the grid point with the highest surface velocity measured and a single odour sample from the grid point with the lowest surface velocity measured. For all north to south rows with consistent surface velocities, SLR collected single samples from the middle grids (Row B).

A total of 17 samples were collected from the Biofilter outlet. The sample locations are indicated in **Figure 3**. Sampling of the biofilter outlet beds was conducted on separate dates due to operational flow constraints that affected measurements on the western bed. Odour sampling and flow measurements for the eastern bed were completed on 23 July 2025, while the western bed was sampled on 20 November 2025.

The samples were analysed by The Odour Unit (TOU), NATA accreditation No.17069 within the 30 hour from sample collection criterion as specified in AS/NZS 4323.3.

### 1.1.2 Biofilter Inlet Odour Testing

A 'lung method' was used to collect samples from the Biofilter inlet. in accordance with AS EN 13725:2025 – “*Stationary Source Emissions: Determination of Odour Concentration by Dynamic Olfactometry and Odour Emission Rate*”. One sample was collected for the inlet of the eastern bed, and one sample was collected for the inlet of the western bed."

A sample access point compliant with the requirements of AS/NZS 4323.1:2021 “*Stationary source emissions - Method 1: Selection of sampling positions*” was available for the western biofilter (see **Figure 4**), but not the eastern biofilter due to the design of the eastern bed.



The western biofilter inlet air flow measurements were undertaken and reported in accordance with AS4321.1:2021 (and NSW EPA method TM-2 (USEPA method M2)) “*Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)*”. The velocity profile was obtained across the ventilation duct from the western inlet utilising an S-Type pitot tube. Wet bulb and dry bulb temperature measurements were collected and used to estimate the gas stream moisture content.

A sample point could not be installed on the eastern biofilter inlet, and several sample access points would need to be installed along the aluminium ducting to each section of the eastern bed to be able to sample the total flow. Therefore, the odour sample for the eastern biofilter inlet was collected from a sample point installed approximately midway down the biofilter (see **Figure 5**). SLR assumed that the total air flow at the eastern biofilter inlet was equal to the total air flow at the eastern biofilter.

SLR is NATA accredited for the measurement of flow in accordance with AS4323.1:2021 and NSW EPA TM-2.

**Figure 4 Illustration of Western Biofilter Inlet Sample Ports**



**Figure 5 Illustration of Eastern Biofilter Inlet Sample Port**



## 2.0 Measurement of Uncertainty

**Table 1** Provides the estimated measurement accuracy associated with the monitoring methods.

**Table 1 Estimated Measurement Uncertainty**

Parameter	Test Method	Uncertainty
Velocity	NSW EPA TM-2, AS 4323.1, USEPA Method 2	±5 %
	Anemometer measurements: AS/NZS 4323.4:2009 Stationary source emissions - Area source sampling - Flux chamber technique	±1.0% of reading ±4 ft/min (±0.02 m/s)
Temperature	NSW EPA TM-2, USEPA Method 2	±2°C
Moisture	Dry/wet bulb temperature	±25%
Odour	AS/NZS 4323.3:2001 Stationary source emissions – Determination of odour concentration by dynamic olfactometry	±50 - 124% (based upon a single determination)
	AS/NZS 4323.4:2009 Stationary source emissions - Area source sampling - Flux chamber technique	

## 3.0 Assessment Criteria

No assessment criteria were applicable to the measurements.



## 4.0 Deviations From the Method

There were no deviations to the specified test reference methodologies.

## 5.0 Reference Conditions

Volumetric flow rates are reported as actual and normalised (dry and referenced to 0°C and 101.3 kpa).

## 6.0 Sample Plane Requirements (West Biofilter Inlet)

**Ideal sampling positions:** In the absence of cyclonic flow activity ideal sampling plane conditions will be found at 7-8 diameters downstream of the exit and 2-3 diameters upstream from a flow disturbance. However, in most cases, a suitable sampling plane will be in a position fitting the minimum criteria specified in Table 1 of AS/NZS 4323.1.

**Non-Ideal sampling position:** If the measurement near a bend is unavoidable, the sampling position shall be greater than one duct diameter upstream of the bend or greater than two duct diameters downstream of the bend. When the criteria in Table 1 of AS/NZS 4323.1 cannot be met, a greater number of sampling points shall be used in order to retain as much accuracy as is practicable.

## 7.0 Operating Conditions

The EFS substrate facility was considered to be operating under normal conditions.

## 8.0 Biofilter Odour Results

### 8.1 Biofilter Outlet Results

The Biofilter outlet was tested under normal operating conditions on Wednesday 23 July 2025 and Thursday 20 November 2025. These days are considered to represent the worst-case scenario in terms of odours being generated from the composting activities occurring on site. All samples were collected using the Witches Hat Hood method.

Refer to **Table 2** and **Table 3** for a summary of sampling times, temperature and air velocities measured within the WWH.

Refer to **Table 4** to **Table 6** for results of the odour concentrations measured for the eastern and western biofilter beds. Certificates of Analysis are provided in **Appendix A**

In summary, the maximum odour concentration measured was 430 odour units (ou) and the average odour concentration measured was 141 ou.

**Table 7** provides detailed results of the mass odour emission rates (MOER) per biofilter grid cell measured. The total MOER for the entire biofilter was 2,515 ou.m<sup>3</sup>/s. It is noted that MOERs presented in **Table 7** for each grid point have been calculated based on an area of 67 m<sup>2</sup> for the eastern bed samples and 77.7 m<sup>2</sup> for the western bed samples rather than the actual areas. This was to allow for grids that were not sampled. As such, the sum of all MOERs is representative of the whole biofilter rather than just those grid cells sampled.



**Table 2 Summary of Biofilter Measured Results – Temperature and Air Velocities – 23 July 2025**

		North												
		Biofilter Western Bed					Biofilter Eastern Bed							
Grid Identification	West	Row A	11A	10A	9A	8A	7A	6A	5A	4A	3A	2A	1A	East
Time of Measurement			10:00	10:06	10:03	9:33	9:51	9:18	9:05	9:03	8:50	8:45	8:30	
Air Velocity (m/s)			0.83	0.91	0.77	0.88	0.92	0.63	0.40	0.38	0.31	0.35	0.28	
Temp in WHH (°C, dry)		30.00	33.30	31.60	31.30	29.90	24.00	22.00	19.50	16.00	18.10	13.5		
Grid Identification		Row B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	
Time of Measurement			10:14	10:09	10:00	9:55	9:48	9:17	9:06	8:59	8:52	8:48	8:33	
Air Velocity (m/s)			0.93	0.84	0.88	0.82	0.38	1.01	0.74	0.55	0.17	0.48	0.42	
Temp in WHH (°C, dry)		33.00	31.10	32.10	30.70	30.90	28.60	24.80	21.70	16.30	20.00	17.20		
Grid Identification		Row C	11C	10C	9C	8C	7C	6C	5C	4C	3C	2C	1C	
Time of Measurement	10:12		10:11	9:56	9:56	9:46	9:14	9:12	8:57	8:54	8:50	8:36		
Air Velocity (m/s)	0.87		0.89	0.85	0.91	0.61	1.07	0.63	0.72	0.88	0.61	0.63		
Temp in WHH (°C, dry)	33.3	34	32.5	33.5	24.6	28.7	24.2	25.7	27.9	24.3	22.8			
		South												
<b>Avg. Air Velocity (m/s)</b>		<b>0.9</b>	<b>0.9</b>	<b>0.8</b>	<b>0.9</b>	<b>0.6</b>	<b>0.9</b>	<b>0.6</b>	<b>0.6</b>	<b>0.5</b>	<b>0.5</b>	<b>0.4</b>		
<b>Avg. Air Velocity across Biofilter (m/s)</b>	<b>0.7</b>													



**Table 3 Summary of Biofilter Measured Results – Temperature and Air Velocities – 20 November 2025**

		North												
		Biofilter Western Bed					Biofilter Eastern Bed							
<b>Grid Identification</b>	West	Row A	<b>11A</b>	<b>10A</b>	<b>9A</b>	<b>8A</b>	<b>7A</b>	<b>6A</b>	<b>5A</b>	<b>4A</b>	<b>3A</b>	<b>2A</b>	<b>1A</b>	East
Time of Measurement			8:23	8:31	8:40	8:51	8:59	11:24	11:27	11:35	11:44	11:47	11:54	
Air Velocity (m/s)			0.24	0.28	0.31	0.31	0.29	0.43	0.58	0.62	0.60	0.69	0.55	
Temp in WHH (°C, dry)		28.00	29.80	30.20	29.60	29.30	36.30	36.00	36.50	43.10	42.90	37.80		
<b>Grid Identification</b>		Row B	<b>11B</b>	<b>10B</b>	<b>9B</b>	<b>8B</b>	<b>7B</b>	<b>6B</b>	<b>5B</b>	<b>4B</b>	<b>3B</b>	<b>2B</b>	<b>1B</b>	
Time of Measurement			8:25	8:34	8:44	8:54	9:03	11:28	11:32	11:37	11:43	11:48	11:52	
Air Velocity (m/s)			0.28	0.24	0.33	0.25	0.29	0.43	0.94	0.50	0.52	0.52	0.63	
Temp in WHH (°C, dry)		27.60	27.60	28.60	29.20	29.20	38.90	37.30	38.80	38.20	38.20	38.00		
<b>Grid Identification</b>		Row C	<b>11C</b>	<b>10C</b>	<b>9C</b>	<b>8C</b>	<b>7C</b>	<b>6C</b>	<b>5C</b>	<b>4C</b>	<b>3C</b>	<b>2C</b>	<b>1C</b>	
Time of Measurement	8:28		8:37	8:47	8:56	9:07	11:30	11:31	11:40	11:42	11:49	11:51		
Air Velocity (m/s)	0.32		0.27	0.30	0.28	0.30	0.51	0.64	0.75	0.66	0.64	0.46		
Temp in WHH (°C, dry)	28.6	28.6	30.5	29.7	29.4	37.3	37.9	38.2	39.3	37.2	40.6			
		South												
<b>Avg. Air Velocity (m/s)</b>		<b>0.3</b>	<b>0.3</b>	<b>0.3</b>	<b>0.3</b>	<b>0.3</b>	<b>0.5</b>	<b>0.7</b>	<b>0.6</b>	<b>0.6</b>	<b>0.6</b>	<b>0.6</b>	<b>0.5</b>	
<b>Avg. Air Velocity across Biofilter (m/s)</b>		<b>0.5</b>												



**Table 4 Summary of Biofilter Outlet Results – Eastern Bed – 23 July 2025**

Parameter	Sample 1A	Sample 1C	Sample 2A	Sample 2C	Sample 3B	Sample 3C
SLR Sample No.	16161	16162	16163	16164	16165	16166
Sample Start Time	23-07-2025 11:42	23-07-2025 11:41	23-07-2025 12:09	23-07-2025 12:08	23-07-2025 12:36	23-07-2025 12:36
Sample Finish Time:	23-07-2025 11:56	23-07-2025 11:56	23-07-2025 12:23	23-07-2025 12:23	23-07-2025 12:49	23-07-2025 12:49
NATA Laboratory I.D No.	SC25506	SC25507	SC25508	SC25509	SC25510	SC25512
Analysis Date & Time Completed	24-07-2025 9:42	24-07-2025 10:04	24-07-2025 10:33	24-07-2025 11:01	24-07-2025 11:33	24-07-2025 13:23
Sample Analysis Period in Compliance (≤30-hrs)	21.8	22.1	22.2	22.6	22.7	24.6
( $D_{s\ WHH}$ ) Sample Point WHH Stack Internal Diameter (mm)	100	100	100	100	100	100
( $A_{s\ WHH}$ ) Sample Plane Cross Sectional Area (m <sup>2</sup> )	0.0079	0.0079	0.0079	0.0079	0.0079	0.0079
( $T_{s\ WHH}$ ) Average Stack (Surface) Temperature (°C)	18.7	23.0	17.7	26.4	24.1	32.8
( $P_{s\ WHH}$ ) Average Stack / Surface Pressure (kPa)	101.3	101.3	101.3	101.3	101.3	101.3
( $v_{s\ (WHH)}$ ) Average Grid Stack Air Velocity (m/s)	0.28	0.63	0.35	0.61	0.17	0.88
( $Q_{a\ WHH}$ ) Actual Grid Flow Rate (m <sup>3</sup> /s)	0.0022	0.0049	0.0027	0.0048	0.0013	0.0069
( $D_B\ WHH$ ) WHH Base Internal Diameter (mm)	801	801	801	801	801	801
( $A_B\ WHH$ ) WHH Base Cross Sectional Area (m <sup>2</sup> )	0.504	0.504	0.504	0.504	0.504	0.504
( $Q_{flux}$ ) Actual Grid Surface Flux Velocity (m/s)	0.004	0.010	0.005	0.010	0.003	0.014
<b>Odour Concentration (wet) (ou)</b>	70	76	108	166	99	430
Odour Character	Sewage, sour	Grassy, celery	Chlorine	Dusty, municipal solid waste	Landfill, Grassy	Dusty, municipal solid waste



**Table 5 Summary of Biofilter Outlet Results – Eastern Bed – 23 July 2025 – Continued**

Parameter	Sample 3C	Sample 4A	Sample 4C	Sample 5A	Sample 5B	Sample 6A
SLR Sample No.	16166	16167	16168	16169	16170	16171
Sample Start Time	23-07-2025 12:36	23-07-2025 1:01	23-07-2025 13:01	23-07-2025 13:28	23-07-2025 13:28	23-07-2025 13:58
Sample Finish Time:	23-07-2025 12:49	23-07-2025 1:13	23-07-2025 13:13	23-07-2025 13:42	23-07-2025 13:42	23-07-2025 14:11
NATA Laboratory I.D No.	SC25512	SC25513	SC25514	SC25511	SC25515	SC25516
Analysis Date & Time Completed	24-07-2025 13:23	24-07-2025 1:57	24-07-2025 14:27	24-07-2025 12:15	24-07-2025 14:56	24-07-2025 15:30
Sample Analysis Period in Compliance (≤30-hrs)	24.6	24.7	25.2	22.5	25.2	25.3
( <b>D<sub>s WHH</sub></b> ) Sample Point WHH Stack Internal Diameter (mm)	100	100	100	100	100	100
( <b>A<sub>s WHH</sub></b> ) Sample Plane Cross Sectional Area (m <sup>2</sup> )	0.0079	0.0079	0.0079	0.0079	0.0079	0.0079
( <b>T<sub>s WHH</sub></b> ) Average Stack (Surface) Temperature (°C)	32.8	23.0	26.9	21.9	26.6	26.7
( <b>P<sub>s WHH</sub></b> ) Average Stack / Surface Pressure (kPa)	101.3	101.3	101.3	101.3	101.3	101.3
( <b>v<sub>s (WHH)</sub></b> ) Average Grid Stack Air Velocity (m/s)	0.88	0.38	0.72	0.40	0.74	0.63
( <b>Q<sub>a WHH</sub></b> ) Actual Grid Flow Rate (m <sup>3</sup> /s)	0.0069	0.0030	0.0057	0.0031	0.0058	0.0049
( <b>D<sub>B WHH</sub></b> ) WHH Base Internal Diameter (mm)	801	801	801	801	801	801
( <b>A<sub>B WHH</sub></b> ) WHH Base Cross Sectional Area (m <sup>2</sup> )	0.504	0.504	0.504	0.504	0.504	0.504
( <b>Q<sub>flux</sub></b> ) Actual Grid Surface Flux Velocity (m/s)	0.014	0.006	0.011	0.006	0.012	0.010
<b>Odour Concentration (wet) (ou)</b>	<b>28</b>	<b>59</b>	<b>128</b>	<b>152</b>	<b>64</b>	<b>215</b>
Odour Character	Dusty, municipal solid waste	Grassy, municipal solid waste	Landfill, bin juice	Greenwaste, herbaceous	Greenwaste, herbaceous	Greenwaste, herbaceous



**Table 6 Summary of Biofilter Outlet Results – Western Bed – 20 November 2025**

Parameter	Sample 7B	Sample 8B	Sample 9B	Sample 10B	Sample 11B
SLR Sample No.	16555	16554	16553	16552	16551
Sample Start Time	20-11-2025 10:59	20-11-2025 10:35	20-11-2025 10:35	20-11-2025 10:05	20-11-2025 10:05
Sample Finish Time:	20-11-2025 11:11	20-11-2025 10:47	20-11-2025 10:47	20-11-2025 10:17	20-11-2025 10:17
NATA Laboratory I.D No.	SC25815	SC25814	SC25813	SC25812	SC25811
Analysis Date & Time Completed	21-11-2025 12:46	21-11-2025 11:40	21-11-2025 11:08	21-11-2025 10:35	21-11-2025 9:58
Sample Analysis Period in Compliance (≤30-hrs)	25.6	24.9	24.3	24.3	23.7
<b>(D<sub>s WHH</sub>)</b> Sample Point WHH Stack Internal Diameter (mm)	100	100	100	100	100
<b>(A<sub>s WHH</sub>)</b> Sample Plane Cross Sectional Area (m <sup>2</sup> )	0.0079	0.0079	0.0079	0.0079	0.0079
<b>(T<sub>s WHH</sub>)</b> Average Stack (Surface) Temperature (°C)	36.6	35.8	36.6	32.3	31.6
<b>(P<sub>s WHH</sub>)</b> Average Stack / Surface Pressure (kPa)	100.9	100.9	100.9	100.9	100.9
<b>(v<sub>s (WHH)</sub>)</b> Average Grid Stack Air Velocity (m/s)	0.29	0.25	0.33	0.24	0.28
<b>(Q<sub>a WHH</sub>)</b> Actual Grid Flow Rate (m <sup>3</sup> /s)	0.0023	0.0020	0.0026	0.0019	0.0022
<b>(D<sub>B WHH</sub>)</b> WHH Base Internal Diameter (mm)	801	801	801	801	801
<b>(A<sub>B WHH</sub>)</b> WHH Base Cross Sectional Area (m <sup>2</sup> )	0.504	0.504	0.504	0.504	0.504
<b>(Q<sub>flux</sub>)</b> Actual Grid Surface Flux Velocity (m/s)	0.005	0.004	0.005	0.004	0.004
<b>Odour Concentration (wet) (ou)</b>	<b>91</b>	<b>181</b>	<b>166</b>	<b>128</b>	<b>235</b>
Odour Character	Dirt, Soil	Dirt, Soil	Dirt, Soil, Onion, Cabbage	Dirt, Soil, Fermented	Dirt, Soil



**Table 7 Summary of Biofilter Mass Odour Emission Rates – 23 July and 20 November 2025**

Location	(Q <sub>flux</sub> ) Actual Grid Surface Flux Velocity (m/s)	Odour Concentration (wet) (ou)	(SOER) Surface Odour Emission Rate (wet) (ou.m/s)	Biofilter Grid Cross Sectional Area (m <sup>2</sup> )	Flow through Biofilter during Sampling (m <sup>3</sup> /hr)	(MOER) Mass Odour Emission Rate per Section (wet) (ou.m <sup>3</sup> /s)	OIA <sup>1</sup> MOER Modelled Operations (ou.m <sup>3</sup> /s)
Sample 1A	0.004	70	0.3	67	1052	20	NA
Sample 1C	0.010	76	0.7	67	2367	50	NA
Sample 2A	0.005	108	0.6	67	1315	39	NA
Sample 2C	0.010	166	1.6	67	2292	106	NA
Sample 3B	0.003	99	0.3	67	639	18	NA
Sample 3C	0.014	430	5.9	67	3307	395	NA
Sample 4A	0.006	28	0.2	67	1428	11	NA
Sample 4C	0.011	59	0.7	67	2705	44	NA
Sample 5A	0.006	128	0.8	67	1503	53	NA
Sample 5B	0.012	152	1.8	67	2781	117.4	NA
Sample 6A	0.010	64	0.6	67	2367	42.1	NA
Sample 6C	0.017	215	3.6	67	4021	240.1	NA
Sample 7B	0.0045	91.0	0.4	77.7	1265	32.0	NA
Sample 8B	0.0039	181.0	0.7	77.7	1090	54.8	NA
Sample 9B	0.0051	166.0	0.9	77.7	1439	66.4	NA
Sample 10B	0.0037	128.0	0.5	77.7	1047	37.2	NA
Sample 11B	0.0044	235.0	1.0	77.7	1221	79.7	NA
<b>Total (scaled)</b>	--	--	--	<b>2,371</b>	<b>63,053</b> <sup>1</sup>	<b>2,353</b> <sup>2</sup>	NA

1 The total Scaled Flow through Biofilter during Sampling has been normalised by averaging the Qflux of each row and the averaging all the 11 rows of the biofilter.  
 2 (MOER) Mass Odour Emission Rate per Section (wet) has been normalised by averaging the MOER of each row and the averaging all the 11 rows of the biofilter.

<sup>1</sup> Odour Impact Assessment prepared by The Odour Unit dated 28 August 2015



## 8.2 Biofilter Inlet Results

The biofilter inlets were measured on Wednesday 23 July 2025 and Thursday 20 November 2025 in parallel with the biofilter outlet testing. Refer to **Table 8** for a detailed summary of the biofilter inlet measured results. The Certificates of Analysis is provided in **Appendix A**.

**Table 8 Summary of Biofilter Inlet Results – 23 July and 20 November 2025**

Parameter	East	West
SLR Sample No.	16173	16556
Sample Start Time	23-07-2025 14:20	20-11-2025 12:17
Sample Finish Time:	23-07-2025 14:32	20-11-2025 13:35
NATA Laboratory I.D No.	SC25518	SC25816
Analysis Date & Time Completed	24-07-2025 14:17	21-11-2025 13:19
Sample Analysis Period in Compliance (≤30-hrs)	23.7	23.7
<b>(A<sub>s</sub>)</b> Sample Plane Cross Sectional Area (m <sup>2</sup> )	--	--
<b>(T<sub>s</sub>)</b> Average Stack Temperature (°C)	27.6	34.9
<b>(P<sub>s</sub>)</b> Average Stack Pressure (kPa)	--	101.1
<b>(Q<sub>a</sub>)</b> Actual Flow Rate (m <sup>3</sup> /hr) Flow Rate through Biofilter Inlet during Sampling (m <sup>3</sup> /hr)	38,666 <sup>1</sup>	74,250
<b>Odour Concentration (wet) (ou)</b>	<b>5,790</b>	<b>131,000</b>
<b>Mass Odour Emission Rate (MOER) (ou.m<sup>3</sup>/s)</b>	<b>62,187</b>	<b>2,701,879</b>
Odour Character	Greenwaste, herbaceous	Green waste, garbage, sludge
1 denotes that SLR have assumed that Biofilter Inlet total air flow is equal to Biofilter Outlet due to no suitable access points being available to conduct air velocity measurements for the Eastern Biofilter Inlet.		

## 8.3 Biofilter Efficiency Results

The efficiency of the western biofilter (for which a suitable sampling port for the measurement of air velocity is available) was assessed through the comparison of inlet versus outlet MOERs as follows:

$$\frac{\text{Inlet MOER (2,701,879 ou.m}^3\text{/s)} - \text{Outlet MOER (12,895 ou.m}^3\text{/s)}}{\text{Inlet MOER (2,701,879 ou.m}^3\text{/s)}}$$

Result ≥ 95% efficiency

For the eastern biofilter, in the absence of a suitable sample point compliant with the requirements of AS 4323.1, efficiency calculations were assessed using the odour concentrations measured and assuming the flows through the biofilter inlet and outlet are similar.



The efficiency of the Eastern Biofilter has been calculated as follows:

$$\frac{\text{Inlet Conc.}(5,790 \text{ ou}) - \text{Average Outlet Conc.}(133 \text{ ou})}{\text{Inlet Conc.}(5,790 \text{ ou})}$$

Result  $\geq$  95% efficiency

Alternatively:

$$\frac{\text{Inlet MOER } (62,187 \text{ ou.m}^3/\text{s}) - \text{Outlet MOER } (1,705 \text{ ou.m}^3/\text{s})}{\text{Inlet MOER } (62,187 \text{ ou.m}^3/\text{s})}$$

Result  $\geq$  95% efficiency.

## 9.0 Summary and Comparison against OIA and Previous Measurements

**Table 9** presents a comparison of odour concentrations and emission rates collected as part of this study and compares these against those assumed by the OIA and collected annually since 2018. In summary:

- The measured biofilter outlet odour emission rates (based on measured concentrations and flow through the biofilter) are 95% lower than those assumed by the OIA.
- Peak biofilter outlet odour emissions rates are estimated to be 70% lower than those assumed by the OIA.
- The average biofilter outlet odour concentration measured is 141 ou which is 72% lower than the odour concentration assumed by the OIA.
- The average biofilter odour removal efficiency is greater than 95%.

Based on the above, the biofilter is considered to be performing satisfactory on the day of monitoring.

**Table 9 Summary of Biofilter results and Comparison against OIA and Previous Measurements**

Year	Average Flow through Biofilter during Sampling (m <sup>3</sup> /hr)	Average Odour Concentration (wet) (ou)	Total Biofilter MOER (wet) (ou.m <sup>3</sup> /s)	Average Biofilter Efficiency	Maximum Flow through Biofilter (m <sup>3</sup> /hr)	Maximum Estimated Biofilter MOER (wet) (ou.m <sup>3</sup> /s)	Change Compared to OIA (%)
OIA		500			390,000	54,168	
2018	204,610	165	9,482	> 95%	390,000	18,073	-67%
2020	189,717	150	8,767	> 95%	402,000	18,576	-66%
2021	193,070	82	4,578	> 95%	402,000	9,533	-82%
2022	233,506	183	11,752	> 95%	402,000	20,231	-63%
2023	122,178	171	7,360	> 95%	402,000	24,215	-55%
2024	166,971	350	18,067	> 95%	402,000	43,498	-20%
<b>2025</b>	<b>63,053</b>	<b>141</b>	<b>2,515</b>	<b>&gt; 95%</b>	<b>402,000</b>	<b>16,035</b>	<b>-70%</b>



## 10.0 Feedback

At SLR, we are committed to delivering professional quality service to our clients. We are constantly looking for ways to improve the quality of our deliverables and our service to our clients. Client feedback is a valuable tool in helping us prioritise services and resources according to our client needs.

To achieve this, your feedback on the team's performance, deliverables and service are valuable and SLR welcome all feedback via <https://www.slrconsulting.com/en/feedback>. We recognise the value of your time and we will make a \$10 donation to our 2023 Charity Partner - Lifeline, for every completed form.





# Appendix A Certificate of Analysis

**ELF Farm Supplies**

**Annual Biofilter Testing**

**Elf Farm Supplies Pty Ltd**

SLR Project No.: 610.032929.00001

8 December 2025



✓ **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](mailto: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](mailto:qldinfo@odourunit.com.au)  
 ABN: 87 102 255 765

## Odour Concentration Measurement Report

### Sampling and Laboratory Information

Organisation	SLR Consulting	Telephone	+61 2 9428 8124
Contact	A. Lawless	Email	<a href="mailto:alawless@slrconsulting.com">alawless@slrconsulting.com</a>
Sampling Site	Not disclosed	Sampling Personnel	SLR Consulting
Sampling Method	Not disclosed	Laboratory Location	Mascot, NSW

### Order and Project Information

Order requested by	A. Lawless	Order accepted by	A. Schulz
Date of order	02/07/2025	TOU Project #	N1869
Order number	PN 610.032929.00001	Project Manager	A. Schulz
Signed by	A. Lawless	Panel Operator	T. 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 $22^\circ\text{C} \pm 3^\circ\text{C}$ .
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. $r = 0.182$ 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. $A = 0.202$ 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: Tuesday, 29 July 2025

Panel Roster Number: SYD20250724\_064



Accreditation Number: 14974

**A. Schulz**  
 Authorised Signatory

**Odour Sample Measurement Results**  
**Panel Roster Number: SYD20250724\_064**

Sample ID / Location	Laboratory ID	Sampling Date & Time	Analysis Date & Time	Panel Size	Valid ITEs	Final Odour Concentration (ou)
1A - 16161	SC25506	23.07.2025 1142 - 1150 hrs	24.07.2025 0942 hrs	4	8	70
1C - 16162	SC25507	23.07.2025 1141 - 1156 hrs	24.07.2025 1004 hrs	4	8	76
2A - 16163	SC25508	23.07.2025 1209 - 1223 hrs	24.07.2025 1033 hrs	4	8	108
2C - 16164	SC25509	23.07.2025 1208 - 1223 hrs	24.07.2025 1101 hrs	4	8	166
3B - 16165	SC25510	23.07.2025 1236 - 1249 hrs	24.07.2025 1133 hrs	4	8	99
5A - 16169	SC25511	23.07.2025 1328 - 1342 hrs	24.07.2025 1215 hrs	4	8	128
3C - 16166	SC25512	23.07.2025 1236 - 1249 hrs	24.07.2025 1323 hrs	4	8	430
4A - 16167	SC25513	23.07.2025 1301 - 1313 hrs	24.07.2025 1357 hrs	4	8	58

**Samples Received in Laboratory** – From: SLR Consulting (A. Lawless)      Date: 23.07.2025      Time: 1640 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

## Odour Sample Measurement Results Panel Roster Number: SYD20250724\_064

Sample ID / Location	Laboratory ID	Sampling Date & Time	Analysis Date & Time	Panel Size	Valid ITEs	Final Odour Concentration (ou)
4C - 16168	SC25514	23.07.2025 1301 - 1313 hrs	24.07.2025 1427 hrs	4	8	59
5B - 16170	SC25515	23.07.2025 1328 - 1342 hrs	24.07.2025 1456 hrs	4	8	152
6A - 16171	SC25516	23.07.2025 1358 - 1411 hrs	24.07.2025 1530 hrs	4	8	64
6C - 16172	SC25517	23.07.2025 1358 - 1411 hrs	24.07.2025 1552 hrs	4	8	215
East Inlet	SC25518	23.07.2025 1420 - 1432 hrs	24.07.2025 1617 hrs	4	8	5,790

**Samples Received in Laboratory** – From: SLR Consulting (A. Lawless)

Date: 23.07.2025

Time: 1640 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.

## 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	SYD20250724_064	46,000	$20 \leq \chi \leq 80$	724	64	Yes

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

Laboratory ID	Odour Character	Laboratory ID	Odour Character
SC25506	sewage, sour	SC25513	municipal solid waste
SC25507	grassy, celery	SC25514	grassy, municipal solid waste
SC25508	chlorine	SC25515	greenwaste, herbaceous
SC25509	dusty, municipal solid waste	SC25516	greenwaste, herbaceous
SC25510	landfill, grassy	SC25517	greenwaste, herbaceous
SC25511	landfill, bin juice	SC25518	greenwaste, herbaceous
SC25512	municipal solid waste		

Disclaimers

- 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.
- 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.
- Any comments included in, or attachments to, this Report are not covered by the NATA Accreditation issued to The Odour Unit.
- 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	D. Brockel	29.07.2025	M. Assal	29/07/2025	--	--
Final	1.0	--	--	A. Schulz	29/07/2025	--	--
Revised	1.1	--	--	--	--	--	--

**END OF DOCUMENT**

## Odour Concentration Measurement Report

### Sampling and Laboratory Information

Organisation	SLR Consulting	Telephone	0439 416 814
Contact	A. Lawless	Email	<a href="mailto:alawless@slrconsulting.com">alawless@slrconsulting.com</a>
Sampling Site	Not disclosed	Sampling Personnel	SLR Consulting
Sampling Method	Not disclosed	Laboratory Location	Mascot NSW

### Order and Project Information

Order requested by	A. Lawless	Order accepted by	A. Schulz
Date of order	18/11/2025	TOU Project #	N1869
Order number	PO 37311	Project Manager	A. Schulz
Signed by	A. Lawless	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. Samples were analysed as received from the client and/or The Odour Unit. Results relate specifically to the samples as received.
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 <sup>17</sup> . 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. $r = 0.135$ 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. $A = 0.208$ 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 November  
2025

Panel Roster Number: SYD20251121\_104



Accreditation Number: 14974



**A. Schulz**  
Authorised Signatory

# THE ODOUR UNIT

## Odour Sample Measurement Results Panel Roster Number: SYD20251121\_104

Sample ID / Location	Laboratory ID	Sampling Date & Time	Analysis Date & Time	Panel Size	Valid ITEs	Final Odour Concentration (ou)
Sample 16551 – 11B	SC25811	20.11.2025 1005 – 1017 hrs	21.11.2025 0958 hrs	4	8	235
Sample 16552 – 10B	SC25812	20.11.2025 1005 – 1017 hrs	21.11.2025 1035 hrs	4	8	128
Sample 16553 – 9B	SC25813	20.11.2025 1035 – 1047 hrs	21.11.2025 1108 hrs	4	8	166
Sample 16554 – 8B	SC25814	20.11.2025 1035 – 1047 hrs	21.11.2025 1140 hrs	4	8	181
Sample 16555 – 7B	SC25815	20.11.2025 1059 – 1111 hrs	21.11.2025 1246 hrs	4	8	91
Sample 16556 – Inlet West	SC25816	20.11.2025 1323 – 1335 hrs	21.11.2025 1319 hrs	4	8	131,000

**Samples Received in Laboratory** – From: SLR Consulting (A. Lawless)

Date: 20.11.2025

Time: 1605

**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.

## 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	SYD20251121_104	46,000	$20 \leq \chi \leq 80$	1,024	45	Yes

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

Laboratory ID	Odour Character
SC25811	dirt, soil
SC25812	dirt, soil, fermented
SC25813	dirt, soil, onion, cabbage
SC25814	dirt, soil
SC25815	dirt, soil
SC25816	green waste, garbage, sludge

- Disclaimers
- 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.
  - 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.
  - Any comments included in, or attachments to, this Report are not covered by the NATA Accreditation issued to The Odour Unit.
  - 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	A. Schulz	21.11.2025	I. Farrugia	21.11.2025	--	--
Final	1.0	--	--	A. Schulz	21.11.2025	--	--
Revised	1.1	--	--	--	--	--	--

**END OF DOCUMENT**

# **Appendix B    Equipment and Calibration Details**

## **ELF Farm Supplies**

### **Annual Biofilter Testing**

**Elf Farm Supplies Pty Ltd**

SLR Project No.: 610.032929.00001

8 December 2025



Table B1 summarises the equipment details for the equipment need to complete the testing.

**Table B-1**

Equipment Type	SLR Asset Number	Manufacturer and Model	Calibration Due Date
Pitot Tube	5076	NA	03-04-2027
Anemometer	5000	TSI Velocicalc – Air Velocity Meter – Model 5725	14-07-2026
Manometer	2815	Dwyer series 475 Mark III digital manometer	22-07-2026
Thermocouple	5090	FLUKE thermocouple	03-02-2026
Thermocouple	5092	FLUKE thermocouple	03-02-2026
Timepiece - AQ	5089	Apple - iPhone	07-05-2026
Measuring Tape	1960	Craft Right	24-05-2028
Witches Hats	NA	Client owned	NA
Odour drum	5122	NA	Inspected
Odour drum	1623	NA	Inspected
Air pump	2773	SKC-Aircheck	03-03-2026
Air pump	2776	SKC-Aircheck	29-04-2026
Tetracal	2076	BGI	25-02-2026



# **Appendix C    Sampling Plane Records and Measurements**


**ELF Farm Supplies**


**Annual Biofilter Testing**

**Elf Farm Supplies Pty Ltd**

SLR Project No.: 610.032929.00001

8 December 2025

Description	Results	Measurement Point Pictures
<b>Location</b>	West Inlet	
<b>Date</b>	20-11-2025	
<b>Sampling time</b>	12:55-13:42	
Test method	NSW EPA TM-2, AS 4323.1	
<b>Duct diameter</b>	2.4 m	
<b>Upstream requirements</b>		
Type of disturbance	Bend	
Distance from disturbance	8 m	
Number of duct diameters	3.3D	
Ideal minimum distance criterion	2D	
Number of diameters less than ideal	1D	
Sampling Factor	1	
<b>Downstream requirements</b>		
Type of disturbance	Connection	
Distance from disturbance	12 m	
Number of duct diameters	5D	
Ideal minimum distance criterion	6D	
Number of diameters less than ideal	1D	
<b>AS 4323.1 compliance</b>	Compliant, Non-Ideal Sampling Plane	
Sampling Factor	1.05	
<b>Number of sampling points for manual isokinetic sampling</b>		
Minimum number of sampling traverse	2	
Minimum number of access holes	2	
Minimum number of sampling points	2	
Total number of sampling points	24	
<b>Measurements</b>		
Actual volumetric flow	20.63 m <sup>3</sup> /s	
Normal volumetric flow	17.44 m <sup>3</sup> /s	
Average velocity	4.56 m/s	

Description	Results	Measurement Point Pictures
Average Temperature	34.9 °C	
Dry temperature	34.9 °C	
Wet temperature	-	
Moisture content	4.5%	
Static pressure	0.53 kpa	
Total absolute stack pressure	101.21 kpa	
BOM ambient pressure	1011.5 hPa	
<b>Additional notes</b>	None	
<b>Testing officer</b>	Alexander Lawless	